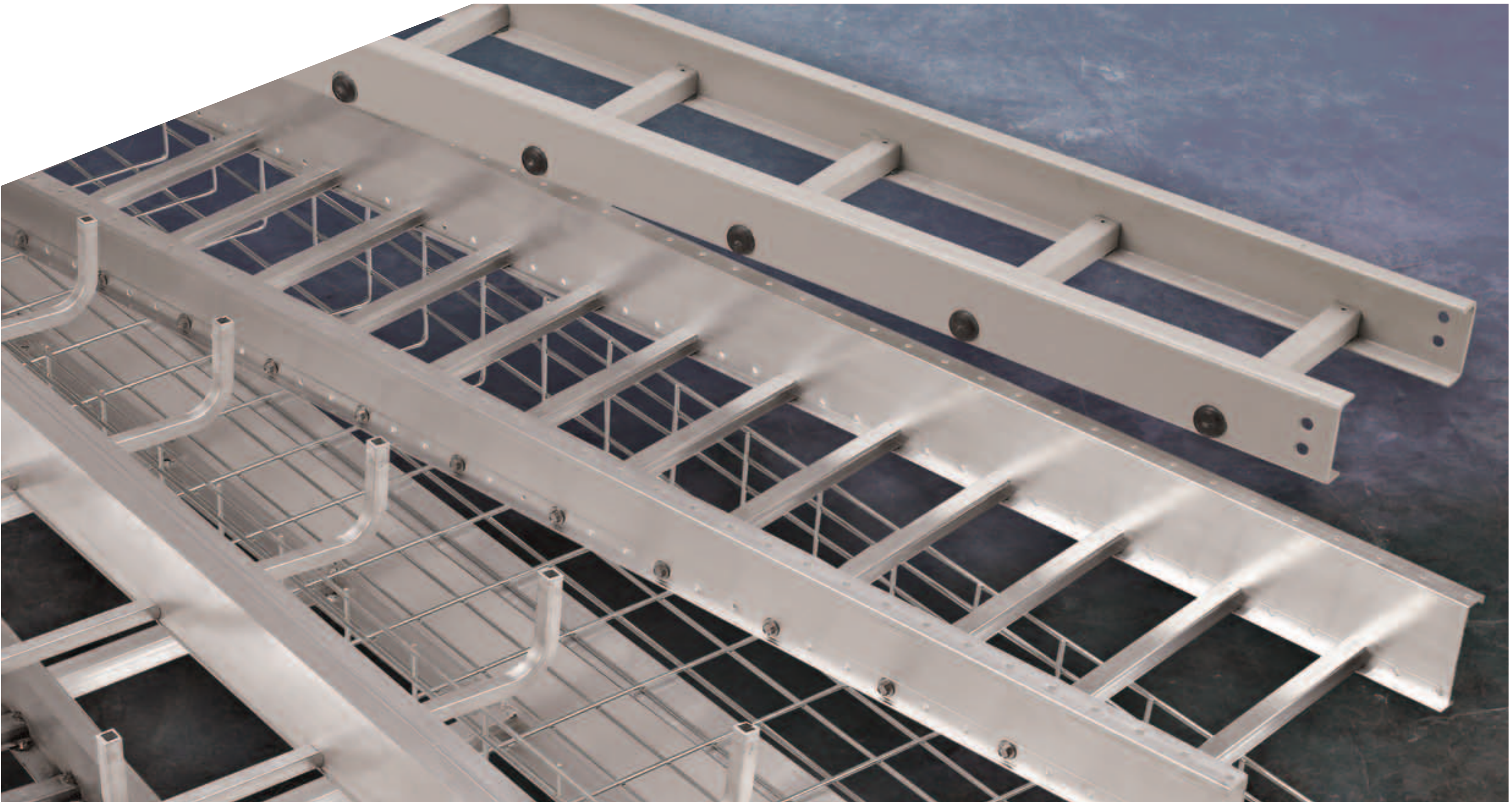
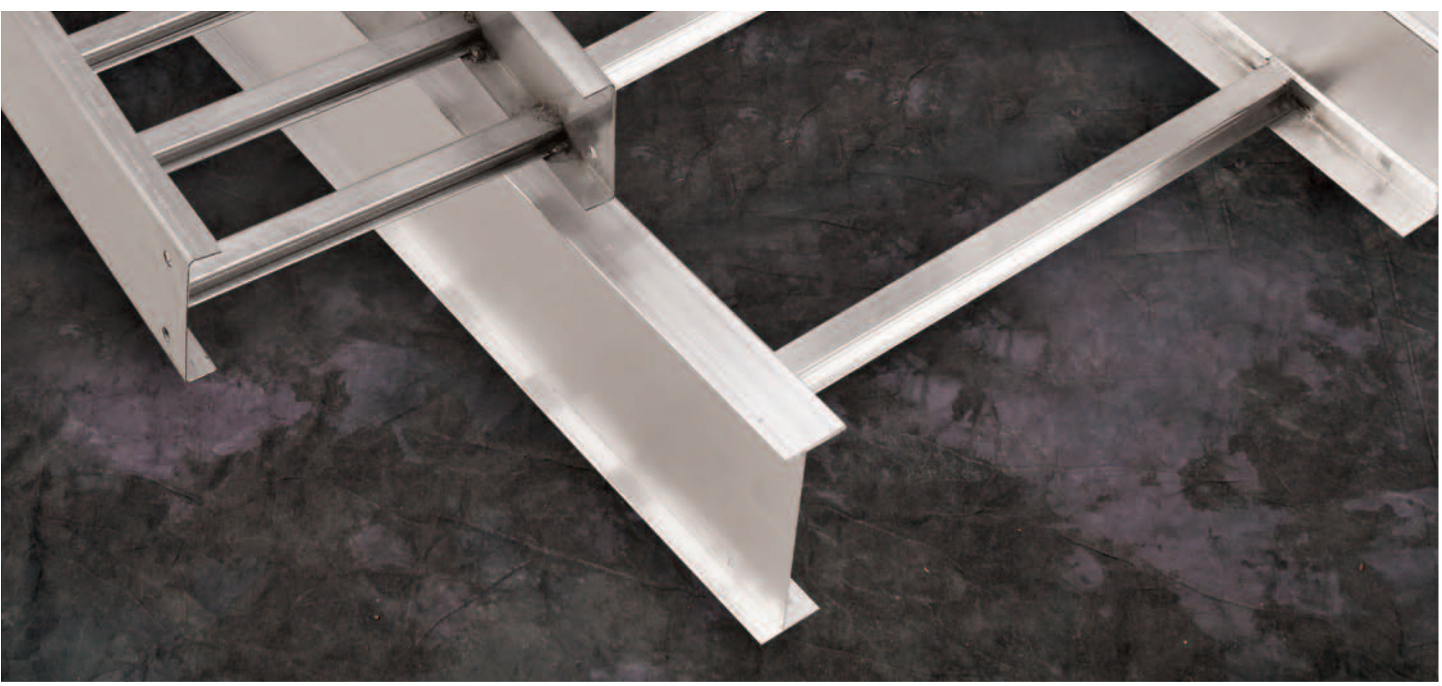


CT-07

Cable Tray Systems

Aluminum, Steel, Stainless Steel & Fiberglass Cable Tray Systems
Redi-Rail™ & Cent-R-Rail® Tray Systems
Cable Channel & Wire Basket Systems

COOPER B-Line



Introduction

B-Line Systems was formed in 1956 and has over 30 years experience manufacturing cable tray systems in which it has grown to become the industry leader. This growth was achieved by offering unmatched quality in both service and products.

Today Cooper B-Line stands alone in its customer service resources with cable tray fabrication location at four locations throughout the United States. Strategically located facilities alone do not generate unmatched service. The professional staff at Cooper B-Line is knowledgeable, energetic, and care about customer needs. The right attitude coupled with the facilities does generate unsurpassed customer service.

Cooper B-Line's product offerings also set new standards. Cooper B-Line manufactures cable support product lines that bridge both the electrical and telecom markets. Each of those product lines are engineered to provide top performance while offering unique installation savings. This catalog is dedicated to the metallic, two side rail, cable tray systems.

NEMA MEMBER

Cooper B-Line cable trays conform to the requirements of IEC Standard 61537, 2001 Ed.

Questions, Comments, Suggestions?
"B-VOCAL℠ with B-Line"
Voice Of the Customer...Actively Listening
bvocal@cooperbline.com
618-654-2184 ext. 456

Ask The Experts!

1-800-851-7415 ext. 366

Cooper B-Line

509 West Monroe Street	Phone: 800-851-7415
Highland, IL 62249	Fax: 618-654-1917

www.cooperbline.com

Table of Contents

(Pages: TOC-1 thru TOC-3)

continued on page TOC-2

Table of Contents

(Pages: TOC-1 thru TOC-3)

Series 2, 3, 4, & 5 Aluminum

Series 2, 3, 4, & 5 Steel

Series 2, 3, 4, & 5 Stainless Steel

Series 2, 3, 4, & 5 Fittings

Fiberglass Cable Tray

Cable Fixing

Appendix

Cable Tray Manual

continued on page TOC-3

Table of Contents

(Pages: TOC-1 thru TOC-3)

Part Number Index

Searching for Cooper B-Line Cable Tray Material?

Need a Cable Tray Materials Price Quote?

Get Fastray On-Line.

http://www.cooperbline.com/product/CableTray/SearchProducts

- Search for Product Info!
- Create Submittal Package! (see page TI-3)
- View Bill of Materials!
- Even Receive a Quote Request!

All This ON-LINE

Cooper B-Line Gives Just the Facts on:

Construction Specifications

All specs are arranged as to their recommended CSI MasterFormat™ Divisions.

All Construction Specification Documents

On-Line or Downloaded

in Mircosoft Word format

http://www.cooperbline.com/engineer/specs.asp

If you need more information about this or any other great B-Line product just...

By Just One Click of the Mouse Button add Cooper B-Line Cable Tray to your next set of Plans

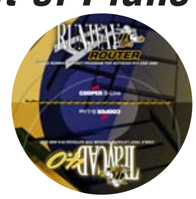
To Download or order a Free copy of TrayCAD®
Go to: www .cooperbline.com
and click on Software & Specifications

Directly: http://www.cooperbline.com/engineer/Software.asp#TrayCAD

Call: (800) 851-7415

TrayCAD® 4.0 is a cable tray layout design program that works with AutoCAD® R14 and 2000. TrayCAD® 4.0 is a Windows® based program and installs as an add-on to your AutoCAD® system. Use the TrayCAD® toolbar to add cable tray to your plans by drawing a single line as the center line of the tray run, then, with the click of a button, the program will build a 3-D wire-frame model of the cable tray and all of the appropriate fittings. The program will also create a Bill of Material and contains a library of details.

By Just One Click of the Mouse Button add Cooper B-Line Cable Runway, Cent-R-Rail® and Relay Racks to your next set of Plans



To Download or order a Free copy of Runway Router™
Go to: www .cooperbline.com
and click on Software & Specifications

Directly: http://www.cooperbline.com/engineer/Software.asp#TrayCAD

Call: (800) 851-7415

Runway Router™ is a cable runway (ladder rack) layout design program that works with AutoCAD® R14 and 2000. Runway Router™ is a Windows® based program that installs as an add-on to your AutoCAD® system. Use the commands from the Runway Router® toolbar to layout cable runway, Cent-R-Rail®, relay racks and electronic cabinets. Add cable runway or Cent-R-Rail® to your existing plans by drawing a single line as the centerline path of the run. Then, with the click of a button, the program will build a 3-D wire-frame model of the cable runway and all of the appropriate connectors and fittings. The program will also create a Bill Of Materials, and contains a library of details.

Cooper B-Line Cable Tray Systems

Cable tray is a mechanical support system that can support cables and raceways. Cable tray is not a raceway. Cable tray systems are required to be electrically continuous but not mechanically continuous.

Advantages of Cooper B-Line Cable Tray Systems

- **Safety**
- **Dependability**
- **Space Savings**
- **Cost Savings**
- **Design Cost Savings**
- **Material Savings**
- **Installation Cost & Time Savings**
- **Maintenance Savings**

For more information refer to Cooper B-Line's Cable Tray Manual (Pages M-1 thru M-51) or call Cooper B-Line engineering at 1-800-851-7415 extension 366

Quick List Selection Process

See pages CTS-20 & CTS-21 for expanded selection process.

1. Support Span Issues are: Strength and Length

- Very important to first consider the support span as it affects the strength of the system and the length of the straight sections required.
- Short Span, 6 to 8 foot support spacing - use 12 foot sections.
- Intermediate Span, 8 to 12 foot support spacing - use 12 foot sections.
- Long Span, 16 to 20 foot support spacing - use 20 foot sections.
- Extra Long Span, over 20 foot to 30 foot support spacing - use 24 or 30 foot sections.

2. Working Load Issues are: Size (Width, Loading Depth, and Strength)
Cable Load

- Types and numbers of cables to support - Total cable load in lbs. per linear foot (lbs/ft)
- Power - is single layer - issue width (refer to local electrical code)
- Low Voltage - is stacked - issue loading depth and width (refer to affecting code)
- See chart of listed cable load guidelines (refer to pages CTS-20 and CTS-21)

Additional Loads

200 lb. concentrated load - Industrial installations
Ice, Wind, Snow loads - Outdoor installations
Select a Cable Tray system that meets the working load for the support span required and a straight section length that fits the installation. NEMA VE 2 - Straight sections equal to or larger than span.
www.cabletrays.com/technica.htm

3. Installation Environment Issues are: Material and Finish

- Indoor Dry - Institutional, Office, Commercial, Light Industrial
  Aluminum, Pre-Galvanized Steel
- Indoor Industrial - Automotive, Pulp and Paper, Power Plants
  Aluminum, Pre-Galvanized Steel, Possibly Hot-Dipped Galvanized After Fabrication (HDGAF)
- Outdoor Industrial - Petrochemical, Automotive, Power Plants
  Aluminum, Hot-Dipped Galvanized After Fabrication (HDGAF)
- Outdoor Marine - Off Shore Platforms
  Aluminum, Stainless Steel, Fiberglass
- Special - Petrochemical, Pulp and Paper, Environmental Air
  Contact Cooper B-Line Engineering (1-800-851-7415 ext, 366)

Cooper B-Line Cable Tray Product Offering

- **Two Side Rail Systems**
  Aluminum, Pre-Galvanized Steel, Hot Dip Galvanized After Fabrication Steel, 304 and 316L Stainless Steel, Fiberglass in Polyester Resin, Vinyl Ester, Zero Halogen, and Dis-Stat
  Redi-Rail Systems loaded with special installation and cable friendly features.
  Systems tested to 173 lbs/ft on a 30 foot span
  Special bottom options and splices
  Highest quality fittings
  Unmatched accessories supplied with attachment hardware
- **Cable Channel (See CCT Section)**
  3, 4, and 6 inch widths in Aluminum, Pre-Galvanized Steel, Hot Dip Galvanized After Fabrication Steel and 304 or 316L Stainless Steel
  3, 4, 6, and 8 inch widths in Fiberglass in Polyester Resin, Vinyl Ester, Zero Halogen, and Dis-Stat
  Unmatched fitting and accessory offering
  Special bottom options and splices
  Highest quality fittings
  Unmatched accessories supplied with attachment hardware
- **Cent-R-Rail® Systems (See CRR Section)**
  Data Track®, Verti-Rack®, Half-Rack®, and Multi-Tier Half-Rack®
  Each system targeted to installation needs
  Each system is the fastest in the industry to install
  Pre-assembled, boxed connectors, splices
  Crated straight section shipments
- **Wire Basket Cable Tray (See WB Section)**
  Best finish in the industry, ASTM B633, SC2 (ZN)
  Strong straight top wire design maximizes strength and minimizes weight
  Unmatched accessory package

Advantage of Using Cooper B-Line Cable Tray?
Selection!

What kind of Cooper B-Line Cable Tray will work for your project?
First, answer three questions.

1. **Location:** Where will the project be located?
   A. Is the installation inside or outside?
   (decision dealing with thermal and weather conditions)
   B. Any contact of corrosive materials?
   (decision on cable tray material or finish)
   C. Is the location for the cable tray confined or open?
   (decision on the size and type of cable tray)
2. Span: What would be the longest and shortest spans between supporting locations for the installation of cables? (decision on type or combination of types of cable tray design needed to be the most efficient and economical)
3. Cables: How many and what type of cables are involved in the support installation?
   (decision on the strength of the cable tray)

All these variables are important to the cost savings and safety of your Cooper B-Line Cable Tray installation project.

It is your money, your decision.

Cable Tray Selection Charts

Short Span 6 - 8 Foot
(distance between the supports)

Recommended Short Span Cable Tray Selection
Use 10 ft or 12 ft Sections

	Catalog Number	Rail Height	Load Depth	Span Load lbs/ft 6'	8'	Available Widths	Material*	Straight Sections & Accessories Pages	Fittings Pages
Wire Basket	WB202	2.370"	2.000"	38	23	2"	S	WB-5 & WB-7 thru WB-27	--
	WB204	2.370"	2.000"	38	23	4"	S	WB-5 & WB-7 thru WB-27	--
	WB206	2.370"	2.000"	38	23	6"	S	WB-5 & WB-7 thru WB-27	--
	WB208	2.370"	2.000"	49	25	8"	S	WB-5 & WB-7 thru WB-27	--
	WB212	2.370"	2.000"	62	37	12"	S	WB-5 & WB-7 thru WB-27	--
	WB218	2.370"	2.000"	64	40	18"	S	WB-5 & WB-7 thru WB-27	--
	WB221	2.370"	2.000"	64	40	21"	S	WB-5 & WB-7 thru WB-27	--
	WB224	2.370"	2.000"	66	42	24"	S	WB-5 & WB-7 thru WB-27	--
	WB404	4.190"	4.000"	49	25	4"	S	WB-6 & WB-7 thru WB-27	--
	WB408	4.190"	4.000"	66	36	8"	S	WB-6 & WB-7 thru WB-27	--
	WB412	4.190"	4.000"	90	42	12"	S	WB-6 & WB-7 thru WB-27	--
	WB418	4.190"	4.000"	80	42	18"	S	WB-6 & WB-7 thru WB-27	--
	WB421	4.190"	4.000"	80	42	21"	S	WB-6 & WB-7 thru WB-27	--
	WB424	4.190"	4.000"	83	42	24"	S	WB-6 & WB-7 thru WB-27	--
	WB612	5.900"	6.000"	109	61	12"	S	WB-6 & WB-7 thru WB-27	--
	WB618	5.900"	6.000"	109	61	18"	S	WB-6 & WB-7 thru WB-27	--
	WB620	5.900"	6.000"	109	61	20"	S	WB-6 & WB-7 thru WB-27	--
	WB624	5.900"	6.000"	109	61	24"	S	WB-6 & WB-7 thru WB-27	--
Cable Channel	ACC-03	1.250"	1.250"	15	10	3"	A	CCT-3 & CCT-4 thru CCT-7	CCT-8 thru CCT-15
	ACC-04	1.750"	1.750"	33	20.5	4"	A	CCT-3 & CCT-4 thru CCT-7	CCT-8 thru CCT-15
	ACC-06	1.750"	1.750"	36	22.5	6"	A	CCT-3 & CCT-4 thru CCT-7	CCT-8 thru CCT-15
	†CC-03	1.250"	1.250"	17	11.5	3"	S, SS_	CCT-3 & CCT-4 thru CCT-7	CCT-8 thru CCT-15
	†CC-04	1.750"	1.750"	36	24.5	4"	S, SS_	CCT-3 & CCT-4 thru CCT-7	CCT-8 thru CCT-15
	†CC-06	1.750"	1.750"	41	28	6"	S, SS_	CCT-3 & CCT-4 thru CCT-7	CCT-8 thru CCT-15
	FCC-03	1.000"	1.000"	8	--	3"	F	FT-47 & FT-48	FT-48 thru FT-49
	FCC-04	1.125"	1.125"	12	--	4"	F	FT-47 & FT-48	FT-48 thru FT-49
	FCC-06	1.625"	1.625"	58	--	6"	F	FT-47 & FT-48	FT-48 thru FT-49
	FCC-08	2.188"	2.188"	87	--	8"	F	FT-47 & FT-48	FT-48 thru FT-49
Cent-R-Rail	C3ADB	3.700"	3.000"	100	100	6" - 24"	A	CRR-11 & CRR-19 thru CRR-43	--
	C4ADB	4.700"	4.000"	100	100	6" - 24"	A	CRR-11 & CRR-19 thru CRR-43	--
	C6ADB	6.700"	6.000"	100	100	6" - 24"	A	CRR-11 & CRR-19 thru CRR-43	--
	C3A1H	3.700"	3.000"	50	50	3" - 12"	A	CRR-15 & CRR-19 thru CRR-43	--
	C4A1H	4.700"	4.000"	50	50	3" - 12"	A	CRR-15 & CRR-19 thru CRR-43	--
	C6A1H	6.700"	6.000"	50	50	3" - 12"	A	CRR-15 & CRR-19 thru CRR-43	--
	C2A①V	All	2.000"	--	225	3" - 12"	A	CRR-13 & CRR-19 thru CRR-43	--
	C3A②M	All	3.000"	50	50	3" - 12"	A	CRR-17 & CRR-19 thru CRR-43	--
	C4A②M	All	4.000"	50	50	3" - 12"	A	CRR-17 & CRR-19 thru CRR-43	--
Redi-Rail	H14AR	3.840"	3.000"	224	194	6" - 36"	A	RR-3 & RR-6 thru RR-13	RR-5
	H15AR	4.840"	4.000"	224	224	6" - 36"	A	RR-3 & RR-6 thru RR-13	RR-5
	H16AR	5.840"	5.000"	224	224	6" - 36"	A	RR-4 & RR-6 thru RR-13	RR-5
	H17AR	6.840"	6.000"	224	224	6" - 36"	A	RR-4 & RR-6 thru RR-13	RR-5
Cable Tray Steel	148	3.625"	3.077"	204	115	6" - 36"	S	LST-3 & LST-7 thru LST-13	LST-15 thru LST-23
	156	4.188"	3.628"	304	171	6" - 36"	S	LST-4 & LST-7 thru LST-13	LST-15 thru LST-23
	166	5.188"	4.628"	308	173	6" - 36"	S	LST-5 & LST-7 thru LST-13	LST-15 thru LST-23
	176	6.188"	5.628"	-	194	6" - 36"	S	LST-6 & LST-7 thru LST-13	LST-15 thru LST-23
Cable Tray Fiber	13F	3.000"	2.000"	257	145	6" - 24"	F	FT-21 & FT-25 thru FT-42	FT-43 thru FT-46

*Material A = Aluminum • S = Steel • SS_ = Stainless Steel Type 304 or 316 • F = Fiberglass
† = G for HDGAF • P for Pre-Galvanized • SS4 for 304 or SS6 for 316 Stainless Steel
① Insert 2, 3, 4, 5 or 6 for number of tiers • ② Insert 2, 3 or 4 for number of tiers

Cooper B-Line cable trays conform to the requirements of IEC Standard 61537, 2001 Ed.

Intermediate Span 10 - 12 Foot

(distance between the supports)

Recommended Intermediate Span Cable Tray Selection

Use 12 ft Sections

	Catalog Number	Rail Height	Load Depth	Span Load lbs/ft 10'	Span Load lbs/ft 12'	Available Widths	Material*	Straight Sections & Accessories Pages	Fittings Pages
Cent-R-Rail	C3ADB	3.700"	3.000"	100	100	6" - 24"	A	CRR-11 & CRR-19 thru CRR-43	--
Cent-R-Rail	C4ADB	4.700"	4.000"	100	100	6" - 24"	A	CRR-11 & CRR-19 thru CRR-43	--
Cent-R-Rail	C6ADB	6.700"	6.000"	100	100	6" - 24"	A	CRR-11 & CRR-19 thru CRR-43	--
Cent-R-Rail	C3A1H	3.700"	3.000"	100	100	3" - 12"	A	CRR-15 & CRR-19 thru CRR-43	--
Cent-R-Rail	C4A1H	4.700"	4.000"	100	100	3" - 12"	A	CRR-15 & CRR-19 thru CRR-43	--
Cent-R-Rail	C6A1H	6.700"	6.000"	100	100	3" - 12"	A	CRR-15 & CRR-19 thru CRR-43	--
Redi-Rail	H14AR	3.840"	3.000"	124	86	6" - 36"	A	RR-3 & RR-6 thru RR-13	RR-5
Redi-Rail	H15AR	4.840"	4.000"	147	102	6" - 36"	A	RR-3 & RR-6 thru RR-13	RR-5
Redi-Rail	H16AR	5.840"	5.000"	164	114	6" - 36"	A	RR-4 & RR-6 thru RR-13	RR-5
Redi-Rail	H17AR	6.840"	6.000"	144	100	6" - 36"	A	RR-4 & RR-6 thru RR-13	RR-5
Cable Tray – Aluminum	24A	4.120"	3.050"	181	126	6" - 36"	A	AT-3 & AT-13 thru AT-23	TF-3 thru TF-17
Cable Tray – Aluminum	25A	5.000"	3.930"	200	139	6" - 36"	A	AT-5 & AT-13 thru AT-23	TF-3 thru TF-17
Cable Tray – Aluminum	26A	6.120"	5.040"	204	142	6" - 36"	A	AT-7 & AT-13 thru AT-23	TF-3 thru TF-17
Cable Tray – Aluminum	37A	7.140"	6.050"	--	222	6" - 36"	A	AT-9 & AT-13 thru AT-23	TF-3 thru TF-17
Cable Tray – Steel	148	3.625"	3.077"	73	51	6" - 36"	S	LST-3 & LST-7 thru LST-13	LST-15 thru LST-23
Cable Tray – Steel	156	4.188"	3.628"	109	76	6" - 36"	S	LST-4 & LST-7 thru LST-13	LST-15 thru LST-23
Cable Tray – Steel	166	5.188"	4.628"	111	77	6 "- 36"	S	LST-5 & LST-7 thru LST-13	LST-15 thru LST-23
Cable Tray – Steel	176	6.188"	5.628"	124	86	6" - 36"	S	LST-6 & LST-7 thru LST-13	LST-15 thru LST-23
Cable Tray – Steel	248	4.188"	3.140"	148	103	6" - 36"	S	ST-3 & ST-11 thru ST-21	TF-3 thru TF-17
Cable Tray – Steel	258	5.188"	4.140"	157	109	6" - 36"	S	ST-5 & ST-11 thru ST-21	TF-3 thru TF-17
Cable Tray – Steel	268	6.188"	5.140"	158	110	6" - 36"	S	ST-7 & ST-11 thru ST-21	TF-3 thru TF-17
Cable Tray – Steel	378	7.188"	6.140"	204	142	6" - 36"	S	ST-9 & ST-11 thru ST-21	TF-3 thru TF-17
Cable Tray – Stainless Steel	348	4.188"	3.130"	180	125	6" - 36"	SS_	SST-3 & SST-6 thru SST-13	TF-3 thru TF-17
Cable Tray – Stainless Steel	358	5.188"	4.130"	248	172	6" - 36"	SS_	SST-4 & SST-6 thru SST-13	TF-3 thru TF-17
Cable Tray – Stainless Steel	368	6.188"	5.130"	236	164	6" - 36"	SS_	SST-5 & SST-6 thru SST-13	TF-3 thru TF-17
Cable Tray – Fiberglass	13F	3.000"	2.000"	93	64	6" - 24"	F	FT-21 & FT-25 thru FT-42	FT-43 thru FT-46
Cable Tray – Fiberglass	24F	4.000"	3.000"	226	157	6" - 36"	F	FT-22 & FT-25 thru FT-42	FT-43 thru FT-46

*Material
A = Aluminum
S = Steel
SS_ = Stainless Steel
Type 304 or 316
F = Fiberglass

Cooper B-Line cable trays conform to the requirements of IEC Standard 61537, 2001 Ed.

Cable Tray Selection Charts

Long 16 - 20 Foot
(distance between the supports)

Recommended Intermediate Span Cable Tray Selection
Use 20 ft Sections

Cable Tray

	Catalog Number	Rail Height	Load Depth	Span Load lbs/ft			Available Widths	Material*	Straight Sections & Accessories Pages	Fittings Pages
				16'	18'	20'				
Aluminum	25A	5.000"	3.930"	78	62	50	6" - 36"	A	AT-5 & AT-13 thru AT-23	TF-3 thru TF-17
	34A	4.200"	3.080"	125	99	80	6" - 36"	A	AT-3 & AT-13 thru AT-23	TF-3 thru TF-17
	35A	5.060"	3.960"	121	96	77	6" - 36"	A	AT-5 & AT-13 thru AT-23	TF-3 thru TF-17
	26A	6.120"	5.040"	80	63	51	6" - 36"	A	AT-7 & AT-13 thru AT-23	TF-3 thru TF-17
	36A	6.170"	5.060"	131	104	84	6" - 36"	A	AT-7 & AT-13 thru AT-23	TF-3 thru TF-17
	37A	7.140"	6.050"	125	99	80	6" - 36"	A	AT-9 & AT-13 thru AT-23	TF-3 thru TF-17
	46A	6.190"	5.080"	161	127	103	6" - 36"	A	AT-7 & AT-13 thru AT-23	TF-3 thru TF-17
	47A	7.240"	6.130"	156	123	100	6" - 36"	A	AT-9 & AT-13 thru AT-23	TF-3 thru TF-17
	H46A	6.240"	5.090"	261	206	167	6" - 36"	A	AT-7 & AT-13 thru AT-23	TF-3 thru TF-17
	H47A	7.240"	6.090"	233	184	149	6" - 36"	A	AT-9 & AT-13 thru AT-23	TF-3 thru TF-17
Steel	346	4.188"	3.130"	98	78	63	6" - 36"	S	ST-3 & ST-11 thru ST-21	TF-3 thru TF-17
	356	5.188"	4.130"	108	85	69	6" - 36"	S	ST-5 & ST-11 thru ST-21	TF-3 thru TF-17
	366	6.188"	5.140"	117	93	75	6" - 36"	S	ST-7 & ST-11 thru ST-21	TF-3 thru TF-17
	378	7.188"	6.140"	80	63	51	6" - 36"	S	ST-9 & ST-11 thru ST-21	TF-3 thru TF-17
	444	4.188"	3.110"	142	112	91	6" - 36"	S	ST-3 & ST-11 thru ST-21	TF-3 thru TF-17
	454	5.188"	4.110"	166	131	106	6" - 36"	S	ST-5 & ST-11 thru ST-21	TF-3 thru TF-17
	464	6.188"	5.110"	192	152	51	6" - 36"	S	ST-7 & ST-11 thru ST-21	TF-3 thru TF-17
	476	7.188"	6.130"	120	95	77	6" - 36"	S	ST-9 & ST-11 thru ST-21	TF-3 thru TF-17
	574	7.188"	6.110"	203	160	130	6" - 36"	S	ST-9 & ST-11 thru ST-21	TF-3 thru TF-17
Stainless Steel	348	4.188"	3.130"	70	56	45	6" - 36"	SS_	SST-3 & SST-6 thru SST-13	TF-3 thru TF-17
	358	5.188"	4.130"	97	77	62	6" - 36"	SS_	SST-4 & SST-6 thru SST-13	TF-3 thru TF-17
	368	6.188"	5.140"	92	73	59	6" - 36"	SS_	SST-5 & SST-6 thru SST-13	TF-3 thru TF-17
	464	6.188"	5.110"	192	152	123	6" - 36"	SS_	SST-5 & SST-6 thru SST-13	TF-3 thru TF-17
Fiberglass	36F	6.000"	5.000"	139	109	89	6" - 36"	F	FT-23 & FT-25 thru FT-42	FT-43 thru FT-46
	46F	6.000"	5.000"	221	174	141	6" - 36"	F	FT-23 & FT-25 thru FT-42	FT-43 thru FT-46
	H46F	6.000"	5.000"	239	188	153	6" - 36"	F	FT-23 & FT-25 thru FT-42	FT-43 thru FT-46

IEC

Cooper B-Line cable trays conform to the requirements of IEC Standard 61537, 2001 Ed.

*Material
A = Aluminum
S = Steel
SS_ = Stainless Steel Type 30<u>4</u> or 31<u>6</u>
F = Fiberglass

Extra Long Span 24 - 30 Foot
(distance between the supports)

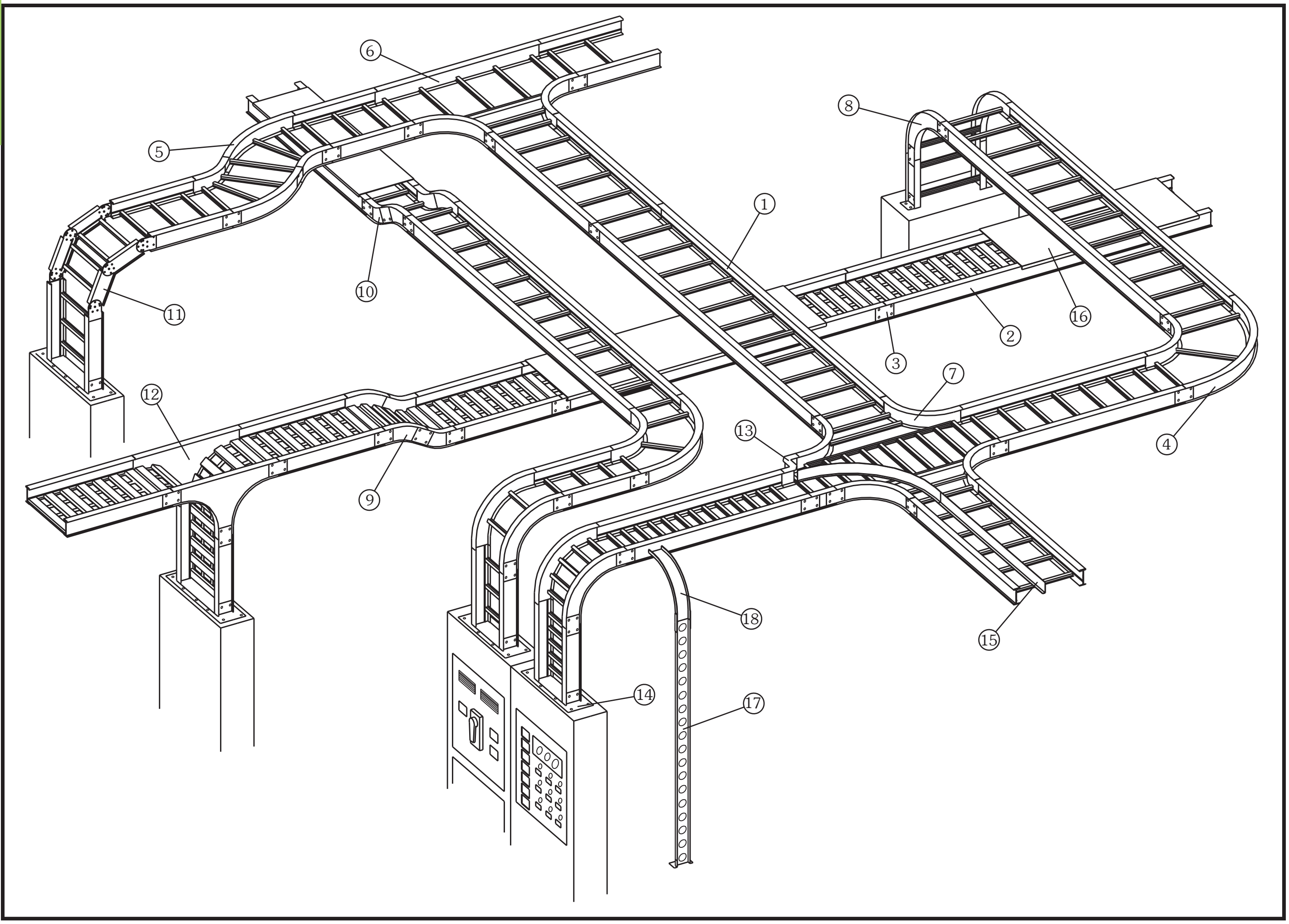
Recommended Extra Long Span Cable Tray Selection
Use 24 ft or 30 ft Sections

Cable Tray	Catalog Number	Rail Height	Load Depth	Span Load lbs/ft 24'	Span Load lbs/ft 30'	Available Widths	Material*	Straight Sections & Accessories Pages	Fittings Pages
Aluminum	46A	6.190"	5.080"	72	-	6" - 36"	A	AT-7 & AT-13 thru AT-23	TF-3 thru TF-17
Aluminum	47A	7.240"	6.130"	69	-	6" - 36"	A	AT-9 & AT-13 thru AT-23	TF-3 thru TF-17
Aluminum	57A	7.400"	6.230"	161	75	12" - 36"	A	AT-10 & AT-13 thru AT-23	TF-3 thru TF-17
Aluminum	H46A	6.240"	5.090"	116	-	6" - 36"	A	AT-7 & AT-13 thru AT-23	TF-3 thru TF-17
Aluminum	H47A	7.240"	6.090"	103	-	6" - 36"	A	AT-9 & AT-13 thru AT-23	TF-3 thru TF-17
Aluminum	S8A	8.000"	6.200"	252	161	12" - 36"	A	AT-11 & AT-12	AT-12
Steel	444	4.188"	2.110"	63	-	6" - 36"	S	ST-3 & ST-11 thru ST-21	TF-3 thru TF-17
Steel	454	5.188"	4.110"	74	-	6" - 36"	S	ST-5 & ST-11 thru ST-21	TF-3 thru TF-17
Steel	464	6.188"	5.110"	85	-	6" - 36"	S	ST-7 & ST-11 thru ST-21	TF-3 thru TF-17
Steel	476	7.188"	6.130"	53	-	6" - 36"	S	ST-9 & ST-11 thru ST-21	TF-3 thru TF-17
Steel	574	7.188"	6.110"	90	-	6" - 36"	S	ST-9 & ST-11 thru ST-21	TF-3 thru TF-17
SS	464	6.188"	5.110"	85	-	6" - 36"	SS_	SST-5 & SST-6 thru SST-13	TF-3 thru TF-17

*Material A = Aluminum
S = Steel
SS_ = Stainless Steel
Type 304 or 316

Cooper B-Line cable trays conform to the requirements of IEC Standard 61537, 2001 Ed.

B-Line Cable Trays - Designed for Your Cable Support Requirements



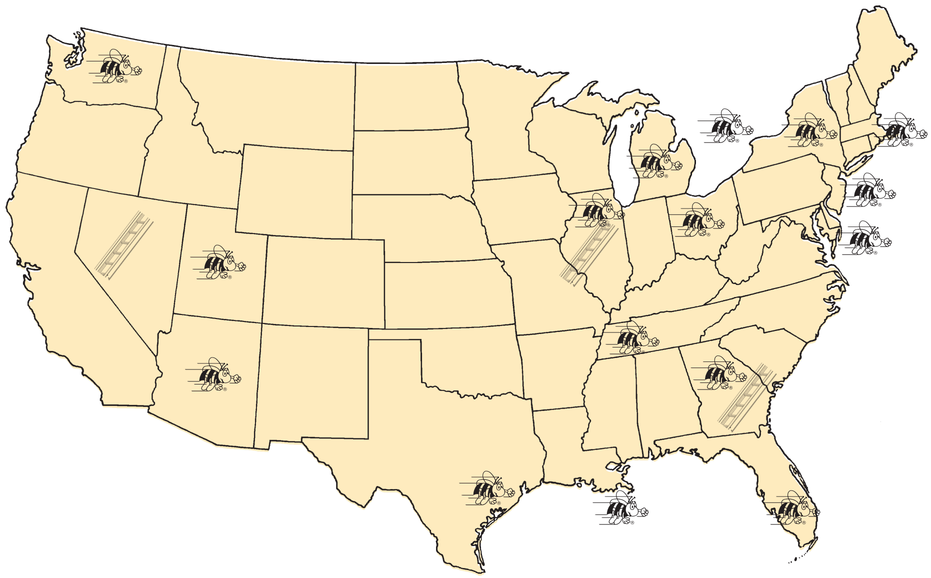
Nomenclature

1. Ladder Type Cable Tray
2. Ventilated Trough Type Cable Tray
3. Straight Splice Plate
4. 90° Horizontal Bend, Ladder Type Cable Tray
5. 45° Horizontal Bend, Ladder Type Cable Tray
6. Horizontal Tee, Ladder Type Cable Tray
7. Horizontal Cross, Ladder Type Cable Tray
8. 90° Vertical Outside Bend, Ladder Type Cable Tray
9. 45° Vertical Outside Bend, Ventilated Type Cable Tray
10. 30° Vertical Inside Bend, Ladder Type Cable Tray
11. Vertical Bend Segment (VBS)
12. Vertical Tee Down, Ventilated Trough Type Cable Tray
13. Left Hand Reducer, Ladder Type Cable Tray
14. Frame Type Box Connector
15. Barrier Strip Straight Section
16. Solid Flanged Tray Cover
17. Ventilated Channel Straight Section
18. Channel Cable Tray, 90° Vertical Outside Bend

The B-Line Advantage - The Company

COOPER B-Line -- is Committed to the Success of its Customers through Manufacturing, Engineering and Service.

COOPER B-Line -- is Positioned to Serve.



Four United States cable tray fabrication sites:

Troy, IL	Ellaville, GA
Alum Bank, PA	Reno, NV

Sixteen factory inventories

COOPER B-Line -- a Proven Industry Leader.

Over thirty years experience

COOPER B-Line -- offers Industry Involvement.

NEMA - 5VE Member -- Metallic Cable Tray Section
NEMA - 5FG Member -- Nonmetallic Cable Tray Section
Cable Tray Institute (CTI) -- A Founding Member
Cooper B-Line cable trays conform to the requirements of IEC Standard 61537, 2001 Ed.

COOPER B-Line -- unmatched Cable Support Systems.

Cable Tray -- Two Side Rail (Metallic)
Cable Tray -- Two Side Rail (Metallic) Redi-Rail™ Design
Cable Tray -- Two Side Rail (Nonmetallic)
Cable Tray -- CENT-R-RAIL; DATA-TRACK, VERTI-RACK, HALF-RACK, and MULTI-TIER HALF-RACK.
Cable Tray -- Wire Basket Cable Support Systems
Cable Runways -- B-Line Telecom
NEMA Wireways -- Circle AW Products Co., a B-Line Company

B-Line Advantage

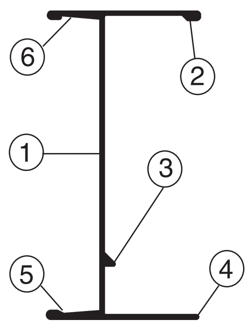
The B-Line Advantage - The Product

Aluminum Cable Tray, Series 2, 3 & 4

COOPER B-Line -- the Side Rails

Our I-Beam -- the most efficient structural shape

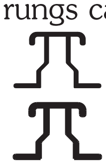
Using "Copper-free" 6063-T6 Aluminum Alloy



1. **I-beam side rail design**
   - maximize strength-to-weight ratio
2. **Added material to top flange to increase cable tray stiffness**
3. **Welding bead**
   - positive rung lock
   - added material disperses heat
4. **Bottom flange inside**
   - positive rung support
5. **Bottom flange outside**
   - strong lower flange for hold down clamps and expansion guides
6. **Top flange outside**
   - strong upper flange for securing the tray cover or the conduit-to-tray adapter

COOPER B-Line -- the Rungs -- provide system integrity

The rungs can represent 40% of your cable tray system.

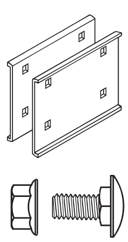


Rung A Standard for widths through 24"
The 24" width supports 589 lbs. with safety factor 1.5

Rung B Standard for widths greater than 24"
The 36" width supports 487 lbs. with safety factor 1.5

- For industrial applications -- 200 lb. concentrated loads
- New P-Rung design allows P-Clamp cable fastening at any location.

COOPER B-Line -- the Splices -- provide system integrity



With the unique Wedge Lock splice system:
- Channel-shaped for extra strength
- Snaps into the side rail
- Positions and holds for bolting, a labor-saving feature
- Four bolt patterns, a labor-saving feature
- 316 Stainless Steel hardware is available as an option

COOPER B-Line -- the Fittings -- provide system integrity

Surpasses NEMA VE 1 requirements
3" straight tangents for splice integrity

COOPER B-Line -- with a 200 lb. Concentrated Load -- providing system integrity

Side rails engineered to support a 200 lb. concentrated load + cable load
Rungs engineered to support a 200 lb. concentrated load + cable load

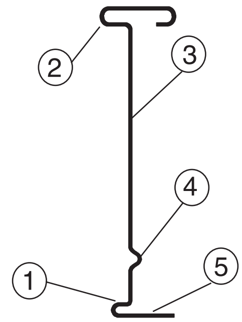
COOPER B-Line -- our reliable time-tested products. A system that works.

The B-Line Advantage - The Product

Steel Cable Tray, Series 2, 3, 4 & 5

COOPER B-Line -- the Side Rails

Our I-Beam -- the most efficient structural shape



1. **Roll formed for extra strength**
2. **Enlarged top flange for stiffness**
3. **Structural grade traceable steel**
4. **Rung top lock**
5. **Rung bottom rest**

Side rails and rungs are stamped every 18" with:

- **Company Name**
- **Part Number**
- **Material**
- **Heat Trace Number**

COOPER B-Line -- the Rungs -- provide system integrity

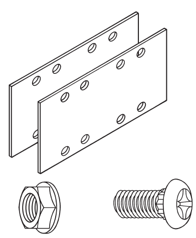
The rungs can represent 40% of your cable tray system.


Rung A — Standard for widths through 24"
The 24" width supports 581 lbs. with safety factor 1.5


Rung B — Standard for widths greater than 24"
The 36" width supports 485 lbs. with safety factor 1.5

For industrial applications -- 200 lb. concentrated loads.
Both Rung A and Rung B are roll formed from traceable structural grade steel

COOPER B-Line -- the Splices -- provide system integrity



The Splices -- the engineered connection:
- Special high strength eleven gauge steel
- Eight bolt connection for required strength
- Finish and hardware options

COOPER B-Line -- Hot Dip Galvanized After Fabrication (HDGAF) -- providing system integrity

- ASTM A123/CSA Type I
- In plant post-dip inspection and deburr
- ASTM F-1136-88 Grade 3 Splice hardware exceeds NEMA requirements.
- ASTM A123 Covers available - system compatibility

COOPER B-Line -- Pre-Galvanized- Hot Dip Mill Galvanized -- providing system integrity

- ASTM A653SS Gr.33 G90/ CSA Type II
- Anti-corrosive silicon bronze welds eliminate cosmetic painting

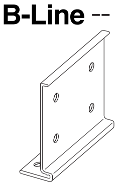
COOPER B-Line -- our reliable time-tested products. A system that works.
- 200 lb. Concentrated Load- side rail and rungs
- Splice integrity - 3" fitting tangents

The B-Line Advantage - The Extras

COOPER B-Line -- Special Packaging

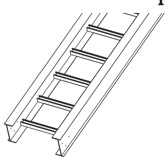
- For less than truckload (LTL) shipments
- Reduced freight claims over 50%
- A positive package for all

COOPER B-Line -- New Mid Span Aluminum Splice



- The standard splice for H46A, H47A and 57A systems
- Optional availability for other systems
- See appendix page AP-2 for details

COOPER B-Line -- Special Aluminum Long Span Systems

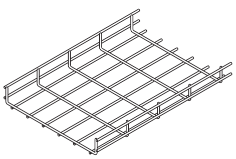


- 57A12-36-360 Tested to 102 lbs./ft. on 30' span - safety factor 1.5
  (Page AT-9 & AT-10)
- S8A12-36-360 Tested to 161 lbs./ft. on 30' span - safety factor 1.5
  (Page AT-11 & AT-12)

COOPER B-Line -- Redi-Rail Aluminum Cable Tray Systems (See RR Section)

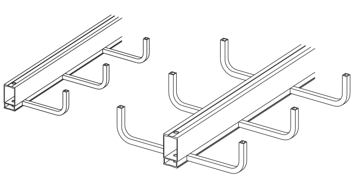
- 2, 3, 4, 5 and 6 inch cable fill depths
- NEMA classes to 12C
- Unique fabrication method provides unmatched installation options
- Industry leading accessory package

COOPER B-Line -- Wire Basket Cable Support Systems (See WB Section)

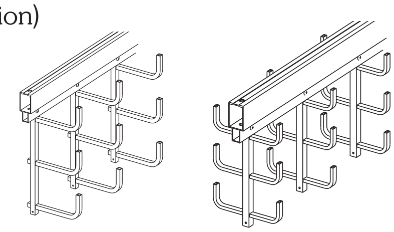


- Field adaptable - no fittings to order
- Low profile in 2", 4” and 6" loading depths
- Rugged welded steel, wire mesh construction

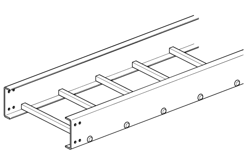
COOPER B-Line -- Cent-R-Rail Cable Tray System (See CRR Section)



- Four unique product offerings
- Perfect for today’s high technology
- Fast to install in congested areas
- Request latest catalog



COOPER B-Line -- Non-Metallic Cable Tray (See FT Section)



- For corrosive environments
- For voltage isolation
- A complete line offering
- Request latest catalog

NEMA MEMBER®

Cooper B-Line cable trays conform to the requirements of IEC Standard 61537, 2001 Ed.

Cable Tray Selection - Selection Process

The following factors should be considered when determining the appropriate cable tray system.

Cable Tray Selection - Material & Finish

Standards Available

MATERIAL	MATERIAL SPECIFICATION	ADVANTAGES
Aluminum	**6063-T6** (Side rails, Rungs and Splice Plates) **5052-H32** (Trough Bottoms, Covers and Accessories)	• Corrosion Resistance • Easy Field Fabrication & Installation • Excellent Strength to Weight Ratio • Excellent Grounding Conductor
Steel	**ASTM A1011 SS Gr. 33** (14 Gauge Plain Steel) **ASTM A1008 Gr. 33 Type 2** (16 & 18 Gauge Plain **ASTM A653SS Gr. 33 G90 (Pre-Galvanized)**	• Electric Shielding • Finish Options • Low Thermal Expansion • Limited Deflection
Stainless Steel	**AISI Type 304 or AISI Type 316** **ASTM A240**	• Superior Corrosion Resistance • Withstands High Temperatures

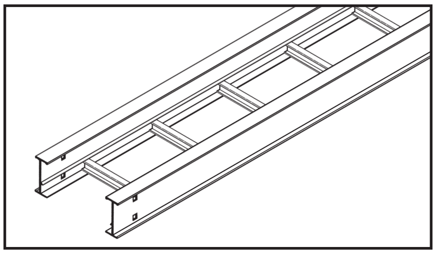
Note: Fiberglass available - see page FT-5

Aluminum

Aluminum cable trays are fabricated from structural grade “copper free” (marine grade) aluminum extrusions. Aluminum’s excellent corrosion resistance is due to its ability to form an aluminum oxide film that when scratched or cut reforms the original protective film. Aluminum has excellent resistance to "weathering” in most outdoor applications. Aluminum cable tray has excellent corrosion resistance in many chemical environments and has been used for over thirty years in petro-chemical plants and paper mills along the gulf coast from Texas to Florida. Typically, aluminum cable trays can perform indefinitely, with little or no degradation over time, making it ideal for many chemical and marine environments. The resistance to chemicals, indoor and outdoor, can best be determined by tests conducted by the user with exposure to the specific conditions for which it is intended. For further information, contact Cooper B-Line or the Aluminum Association.

Some common chemicals which aluminum resists are shown on pages CTS-6 & CTS-7.

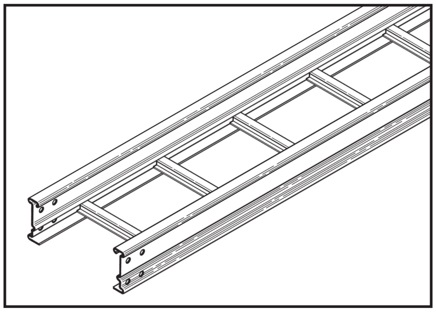
Aluminum Cable Tray



Steel

Steel cable trays are fabricated from continuous roll-formed structural quality steel. By roll-forming steel, the mechanical properties are increased allowing the use of a lighter gauge steel to carry the required load. This reduces the dead weight that must be carried by the supports and the installers. Using structural quality steel, Cooper B-Line assures that the material will meet the minimum yield and tensile strengths of applicable ASTM standards. All cable tray side rails, rungs and splice plates are numbered for material traceability. The corrosion resistance of steel varies widely with coating and alloy.

Steel and Stainless Steel Cable Tray



Note:

For help choosing proper cable tray material, see Cooper B-Line Technical Paper Series.
(bline.com/engineer/Technical.asp)

Stainless Steel

Stainless Steel cable trays are fabricated from continuous roll-formed AISI Type 304 or AISI Type 316/316L stainless steel. Both are non-magnetic and belong to the group called austenitic stainless steels. Like carbon steel, they exhibit increased strength when cold worked by roll-forming or bending.

Several important conditions could make the use of stainless steel imperative. These include long term maintenance costs, corrosion resistance, appearance and locations where product contamination is undesirable. Stainless steel exhibits stable structural properties such as yield strength and high creep strength at elevated temperatures.

Cooper B-Line’s stainless steel cable trays are welded using stainless steel welding wire to ensure each weldment exhibits the same corrosion resistant characteristic as the base metal. Localized staining in the weld area or heat affected zone may occur in severe environments. Specialized shielding gases and low carbon materials are used to minimize carbon contamination during welding and reduce staining and stress corrosion. Specify passivation after fabrication per ASTM A380 to minimize staining, improve aesthetics and further improve corrosion resistance.

A detailed study of the corrosive environment is recommended when considering a stainless steel design (see pages CTS-6 & CTS-7).

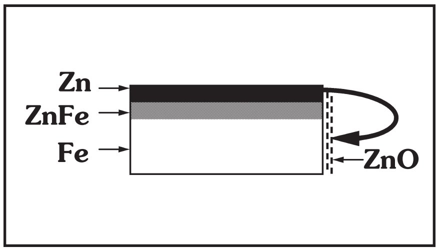
Standards Available

FINISH	SPECIFICATION	RECOMMENDED USE
Electrogalvanized Zinc	**ASTM B633** (For Cable Tray Hardware and Accessories, Alum. and Pre-Galv.) (For Wire Basket Standard is B633 SC2)	**Indoor**
Chromium Zinc	**ASTM F-1136-88** (Hardware for Hot Dip Galvanized Cable Tray)	**Indoor/Outdoor**
Pre-Galvanized Zinc	**ASTM A653SS Gr.33 G90 (CSA Type 2)** (Steel Cable Tray and Fittings)	**Indoor**
Hot Dip Galvanized Zinc After Fabrication	**ASTM A123 (CSA Type 1)** (Steel Cable Tray and Fittings)	**Indoor/Outdoor**
Special Paint	**Per Customer Specification** (Aluminum or Steel Cable Tray & Fittings)	**Indoor**

Zinc Coatings

Zinc protects steel in two ways. First it protects the steel as a coating and second as a sacrificial anode to repair bare areas such as cut edges, scratches, and gouges. The corrosion protection of zinc is directly related to its thickness and the environment. This means a .2 mil coating will last twice as long as a .1 mil coating in the same environment.

Galvanizing also protects cut and drilled edges.



Electrogalvanized Zinc

Electrogalvanized Zinc (also known as zinc plated or electroplated) is the process by which a coating of zinc is deposited on the steel by electrolysis from a bath of zinc salts. This finish is standard for cable tray hardware and some accessories for aluminum and pre-galvanized systems.

A rating of SC3, B-Line's standard, provides a minimum zinc coating thickness of .5 mils (excluding threaded rod, which is SC1 = .2 mils)

When exposed to air and moisture, zinc forms a tough, adherent, protective film consisting of a mixture of zinc oxides, hydroxides, and carbonates. This film is in itself a barrier coating which slows subsequent corrosive attack on the zinc. This coating is usually recommended for indoor use in relatively dry areas, as it provides ninety-six hours protection in salt spray testing per ASTM B117.

Chromium/ Zinc

Chromium/ Zinc is a corrosion resistant composition, which was developed to protect fasteners and small bulk items for automotive use. The coating applications have since been extended to larger parts and other markets.

Chromium/Zinc composition is an aqueous coating dispersion containing chromium, proprietary organics, and zinc flake.

This finish provides 1000 hours protection in salt spray testing per ASTM B117, exceeding NEMA VE-1 requirements by 300%.

Pre-Galvanized Zinc

(Mill galvanized, hot dip mill galvanized or continuous hot dip galvanized)

Pre-Galvanized steel is produced by coating coils of sheet steel with zinc by continuously rolling the material through molten zinc at the mills. This is also known as mill galvanized or hot dip mill galvanized. These coils are then slit to size and fabricated by roll forming, shearing, punching, or forming to produce B-Line pre-galvanized cable tray products.

The G90 specification calls for a coating of .90 ounces of zinc per square foot of steel. This results in a coating of .45 ounces per square foot on each side of the sheet. This is important when comparing this finish to hot dip galvanized after fabrication.

During fabrication, cut edges and welded areas are not normally zinc coated; however, the zinc near the uncoated metal becomes a sacrificial anode to protect the bare areas after a short period of time.

To further insure a quality product, B-Line welds all pre-galvanized cable trays with a silicon bronze welding wire allowing only a small heat affected zone to be exposed. This small area quickly repairs itself by the same process as cut edges.

Hot Dip Galvanized After Fabrication

(Hot dip galvanized or batch hot dip galvanized)

Hot Dip Galvanized After Fabrication cable tray products are fabricated from steel and then completely immersed in a bath of molten zinc. A metallic bond occurs resulting in a zinc coating that completely coats all surfaces, including edges and welds.

Another advantage of this method is coating thickness. Cable trays hot dip galvanized after fabrication have a minimum thickness of 1.50 ounces per square foot on each side, or a total 3.0 ounces per square foot of steel, according to ASTM A123.

The zinc thickness is controlled by the amount of time each part is immersed in the molten zinc bath as well as the speed at which it is removed. The term "double dipping" refers to parts too large to fit into the galvanizing kettle and, therefore, must be dipped one end at a time. It does not refer to extra coating thickness.

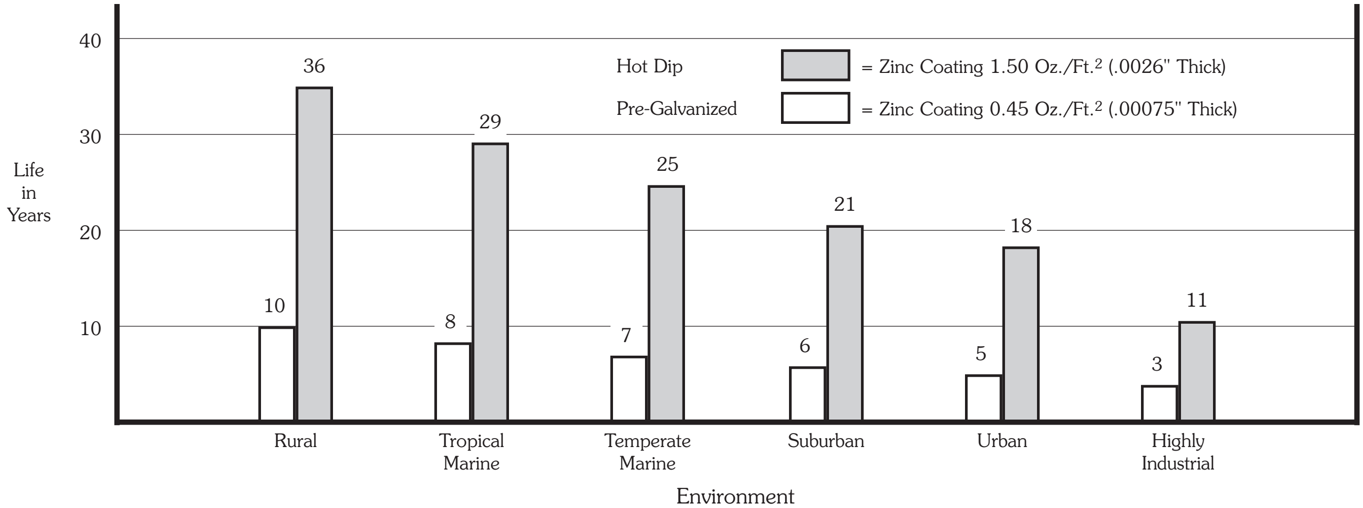
The layer of zinc which bonds to steel provides a dual protection against corrosion. It protects first as an overall barrier coating. If this coating happens to be scratched or gouged, zinc's secondary defense is called upon to protect the steel by galvanic action.

Hot dip galvanized after fabrication is recommended for prolonged outdoor exposure and will protect steel for many years in most outdoor environments and in many aggressive industrial environments (see charts on page 20).

Cable Tray Selection - Material & Finish

Standards Available

Service Life is defined as the time to 5% rusting of the steel surface.
Anticipated Life of Zinc Coatings In Various Atmospheric Environments



PVC Coating

PVC coating aluminum or steel cable tray is not recommended and has been removed from Cooper B-Line's cable tray line.

The application of a 15 mil PVC coating to aluminum or steel cable tray was a somewhat popular finish option 15 or more years ago. The soft PVC coating must be completely intact for the finish to be effective. In a caustic atmosphere, a pinhole in the coating can render it useless and corrode the cable tray. The shipment of the cable tray consistently damages the coating, as does installation. The splice hardware, splice plates and ground straps require field removal of the coating to ensure connections. PVC coated cable tray drastically increases the product's cost and delivery time.

Cooper B-Line recommends using fiberglass - Cooper B-Line's catalog CT03FRP, or stainless steel cable tray systems in highly corrosive areas.

Painting Cable Tray

Cooper B-Line offers painted cable tray to any color specified by the customer. It is important to note that there are key advantages and disadvantages to ordering factory painted cable tray. Cooper B-Line typically does not recommend factory painted cable tray for most applications.

Painted cable tray is often used in "open ceiling" applications, where all the overhead equipment and structure is painted the same color. In this type of application, additional painting is often necessary in the field, after installation, to ensure all of the supporting components, such as hanger rods, clamps and attaching hardware have been painted uniformly. Pre-painted cable tray interferes with common grounding practices, requiring the paint to be removed at splice locations, and/or the addition of bonding jumpers that were otherwise unnecessary. This additional field modification not only increases the installation cost, but causes potential damage to the special painted finish.

It is typically more cost effective to use an Aluminum or Pre-Galvanized Steel cable tray and paint it after installation, along with the other un-painted building components. Consult painting contractor for proper surface preparation.

Special Paint

B-Line cable tray and supports can be painted or primed to meet the customers requirements. Cooper B-Line has several colors available, consult the factory.

If a non-standard color is required the following information needs to be specified:

1. Type of material preparation (primer, etc.)
2. Type of paint, manufacturer and paint number or type of paint with chip.
3. Dry film thickness.

Material/Finish Prefix Designation Chart

Catalog Number Prefix	Material to be Furnished
A	Aluminum
P	Pre-Galvanized
G	Hot Dip Galvanized
ZN	Zinc Plated
S	Plain Steel
SS4	Type 304 Stainless Steel
SS6	Type 316 Stainless Steel

Corrosion

All metal surfaces are affected by corrosion. Depending on the physical properties of the metal and the environment to which it is exposed, chemical or electromechanical corrosion may occur.

Atmospheric Corrosion

Atmospheric corrosion occurs when metal is exposed to airborne liquids, solids or gases. Some sources of atmospheric corrosion are moisture, salt, dirt and sulphuric acid. This form of corrosion is typically worse outdoors, especially near marine environments.

Chemical Corrosion

Chemical corrosion takes place when metal comes in direct contact with a corrosive solution. Some factors which affect the severity of chemical corrosion include: chemical concentration level, duration of contact, frequency of washing, and operating temperature.

Storage Corrosion

Wet storage stain (White rust) is caused by the entrapment of moisture between surfaces of closely packed and poorly ventilated material for an extended period. Wet storage stain is usually superficial, having no affect on the properties of the metal.
Light staining normally disappears with weathering.
Medium to heavy buildup should be removed, in order to allow the formation of normal protective film.
Proper handling and storage will help to assure stain-free material. If product arrives wet, it should be unpacked and dried before storage. Dry material should be stored in a well ventilated "low moisture" environment to avoid condensation formation. Outdoor storage is undesirable, and should be avoided whenever possible.

Galvanic Corrosion

Galvanic corrosion occurs when two or more dissimilar metals are in contacts in the presence of an electrolyte (ie. moisture). An electrolytic cell is created and the metals form an anode or a cathode depending on their relative position on the Galvanic Series Table. The anodic material will be the one to corrode. Whether a material is anodic depends on the relative position of the other material. For example: If zinc and steel are in contact, the zinc acts as the anode and will corrode; the steel acts as the cathode, and will be protected. If steel and copper are in contact, the steel is now the anode and will corrode.
The rate at which galvanic corrosion occurs depends on several factors:

1. The amount and concentration of electrolyte present- An indoor, dry environment will have little or no galvanic corrosion compared to a wet atmosphere.
2. The relative size of the materials- A small amount of anodic material in contact with a large cathodic material will result in greater corrosion. Likewise, a large anode in contact with a small cathode will decrease the rate of attack.
3. The relative position on the Galvanic Series Table - The further apart in the Galvanic Series Table, the greater the potential for corrosion of the anodic material.

Galvanic Series In Sea Water

Anodic End

More Anodic ↑

Magnesium
Magnesium Alloys
Zinc
Beryllium
Aluminum - Zinc Alloys (7000 series)
Aluminum - Magnesium Alloys (5000 series)
Aluminum (1000 series)
Aluminum - Magnesium Alloys (3000 series)
Aluminum - Magnesium - Silicon Alloys (6000 series)
Cadmium
Aluminum - Copper Alloys (2000 series)
Cast Iron, Wrought Iron, **Mild Steel**
Austenitic Nickel Cast Iron
Type 410 Stainless Steel (active)
Type 316 Stainless Steel (active)
Type 304 Stainless Steel (active)
Naval Brass, Yellow Brass, Red Brass
Tin
Copper
Lead-Tin Solders
Admiralty Brass, Aluminum Brass
Manganese Bronze
Silicon Bronze
Tin Bronze
Type 410 Stainless Steel (passive)
Nickel - Silver
Copper Nickel Alloys
Lead
Nickel - Aluminum Bronze
Silver Solder
Nickel 200
Silver
Type 316 Stainless Steel (passive)
Type 304 Stainless Steel (passive)
Incoloy 825
Hastelloy B
Titanium
Hastelloy C
Platinum
Graphite

Cathodic End

Corrosion Guide

Chemical	Aluminum Cold	Aluminum Warm	Aluminum Hot	Stainless Type 304 Cold	Stainless Type 304 Warm	Stainless Type 304 Hot	Stainless Type 316 Cold	Stainless Type 316 Warm	Stainless Type 316 Hot
Acteone	R	R	R	R	R	R	R	R	R
Aluminum Chloride Solution	NR	NR	NR	NR	--	--	F	--	--
Anhydrous Aluminum Chloride	R	R	R	NR	--	--	F	--	--
Aluminum Sulfate	R	R	R	R	R	R	R	R	R
Ammonium Chloride 10%	F	F	NR	R	R	R	R	R	R
Ammonium Hydroxide	F	F	F	R	R	R	R	R	R
Ammonium Phosphate	F	F	NR	R	--	--	R	--	--
Ammonium Sulfate	F	--	--	R	R	R	R	R	R
Ammonium Thiocyanate	R	R	R	R	--	--	R	R	R
Amyl Acetate	R	R	R	R	R	R	R	R	R
Amyl Alcohol	R	R	R	R	--	--	R	R	R
Arsenic Acid	F	F	F	R	R	--	R	R	R
Barium Chloride	F	F	NR	R	R	R	R	R	R
Barium Sulfate	R	R	R	R	R	--	R	R	--
Barium Sulfide	NR	NR	NR	R	R	--	R	R	--
Benzene	R	R	R	R	R	R	R	R	R
Benzoic Acid	F	F	NR	R	R	R	R	R	R
Boric Acid	R	R	F	R	R	R	R	R	R
Bromine Liquid or Vapor	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butyl Acetate	R	R	R	R	--	--	R	R	R
Butyl Alcohol	R	R	R	R	R	R	R	R	R
Butyric Acid	F	F	F	R	R	R	R	R	R
Calcium Chloride 20%	F	F	NR	R	--	--	R	--	--
Calcium Hydroxide	N	--	--	R	R	F	R	R	R
Calcium Hypochlorite 2 - 3%	F	--	--	R	--	--	R	--	--
Calcium Sulfate	R	R	--	R	R	--	R	R	--
Carbon Monoxide Gas	R	R	R	R	R	R	R	R	R
Carbon Tetrachloride	F	F	NR	F	F	F	R	R	R
Chloroform Dry	R	NR	NR	R	R	--	R	R	--
Chloroform Solution	R	NR	NR	--	--	--	--	--	--
Chromic Acid 10% CP	R	R	--	R	R	F	R	R	R
Citric Acid	F	F	F	R	R	NR	R	R	R
Copper Cyanide	NR	NR	NR	R	R	R	R	R	R
Copper Sulfate 5%	NR	NR	NR	R	R	R	R	R	R
Ethyl Alcohol	R	R	R	R	R	R	R	R	R
Ethylene Glycol	R	R	F	R	R	--	R	R	R
Ferric Chloride	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ferrous Sulfate 10%	R	NR	NR	R	R	--	R	R	--
Formaldehyde 37%	R	R	R	R	R	R	R	R	R
Formic Acid 10%	R	R	--	R	R	NR	R	R	R
Gallic Acid 5%	R	R	NR	R	R	R	R	R	R
Hydrochloride Acid 25%	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hydrofluoric Acid 10%	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hydrogen Peroxide 30%	R	R	R	R	R	R	R	R	R
Hydrogen Sulfide Wet	R	--	--	NR	NR	NR	R	R	R

R = Recommended
F = May be used under some conditions
NR = Not Recommended
-- = Information not available

The corrosion data given in this table is for general comparison only. (Reference Corrosion Resistance Tables, Second Edition)

The presence of contaminates in chemical environments can greatly affect the corrosion rate of any material.

B-Line strongly suggests that field service tests or simulated laboratory tests using actual environmental conditions be conducted in order to determine the proper materials and finishes to be selected.

For questionable environments see Fiberglass Cable Tray Corrosion Guide (Page FT-3 & FT-4).

Cold = 50 - 80°F Warm = 130 - 170°F Hot = 200 - 212°F

Corrosion Guide

Chemical	Aluminum			Stainless Type 304			Stainless Type 316		
	Cold	Warm	Hot	Cold	Warm	Hot	Cold	Warm	Hot
Lactic Acid 10%	R	F	NR	R	R	F	R	R	R
Lead Acetate 5%	NR	NR	NR	R	R	R	R	R	R
Magnesium Chloride 1%	NR	NR	NR	R	--	F	R	--	R
Magnesium Hydroxide	R	R	R	R	R	--	R	R	--
Magnesium Nitrate 5%	R	--	--	R	R	R	R	R	R
Nickel Chloride	NR	NR	NR	R	--	--	R	--	--
Nitric Acid 15%	NR	NR	NR	R	R	R	R	R	R
Oleic Acid	R	R	F	R	R	F	R	R	R
Oxalic Acid 10%	R	F	NR	NR	NR	NR	R	R	R
Phenol CP	R	R	R	R	R	R	R	R	R
Phosphoric Acid 50%	NR	NR	NR	R	R	R	R	F	NR
Potassium Bromide 100%	R	F	NR	R	R	--	R	R	R
Potassium Carbonate 100%	F	F	--	R	R	R	R	R	R
Potassium Chloride 5%	R	R	R	R	R	R	R	R	R
Potassium Dichromate	R	R	R	R	R	R	R	R	R
Potassium Hydroxide 50%	NR	NR	NR	R	R	R	R	R	R
Potassium Nitrate 50%	R	R	R	R	R	R	R	R	R
Potassium Sulfate 5%	R	R	R	R	R	R	R	R	R
Propyl Alcohol	R	R	R	R	R	R	R	R	R
Sodium Acetate 20%	R	F	F	R	R	R	R	R	R
Sodium Bisulfate 10%	R	F	F	R	R	R	R	R	R
Sodium Borate	R	F	F	R	R	R	R	R	R
Sodium Carbonate 18%	R	F	F	R	R	R	R	R	R
Sodium Chloride 5%	R	NR	NR	R	R	R	R	R	R
Sodium Hydroxide 50%	NR	NR	NR	R	R	R	R	R	R
Sodium Hypochlorite 5%	R	F	F	F	--	--	R	--	--
Sodium Nitrate 100%	R	R	R	R	R	R	R	R	R
Sodium Nitrite 100%	R	R	R	R	R	R	R	R	R
Sodium Sulfate 100%	R	R	F	R	R	R	R	R	R
Sodium Thiosulfate	R	R	R	R	R	R	R	R	R
Sulfur Dioxide (Dry)	R	R	R	R	R	R	R	R	R
Sulfuric Acid 5%	NR	NR	--	F	NR	NR	R	--	--
Sulfuric Acid 10%	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfuric Acid 50%	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfuric Acid 75 - 98%	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfuric Acid 98 - 100%	NR	NR	--	R	--	--	R	R	F
Tannic Acid 10 & 50%	NR	NR	NR	R	R	R	R	R	R
Tartaric Acid 10 & 50%	F	NR	NR	R	R	R	R	R	R
Vinegar	F	F	F	R	R	R	R	R	R
Zinc Chloride 5 & 20%	F	NR	NR	R	F	NR	R	R	R
Zinc Nitrate	F	NR	NR	R	R	R	R	R	R
Zinc Sulfate	F	NR	NR	R	R	R	R	R	R

(Cable Tray Material)

R = Recommended
F = May be used under some conditions
NR = Not Recommended
-- = Information not available

The corrosion data given in this table is for general comparison only. (Reference Corrosion Resistance Tables, Second Edition)

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Cold = 50 - 80°F Warm = 130 - 170°F Hot = 200 - 212°F

Thermal Contraction and Expansion

It is important that thermal contraction and expansion be considered when installing cable tray systems. The length of the straight cable tray runs and the temperature differential govern the number of expansion splice plates required (see Table 2 below).

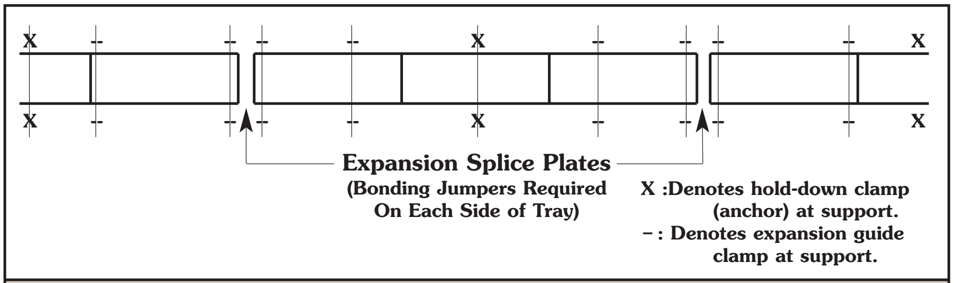
The cable tray should be anchored at the support nearest to its midpoint between the expansion splice plates and secured by expansion guides at all other support locations (see Figure 1). The cable tray should be permitted longitudinal movement in both directions from that fixed point. When used, covers should be overlapped at expansion splices.

Accurate gap settings at the time of installation are necessary for the proper operation of the expansion splice plates. The following procedure should assist the installer in determining the correct gap: (see Figure 2)

1. Plot the highest expected metal temperature on the maximum temperature line.
2. Plot the lowest expected metal temperature on the minimum temperature line.
3. Draw a line between the maximum and minimum points.
4. Plot the metal temperature at the time of installation to determine the gap setting.

Refer to page FT-8 for thermal contraction and expansion of fiberglass cable trays.

Figure 1



Typical Cable Tray Installation

Figure 2

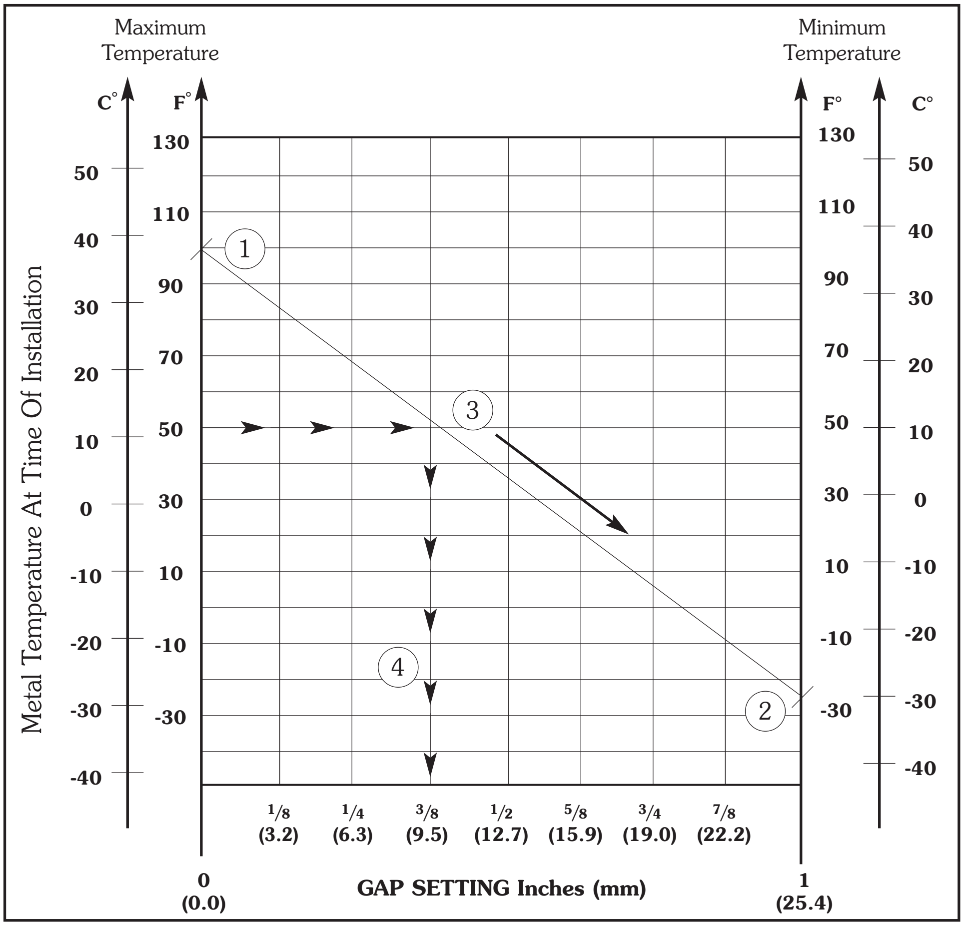


Table 2

Maximum Spacing Between Expansion Joints For 1" Movement									
Temperature Differential		Steel		Aluminum		Stainless Steel 304		Stainless Steel 316	
°F	°C	Feet	m	Feet	m	Feet	m	Feet	m
25	13.9	512	156.0	260	79.2	347	105.7	379	115.5
50	27.8	256	78.0	130	39.6	174	53.0	189	57.6
75	41.7	171	52.1	87	26.5	116	35.4	126	38.4
100	55.6	128	39.0	65	19.8	87	26.5	95	29.0
125	69.4	102	31.1	52	15.8	69	21.0	76	23.2
150	83.3	85	25.9	43	13.1	58	17.7	63	19.2
175	97.2	73	22.2	37	11.3	50	15.2	54	16.4

Note: every pair of expansion splice plates requires two bonding jumpers for grounding continuity.

Installation Considerations

Weight

The weight of an aluminum cable tray is approximately half that of a comparable steel tray. Some factors to consider include: shipping costs, material, handling, project weight restrictions and the strength of support members.

Field Modifications

Aluminum cable tray is easier to cut and drill than steel cable tray since it is a “softer” material. Similarly, galvanized steel cable tray is easier to cut and drill than stainless steel cable tray. Cooper B-Line aluminum cable tray uses a four bolt splice, resulting in half as much drilling and hardware installation as most steel cable tray, which uses an eight bolt splice. Hot dip galvanized and painted steel cable tray finishes must be repaired when field cutting or drilling. Failure to repair coatings will impair the cable tray’s corrosion resistance.

Availability

Aluminum, pre-galvanized, stainless steel and fiberglass cable tray can normally be shipped from the factory in a short period of time. Hot dip galvanized and painted cable tray requires an additional coating process, adding several days of preparation before final shipment. Typically, a coated cable tray will be sent to an outside source for coating, requiring additional packing and shipping.

Electrical Grounding Capacity

The National Electrical Code, Article 392.7 allows cable tray to be used as an equipment grounding conductor. All Cooper B-Line standard steel and aluminum cable trays are classified by Underwriter’s Laboratories per NEC Table 392.7 based on their cross-sectional area.

The corresponding cross-sectional area for each side rail design (2 side rails) is listed on a fade resistant UV stabilized label (see Figure 3). This cable tray label is attached to each straight section and fitting that is U.L. classified. U.L. assigned cross-sectional area is also stated in the loading charts in this catalog for each system.

NEMA Installation Guide

The new NEMA VE 2 is a cable tray installation guideline and is available from NEMA, CTI or Cooper B-Line. For free download see www.cabletrays.com.

Table 392.7(B)(2)
Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductors

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground Fault Protection of any Cable Circuit in the Cable Tray System	Minimum Cross-Sectional Area of Metal* In Square Inches	
	Steel Cable Trays	Aluminum Cable Trays
60	0.20	0.20
100	0.40	0.20
200	0.70	0.20
400	1.00	0.40
600	1.50**	0.40
1000	--	0.60
1200	--	1.00
1600	--	1.50
2000	--	2.00**

For SI units: one square inch = 645 square millimeters.
* Total cross-sectional area of both side rails for ladder or trough-type cable trays; or the minimum cross-sectional area of metal in channel-type cable trays or cable trays of one- piece construction.
** Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.
For larger ampere ratings an additional grounding conductor must be used.

Figure 3

Environmental Loads

Wind Loads

Wind loads need to be determined for all outdoor cable tray installations. Most outdoor cable trays are ladder type trays, therefore the most severe loading to be considered is impact pressure normal to the cable tray side rails (see detail 1).

Detail 1

The impact pressure corresponding to several wind velocities are given below in Table 1.

Table 1
Impact Pressures

V(mph)	P(lbs/ft^2)	V(mph)	P(lbs/ft^2)
15	0.58	85	18.5
20	1.02	90	20.7
25	1.60	95	23.1
30	2.30	100	25.6
35	3.13	105	28.2
40	4.09	110	30.9
45	5.18	115	33.8
50	6.39	120	36.8
55	7.73	125	40.0
60	9.21	130	43.3
65	10.80	135	46.6
70	12.50	140	50.1
75	14.40	145	53.8
80	16.40	150	57.6

V= Wind Velocity
P= Impact Pressure

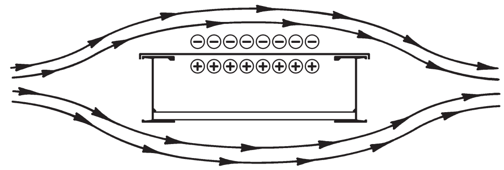
Note: These values are for an air density of 0.07651 lbs/ft^3 corresponding to a temperature of 60° F and barometric pressure of 14.7 lbs/in^2.

Example Calculation:
Side load for 6" side rail with 100 mph wind

$$\frac{25.6 \times 6}{12} = 12.8 \text{ lbs/ft}$$

When covers are installed on outdoor cable trays, another factor to be considered is the aerodynamic effect which can produce a lift strong enough to separate a cover from a tray. Wind moving across a covered tray (see detail 2) creates a positive pressure inside the tray and a negative pressure above the cover. This pressure difference can lift the cover off the tray.

Detail 2



B-Line recommends the use of heavy duty wrap-around cover clamps when covered trays are installed in an area where strong winds occur.

Special Notice:
Covers on wide cable tray and/or cable tray installed at elevations high off the ground may require additional heavy duty clamps or thicker cover material.

Ice Loads

Glaze ice is the most commonly seen form of ice build-up. It is the result of rain or drizzle freezing on impact with an exposed object. Generally, only the top surface (or the cover) and the windward side of a cable tray system is significantly coated with ice. The maximum design load to be added due to ice should be calculated as follows:

$$L_I = \left(\frac{W \times T_I}{144}\right) \times D_I \quad \text{where;}$$

L_I= Ice Load (lbs/linear foot)
W= Cable Tray Width (inches)
T_I= Maximum Ice Thickness (inches)
D_I= Ice Density = 57 lbs/ft^3
the maximum ice thickness will vary depending on location. A thickness of 1/2" can be used as a conservative standard.

Example Calculation:
Ice Loads for 24" wide tray with 1/2" thick ice;

$$\frac{24 \times .5}{144} \times 57 = 4.75 \text{ lbs/ft}$$

Environmental Loads

Snow Loads

Snow is measured by density and thickness. The density of snow varies almost as much as its thickness. The additional design load from snowfall should be determined using the building codes which apply for each installation.

Seismic Loads

A great deal of seismic testing and evaluation of cable tray systems, and their supports, has been performed. The conclusions reached from these evaluations is that cable tray is stronger laterally than vertically, since it acts as a truss in the lateral direction. Other factors that contribute to the stability of cable tray are the energy dissipating motion of the cables within the tray, and the high degree of ductility of the cable tray and the support material.
These factors, working in conjunction with a properly designed cable tray system, should afford reasonable assurance to withstand even strong motion earthquakes.

When seismic bracing is required for a cable tray system, it should be applied to the supports and not the cable tray itself. Cooper B-Line's "Seismic Restraints" brochure provides OSHPD approved methods of bracing cable tray supports using standard Cooper B-Line products. Contact Cooper B-Line to receive a copy of this brochure.

Concentrated Loads

A concentrated static load represents a static weight applied at a single point between the side rails. Tap boxes, conduit attachments and long cable drops are just some of the many types of concentrated loads. When so specified, these concentrated static loads may be converted to an equivalent, uniform load (We) by using the following formula:

$$We = \frac{2 \text{ x (concentrated Static Load)}}{\text{span length}}$$

Cooper B-Line's cable tray side rails, rungs and bottoms will withstand a 200 lb. static load without collapse (series 14 excluded)*. However, it should be noted that per NEMA Standard Publication VE1 cable tray is designed as a support for power or control cables, or both, and is not intended or designed to be a walkway for personnel. Each section of Cooper B-Line Cable Tray has a label stating the following message:

Warning! Not to be used as a walkway, ladder or support for personnel. To be used only as a mechanical support for cables and raceway.

Support Span

The strength of a cable tray is largely determined by the strength of its side rails. The strength of a cable tray side rail is proportionate to the distance between the supports on which it is installed, commonly referred to as the "support span". Therefore, the strength of a cable tray system can be altered by changing the support span. However, there is a limit to how much the strength of a cable tray system can be increased by reducing the support span, because the strength of the cable tray bottom members could become the determining factor of strength.

Once the load requirement of a cable tray system has been established, the following factors should be considered:

1. Sometimes the location of existing structural beams will dictate the cable tray support span. This is typical with outdoor installations where adding intermediate supports could be financially prohibitive. For this situation the appropriate cable tray must be selected to accommodate the existing span.
2. When cable tray supports are randomly located, the added cost of a higher strength cable tray system should be compared to the cost of additional supports. Typically, adding supports is more costly than installing a stronger series of cable tray. The stronger cable tray series (e.g. from 75 lbs./ft. on 20' span to 100 lbs./ft. on 20' span) will increase the price of the cable tray system minimally, possibly less than $1/ft., with little or no additional labor cost for installation. Alternately, one extra support may cost $100.00 (material and labor) for a simple trapeze. Future cable additions or the capability of supporting equipment, raceways for example, also favor stronger cable tray systems. *In summary, upgrading to a stronger cable tray series is typically more cost-effective than using the recommended additional supports for a lighter duty cable tray series.*
3. The support span lengths should be equal to or less than unspliced straight section lengths, to ensure that no more than one splice is placed between supports as stated in the NEMA VE 2 Cable Tray Installation Guideline.

Cable Tray Selection - Strength

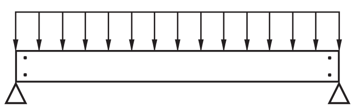
Deflection

Deflection in a cable tray system is primarily an aesthetic consideration. When a cable tray system is installed in a prominent location, a maximum simple beam deflection of 1/200 of support span can be used as a guideline to minimize visual deflection.

It is important at this point to mention that there are two typical beam configurations, simple beam and continuous beam, and to clarify the difference.

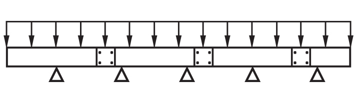
A good example of a simple beam is a single straight section of cable tray supported, but not fastened at either end. When the tray is loaded the cable tray is allowed to flex. Simple beam analysis is used almost universally for beam comparisons even though it is seldom practical in the field installations. The three most prominent reasons for using a simple beam analysis are: calculations are simplified; it represents the worst case loading; and testing is simple and reliable. The published load data in the Cooper B-Line cable tray catalog is based on the simple beam analysis per NEMA & CSA Standards.

Simple Beam



Continuous beam is the beam configuration most commonly used in cable tray installations. An example of this configuration is where cable trays are installed across several supports to form a number of spans. The continuous beam possesses traits of both the simple and fixed beams. When equal loads are applied to all spans simultaneously, the counterbalancing effect of the loads on both sides of a support restricts the movement of the cable tray at the support. The effect is similar to that of a fixed beam. The end spans behave substantially like simple beams. When cable trays of identical design are compared, <u>the continuous beam installation will typically have approximately half the deflection of a simple beam of the same span</u>. Therefore simple beam data should be used only as a general comparison. The following factors should be considered when addressing cable tray deflection:

Continuous Beam

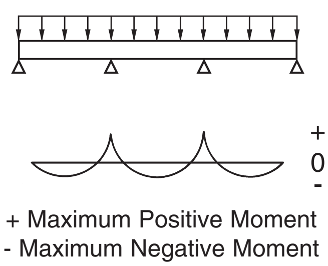


1. Economic consideration must be considered when addressing cable deflection criteria.
2. Deflection in a cable tray system can be reduced by decreasing the support span, or by using a taller or stronger cable tray.
3. When comparing cable trays of equivalent strength, a steel cable tray will typically exhibit less deflection than an aluminum cable tray since the modulus of elasticity of steel is nearly three times that of aluminum.
4. The location of splices in a continuous span will affect the deflection of the cable tray system. The splices should be located at points of minimum stress whenever practical. NEMA Standards VE 1 limits the use of splice plates as follows:

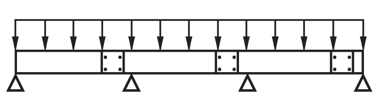
Unspliced straight sections should be used on all simple spans and on end spans of continuous span runs. Straight section lengths should be equal to or greater than the span length to ensure not more than one splice between supports.

See the figures below for splicing configuration samples.

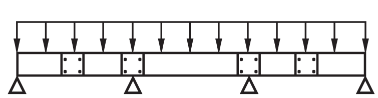
Typical Continuous Span Configuration



Preferred Splice Plate Locations

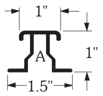
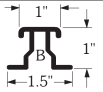
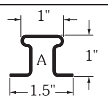
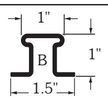
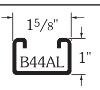
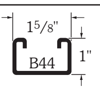
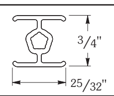
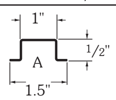
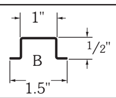
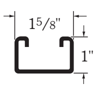
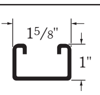


Undesirable Splice Plate Locations

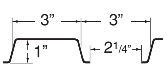
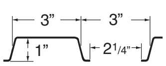
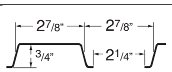


Load Capacity

Ladder Type Rungs

Rung Type	Design Factors	Material Type	Single Rung Uniform Load Capacity (in Lbs.) with safety factor of 1.5						
			Tray Width						
			6	9	12	18	24	30	36
	Ix = .0361 in.^{4} Sx = .0707 in.^{3}	Aluminum				766	575		
	Ix = .0432 in.^{4} Sx = .0877 in.^{3}	Aluminum						594	495
	Ix = .0249 in.^{4} Sx = .0528 in.^{3}	Steel	2912	1941	1456	971	728		
	Ix = .0312 in.^{4} Sx = .0661 in.^{3}	Steel						749	624
	Ix = .0450 in.^{4} Sx = .0787 in.^{3}	Aluminum Strut Rung	3328	2219	1664	1109	832	666	555
	Ix = .0445 in.^{4} Sx = .0782 in.^{3}	Steel Strut Rung	5172	3448	2586	1724	1293	1034	862
	Ix = .0130 in.^{4} Sx = .0344 in.^{3}	Redi-Rail	1480	987	740	493	370	296	224
	Ix = .0039 in.^{4} Sx = .0134 in.^{3}	Steel Series 1	981	654	491	327	245		
	Ix = .0047 in.^{4} Sx = .0164 in.^{3}	Steel Series 1						230	192
	Ix = .0353 in.^{4} Sx = .0708 in.^{3}	Aluminum Marine Rung	2996	1997	1498	999	749	599	499
	Ix = .0347 in.^{4} Sx = .0685 in.^{3}	Steel Marine Rung	4530	3020	2265	1510	1133	906	755

Corrugated Bottoms (Ventilated and Solid)

Bottom Type	Design Factors	Material Type	Single Rung Load Capacity (in Lbs.) with safety factor of 1.5						
			Tray Width						
			6	9	12	18	24	30	36
 Trough	Ix = .0455 in.^{4} Sx = .0898 in.^{3}	Aluminum	3141	2029	1491	970	726	660	594
 Trough	Ix = .0348 in.^{4} Sx = .0667 in.^{3}	Steel	2973	1946	1445	955	711	650	590
 Trough	Ix = .0185 in.^{4} Sx = .0503 in.^{3}	Series 148 Steel	2645	1763	1323	881	661		

Load Capacity

Calculate each anticipated load factor, then add them to obtain a total load. (Example: Working Load = Cable + Concentrated + Wind + Snow + Ice Loads). The Working Load should be used, along with the maximum support spacing, to select a span/load class designation from Table 3. Table 4 (page CTS-14) contains the most common load/span class designations per the US and Canadian metallic cable tray standard, CSA, C22.2 No. 126.1-98 First Addition, NEMA VE 1-1998.

Table 3 - These Loading Classes Are Historical and Supplied For Reference Only

Load Class		Class Designations for lengths of				
lb/ft	kg/m	ft 8 m (2.4)	ft 10 m (3.0)	ft 12 m (3.7)	ft 16 m (4.9)	ft 20 m (6.0)
25	37	--	A	--	--	--
45	67	--	--	--	--	D
50	74	8A	--	12A	16A	20A
65	97	--	C	--	--	--
75	112	8B	--	12B	16B	E or 20B
100	149	8C	--	12C	16C	20C
120	179	--	D	--	--	--
200	299	--	E	--	--	--

Note: 8A/B/C, 12A/B/C, 16A/B/C, and 20A/B/C were the traditional NEMA designations. A, C, D, and E were the conventional CSA designations. Actual tested loadings per span will be stated on the product labels.

Table 4 - B-Line Cable Tray Load Classes

Aluminum (Copper free)

Series	Load Depth	Load lb/ft	Load (kg/m)	Span ft	Span (m)	Former Classes NEMA	Former Classes CSA
H14AR	3	86	(128)	12	(3.7)	12B	D_1 (3m)
24A	3	126	(187)	12	(3.7)	12C	D_1 (3m)
M24A	3	56	(83)	20	(6.1)	20A	D_1 (6m), E (3m)
34A	3	80	(119)	20	(6.1)	20B	E (6m)
H15AR	4	102	(152)	12	(3.7)	12C	D_1 (3m)
25A	4	50	(74)	20	(6.1)	16B	D_1 (6m)
35A	4	121	(180)	16	(4.9)	20B	E (3m)
H16AR	5	114	(170)	12	(3.7)	12C	D_1 (3m)
26A	5	51	(76)	20	(6.1)	20A	D_1 (6m)
36A	5	84	(125)	20	(6.1)	20B	E (6m)
46A	5	103	(153)	20	(6.1)	20C	E (6m)
M46A	5	117	(174)	20	(6.1)	116# @ 20'	
H46A	5	167	(248)	20	(6.1)	167# @ 20'	131 kg/m (7.6m)
H17AR	6	100	(149)	12	(3.7)	12B	D_1 (3m)
37A	6	80	(119)	20	(6.1)	20B	
47A	6	100	(149)	20	(6.1)	20C	
H47A	6	149	(222)	20	(6.1)	149# @ 20'	
57A	6	102	(152)	30	(9.1)	102# @ 30'	152 kg/m (9.1m)
S8A	6	161	(240)	30	(9.1)	161# @ 30'	240 kg/m (9.1m)
Data-Track	All	120	(179)	9.8	(3.0)		
Half Rack	All	25	(37)	9.8	(3.0)		
Verti-Rack	All	100	(149)	12	(3.7)		
Multi-Tier	All	140	(208)	10	(3.1)		

Fiberglass

Series	Load Depth	Load lb/ft	Load (kg/m)	Span ft	Span (m)	Former Classes NEMA	Former Classes CSA
13F	2	145	(216)	8	(2.4)	8C	
24F	3	156	(232)	12	(3.7)		
36F	5	88	(131)	20	(6.1)		
46F	5	141	(210)	20	(6.1)		
H46F	5	152	(226)	20	(6.1)		
48F	7	125	(187)	20	(6.1)		

Steel (HDGAF/Pre-Galvanized)

Series	Load Depth	Load lb/ft	Load (kg/m)	Span ft	Span (m)	Former Classes NEMA	Former Classes CSA
148*	3	51	(76)	12	(3.7)	12A	C_1 (3m)
248*	3	103	(153)	12	(3.7)	12C	D_1 (3m)
346*	3	63	(94)	20	(6.1)	20A	D_1 (6m)
444*	3	91	(135)	20	(6.1)	20B	E (3m)
156*	4	76	(113)	12	(3.7)	12B	C_1 (3m)
258*	4	109	(162)	12	(3.7)	12C	D_1 (3m)
356*	4	69	(103)	20	(6.1)	16C	D_1 (6m)
358*	4	62	(92)	20	(6.1)	20A	D_1 (6m)
454*	4	106	(158)	20	(6.1)	20C	E (6m)
166*	5	77	(115)	12	(3.7)	12B	C_1 (3m)
268*	5	110	(164)	12	(3.7)	12C	D_1 (3m)
368†	5	59	(88)	20	(6.1)	20A	D_1 (3m)
366*	5	75	(112)	20	(6.1)	20B	E (6m)
464*†	5	123	(183)	20	(6.1)	119# @ 20'	E (6m)
176*	6	86	(128)	12	(3.7)	12B	137 kg/m (3.7m)
378*	6	51	(76)	20	(6.1)	20A	D_1 (3m)
476*	6	77	(115)	20	(6.1)	20B	D_1 (6m)
574*	6	130	(193)	20	(6.1)	117# @ 20'	E (6m)
348†	3	125	(186)	12	(3.7)	12C	C_1 (3m)
358†	4	62	(92)	20	(6.1)	20A	89 kg/m (6.1m)
WB212	2	25	(37)	9.8	(3.0)		
WB218	2	28	(42)	9.8	(3.0)		
WB224	2	28	(42)	9.8	(3.0)		
WB412	4	30	(45)	9.8	(3.0)		
WB418	4	31	(46)	9.8	(3.0)		
WB424	4	31	(46)	9.8	(3.0)		
WB612	4	40	(60)	9.8	(3.0)		
WB618	4	36	(54)	9.8	(3.0)		
WB620	4	40	(60)	9.8	(3.0)		
WB624	4	43	(64)	9.8	(3.0)		

* G denotes CSA Type 1 (HDGAF) or P denotes CSA Type 2 (Mill-Galvanized)
† SS4 (Type 304 Stainless) or SS6 (Type 316 Stainless)

Cable Tray Selection - *Strength*

Cable Data

The cable load is simply the total weight of all the cables to be placed in the tray. This load should be expressed in lbs/ft.

The data on this page provides average weights for common cable sizes.

Multiconductor Cable Type TC, 600V with XHHW Conductors, Copper

	3 conductors with ground			4 conductors with ground		
Size	Diameter in.	Area in.^{2}	Weight lbs/ft	Diameter in.	Area in.^{2}	Weight lbs/ft
8	0.66	0.34	0.33	0.72	0.41	0.42
6	0.74	0.43	0.45	0.81	0.52	0.58
4	0.88	0.61	0.66	0.96	0.72	0.84
2	1.00	0.79	0.96	1.10	0.95	1.20
1	1.13	1.00	1.17	1.25	1.23	1.55
1/0	1.22	1.17	1.43	1.35	1.43	1.84
2/0	1.31	1.35	1.72	1.45	1.65	2.20
3/0	1.42	1.58	2.14	1.58	1.96	2.80
4/0	1.55		2.64	1.77		3.46
250	1.76		3.18	1.93		4.04
350	1.98		4.29	2.18		5.48
500	2.26		5.94	2.50		7.64
750	2.71		9.01	3.12		11.40
1000	3.10		11.70			

Multiconductor Cable Type MC, 600V with XHHW Conductors, Copper

	3 conductors with ground						4 conductors with ground					
	Diameter (in.)		Area (in.^{2})		Weight (lbs/ft)		Diameter (in.)		Area (in.^{2})		Weight (lbs/ft)	
Size	Without Jacket	With Jacket	Without Jacket	With Jacket	Alum. Armor	Steel Armor	Without Jacket	With Jacket	Without Jacket	With Jacket	Alum. Armor	Steel Armor
8	0.70	0.80	0.38	0.50	0.41	0.57	0.76	0.86	0.45	0.58	0.51	0.68
6	0.78	0.88	0.48	0.61	0.55	0.74	0.85	0.95	0.57	0.71	0.69	0.87
4	0.89	0.99	0.62	0.77	0.74	0.95	0.97	1.07	0.74	0.90	0.93	1.15
2	1.01	1.12	0.80	0.99	1.08	1.32	1.10	1.22	0.95	1.17	1.29	1.56
1	1.16	1.27	1.06	1.27	1.38	1.63	1.25	1.36	1.23	1.45	1.61	1.91
1/0	1.23	1.34	1.19	1.41	1.56	1.86	1.35	1.46	1.43	1.67	1.94	2.27
2/0	1.32	1.43	1.37	1.61	1.85	2.20	1.46	1.56	1.67	1.91	2.36	2.72
3/0	1.46	1.57	1.67	1.94	2.35	2.67	1.58	1.71	1.96	2.30	2.94	3.33
4/0	1.56	1.68			2.82	3.21	1.75	1.88			3.64	3.97
250	1.74	1.86			3.31	3.94	1.92	2.04			4.21	4.64
350	1.96	2.10			4.48	4.97	2.16	2.30			5.71	6.12
500	2.24	2.37			6.08	6.58	2.47	2.63			7.91	8.39
750	2.68	2.84			8.96	9.70	3.03	3.22			11.48	12.17

Single Conductor Cable 600V

	XHHW			THHN, THWN			TW, THW			USE, RHH, RHW		
Size	Diameter in.	Area in.^{2}	Weight lbs/ft	Diameter in.	Area in.^{2}	Weight lbs/ft	Diameter in.	Area in.^{2}	Weight lbs/ft	Diameter in.	Area in.^{2}	Weight lbs/ft
1/0	0.48		0.37	0.50		0.37	0.53		0.39	0.53		0.39
2/0	0.52		0.46	0.54		0.46	0.57		0.48	0.57		0.49
3/0	0.58		0.57	0.60		0.57	0.62		0.60	0.63		0.60
4/0	0.63		0.71	0.66		0.71	0.68		0.74	0.68		0.75
250	0.70	0.38	0.85	0.72	0.41	0.85	0.75	0.44	0.88	0.76	0.45	0.89
300	0.75	0.44	1.02	0.77	0.47	1.02	0.81	0.52	1.04	0.81	0.52	1.05
350	0.80	0.50	1.17	0.83	0.54	1.17	0.86	0.58	1.21	0.86	0.58	1.22
400	0.85	0.57	1.33	0.87	0.59	1.33	0.90	0.64	1.37	0.91	0.65	1.38
500	0.93	0.68	1.64	0.96	0.72	1.64	0.98	0.75	1.69	0.99	0.77	1.70
600	1.04	0.85	2.03	1.06	0.88	2.01	1.09	0.93	2.03	1.10	0.95	2.07
750	1.14	1.02	2.24	1.17	1.08	2.48	1.19	1.11	2.51	1.20	1.13	2.55
1000	1.29		2.52	1.32		3.30	1.34		3.31	1.35		3.33

Allowable Cable Fill

For allowable cable types see the Appendix page A-9.
The following guidelines are based on the 2002 National Electrical Code, Article 392.

I) Number of Multiconductor Cables rated 2000 volts or less in the Cable Tray

(1) 4/0 or Larger Cables

The ladder cable tray must have an inside available width equal to or greater than the sum of the diameters (Sd) of the cables, which must be installed in a single layer. When using solid bottom cable tray, the sum of the cable diameters is not to exceed 90% of the available cable tray width.

Example: Cable Tray width is obtained as follows:

List Cable Sizes	(D) List Cable Outside Diameter	(N) List Number of Cables	Multiply (D) x (N) = Subtotal of the Sum of the Cable Diameters
3/C - #500 kcmil	2.26 inches	1	2.26 inches
3/C - #250 kcmil	1.76 inches	2	3.52 inches
3/C - #4/0 AWG	1.55 inches	4	6.20 inches

The sum of the diameters (Sd) of all cables = 2.26 + 3.52 + 6.20 = 11.98 inches; therefore a cable tray with an available width of at least 12 inches is required.

(2) Cables Smaller Than 4/0

The total sum of the cross-sectional areas of all the cables to be installed in the cable tray must be equal to or less than the allowable cable area for the tray width, as indicated in Table 5.
When using solid bottom cable tray, the allowable cable area is reduced by 22%.

Table 5

Inside Width of Cable Tray inches	Allowable Cable Area square inches
6	7.0
9	10.5
12	14.0
18	21.0
24	28.0

Example: The cable tray width is obtained as follows:

List Cable Sizes	(A) List Cable Cross Sectional Areas	(N) List Number of Cables	Multiply (A) x (N) + Total of the Cross-Sectional Area for each Size
3/C - #12 AWG	0.167 sq. in.	10	1.67 sq. in.
4/C - #12 AWG	0.190 sq. in.	8	1.52 sq. in.
3/C - # 6 AWG	0.430 sq. in.	6	2.58 sq. in.
3/C - # 2 AWG	0.800 sq. in.	9	7.20 sq. in.

The sum of the total areas is 1.67 + 1.52 + 2.58 + 7.20 = 12.97 inches.
Using Table 4, a 12-inch wide tray with an allowable cable area of 14 sq. inches should be used.

Note: Increasing the cable tray loading depth does not permit an increase in allowable cable area for power and lighting cables. The maximum allowable cable area for all cable tray with a 3 inch or greater loading depth is limited to the allowable cable area for a 3 inch loading depth.

(3) 4/0 or Larger Cables Installed with Cables Smaller than 4/0

The ladder cable tray needs to be divided into two zones (a barrier or divider is not required but one can be used if desired) so that the No. 4/0 and larger cables have a dedicated zone, as they are to be placed in a single layer.

continued on CTS-18

Allowable Cable Fill

A direct method to determine the correct cable tray width is to figure the cable tray widths required for each of the cable combinations per steps (2) & (3).
Then add the widths in order to select the proper cable tray width.

Example: The cable tray width is obtained as follows:

Part A- Width required for #4/0 AWG and larger multiconductor cables

List Cable Size	(D) List Cable Outside Diameter	(N) List Number of Cables	Multiply (D) x (N) = Subtotal of the Sum of the Cable Diameters (Sd)
3/C - #500 kcmil	2.26 inches	1	2.26 inches
3/C - #4/0 AGW	1.55 inches	2	3.10 inches

Cable tray width (inches) required for large cables = 2.26 + 3.10 = 5.36 inches.

Part B- Width required for multiconductor cables smaller than #4/0 AWG

List Cable Sizes	(A) List Cable Cross Sectional Areas	(N) List Number of Cables	Multiply (A) x (N) = Total of the Cross-Sectional Area for each Size
3/C - #12 AWG	0.167 sq. in.	10	1.67 sq. in.
3/C - #6 AWG	0.430 sq. in.	8	3.44 sq. in.
3/C - #2 AWG	0.800 sq. in.	2	1.60 sq. in.

The sum of the total areas (inches) = 1.67 + 3.44 + 1.60 = 6.71 sq. inches.
From Table 5, the cable tray width required for small cables is 6 inches.

The total cable tray width (inches) = 5.36 + 6.00 = 11.36 inches. A 12-inch wide cable tray is required.

(4) Multiconductor Control and/or Signal Cables Only

A ladder cable tray containing only control and/or signal cables, may have 50% of its total available cable area filled with cable. When using solid bottom cable tray pans, the allowable cable area is reduced from 50% to 40%.

Example: Cable tray width is obtained as follows:

2/C- #16 AWG instrumentation cable cross sectional area = 0.04 sq. in.
Total cross sectional area for 300 Cables = 12.00 sq. in.
Minimum available cable area needed = 12.00 x 2 = 24.00 sq. in.; therefore the cable tray width required for 4 inch available loading depth tray = 24.00/4 = 6 inches.

II) Number of Single Conductor Cables Rated 2000 Volts or Less in the Cable Tray

All single conductor cables to be installed in the cable tray must be 1/0 or larger, and are not to be installed with continuous bottom pans.

(1) 1000 KCMIL or Larger Cables

The sum of the diameters (Sd) for all single conductor cables to be installed shall not exceed the cable tray width. See Table 6.

Table 6

Inside Width of Cable Tray inches	Allowable Cable Area square inches
6	6.50
9	9.50
12	13.00
18	19.50
24	26.00
30	32.50
36	39.00

Cable Tray Selection

Allowable Cable Fill

(2) 250 KCMIL to 1000 KCMIL Cables

The total sum of the cross-sectional areas of all the single conductor cables to be installed in the cable tray must be equal to or less than the allowable cable area for the tray width, as indicated in Table 6. (Reference Table 8)

(3) 1000 KCMIL or Larger Cables Installed with Cables Smaller Than 1000 KCMIL

The total sum of the cross-sectional areas of all the single conductor cables to be installed in the cable tray must be equal to or less than the allowable cable area for the tray width, as indicated in Table 7.

Table 7

Inside Width of Cable Tray inches	Allowable Cable Area square inches
6	6.50 - (1.1 Sd)
9	9.50 - (1.1 Sd)
12	13.00 - (1.1 Sd)
18	19.50 - (1.1 Sd)
24	26.00 - (1.1 Sd)
30	32.50 - (1.1 Sd)
36	39.00 - (1.1 Sd)

(4) Single Conductor Cables 1/0 through 4/0

These single conductors must be installed in a single layer. See Table 8.

Note: It is the opinion of some that this practice may cause problems with unbalanced voltages. To avoid these potential problems, the individual conductors for this type of cable tray wiring system should be bundled with ties. The bundle should contain all of the three-phase conductors for the circuit, plus the neutral if used. The single conductor cables bundle should be firmly tied to the cable tray assembly at least every 6 feet.

Table 8

Number of 600 Volt Single Conductor Cables That May Be Installed in Ladder Cable Tray

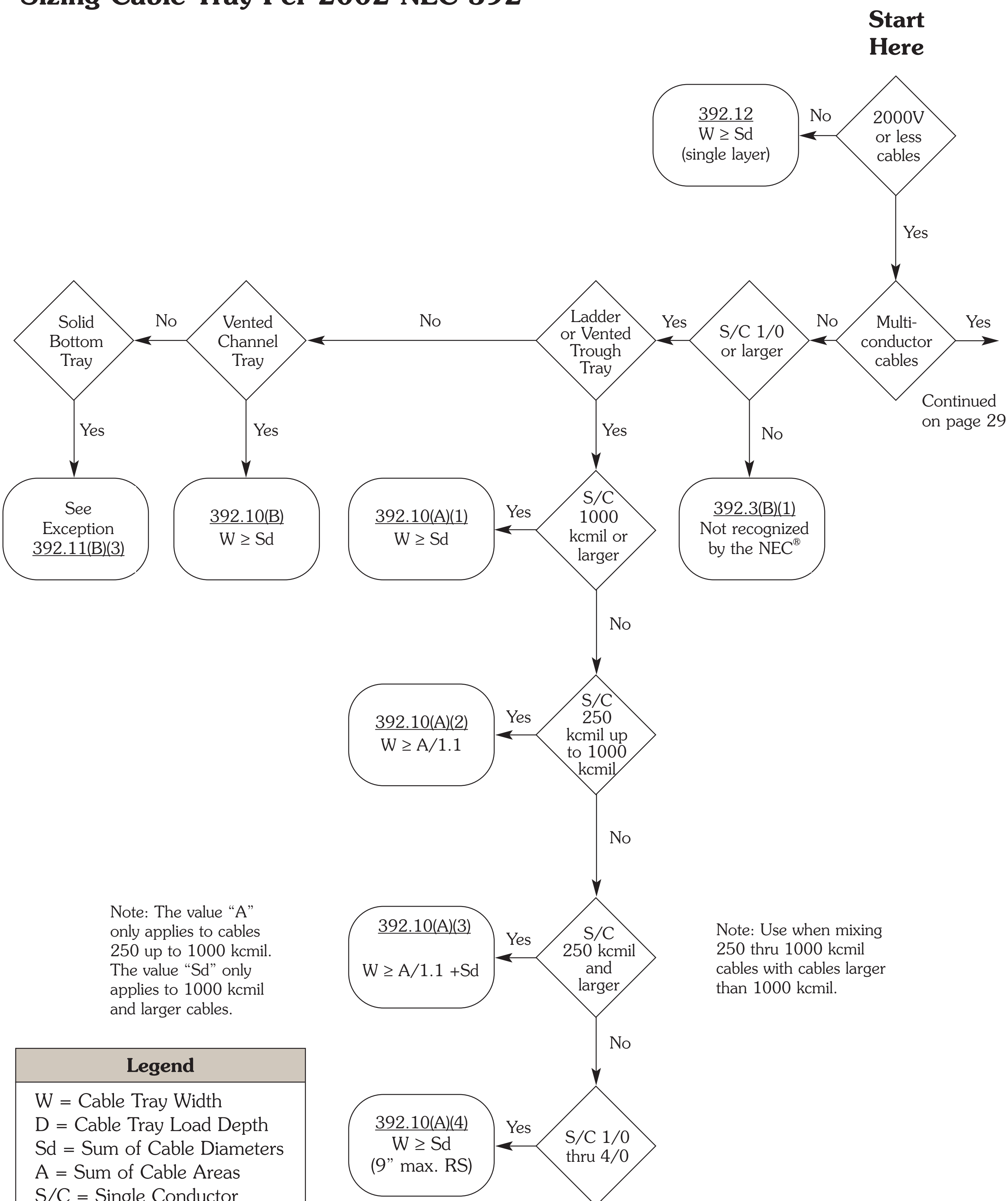
Single Conductor Size	Outside Diameter in.	Area sq. in.	Cable Tray Width				
			6 in.	9 in.	12 in.	18 in.	24 in.
1/0	0.58	-	10	15	20	31	41
2/0	0.62	-	9	14	19	29	38
3/0	0.68	-	8	13	17	26	35
4/0	0.73	-	8	12	16	24	32
250 Kcmil	0.84	.55	11	18	24	35	47
350 Kcmil	0.94	.69	9	14	19	28	38
500 Kcmil	1.07	.90	7	11	14	22	29
750 Kcmil	1.28	1.29	5	8	10	15	20
1000 Kcmil	1.45	-	4	6	8	12	16

Cable diameters used are those for Oknite-Okolon 600 volt single conductor power cables.

III) Number of Type MV and MC Cables Rated 2001 Volts or Over in the Cable Tray

The sum of the diameters (Sd) of all cables, rated 2001 volts or over, is not to exceed the cable tray width.

Sizing Cable Tray Per 2002 NEC 392



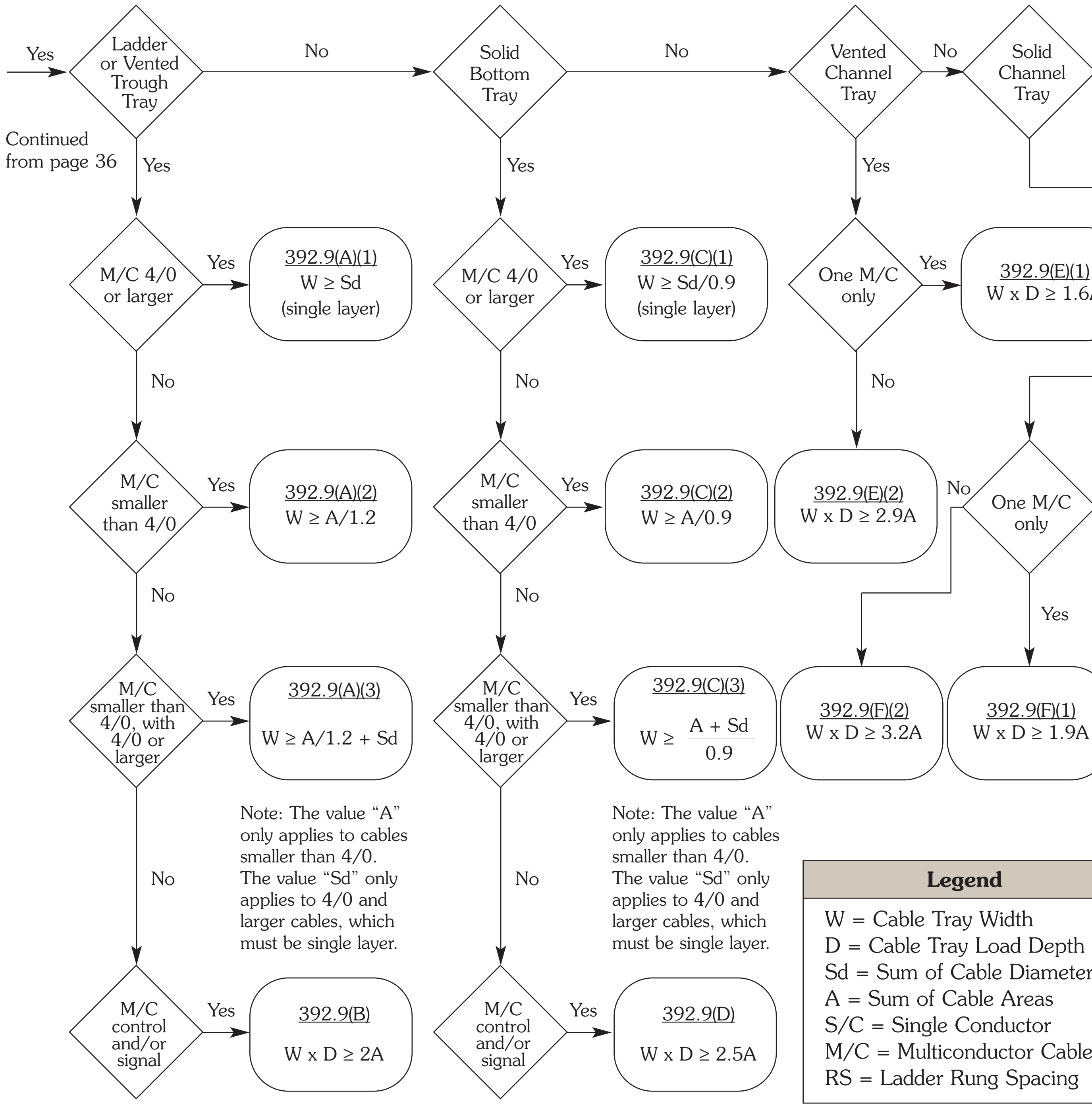
Legend

W = Cable Tray Width
D = Cable Tray Load Depth
Sd = Sum of Cable Diameters
A = Sum of Cable Areas
S/C = Single Conductor
M/C = Multiconductor Cables
RS = Ladder Rung Spacing

Cable Tray Selection

Cable Tray Selection - Width and Available Loading Depth

Note: See appendix on page A-15 for additional information regarding cable ampacity and hazardous (classified) location requirements which might effect the cable tray sizing flow chart.



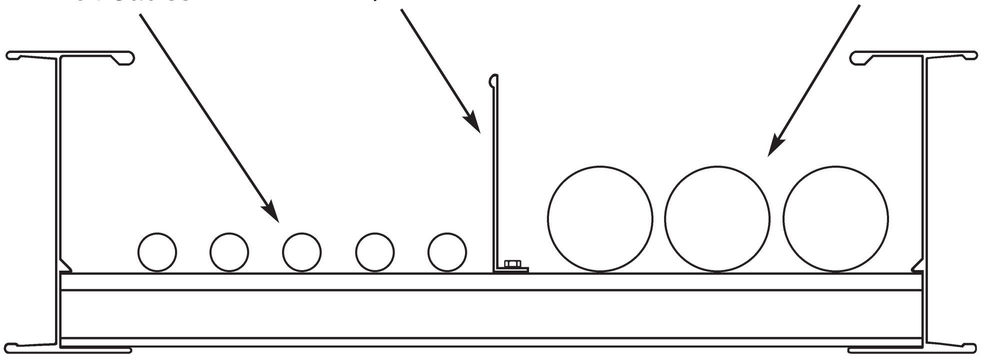
Legend

W = Cable Tray Width
D = Cable Tray Load Depth
Sd = Sum of Cable Diameters
A = Sum of Cable Areas
S/C = Single Conductor
M/C = Multiconductor Cables
RS = Ladder Rung Spacing

Cable Tray Selection - Width and Available Loading Depth

Barrier Requirements

Barrier strips are used to separate cable systems, such as when cables above and below 600 volts per NEC 392.6(F) are installed in the same cable tray. However, when MC type cables rated over 600 volts are installed in the same cable tray with cables rated 600 volts or less, no barriers are required. The barriers should be made of the same material type as the cable tray.
When ordering the barrier, the height must match the *loading depth* of the cable tray into which it is being installed.



Future Expansion Requirements

One of the many features of cable tray is the ease of adding cables to an existing system. Future expansion should always be considered when selecting a cable tray, and allowance should be made for additional *fill area* and *load capacity*. A minimum of 50% expansion allowance is recommended.

Space Limitations

Any obstacles which could interfere with a cable tray installation should be considered when selecting a cable tray width and height. Adequate clearances should be allowed for installation of supports and for cable accessibility.
Note: The overall cable tray dimensions typically exceed the nominal tray width and loading depth.

Lengths Available

The current Cable Tray Standard, NEMA VE 1 and C22.2 No. 126.1-98, lists typical lengths as 3000 mm (10 ft), 3660 mm (12 ft), 6000 mm (20 ft), and 7320 mm (24 ft). It is impractical to manufacture either lighter systems in the longer lengths or heavier systems in the shorter lengths. For that reason, Cooper B-Line has introduced a primary and secondary length for each system. These straight section lengths were selected to direct the user to lengths that best suit support span demands and practical loading requirements. The primary length is the one that is the most appropriate for the strength of the system and that will provide the fastest service levels. The secondary lengths will be made available to service additional requirements. Special lengths are available with extended lead times.

For additional information please review the information contained on the Cooper B-Line website at www.cooperbline.com/product/CableTray/LengthSelection.asp.

Support Span

Per the NEMA VE 2, the support span on which a cable tray is installed should not exceed the length of the unspliced straight section. Thus installations with support spans greater than 12 feet should use 240" (20 feet) or 288" (24 feet) cable tray lengths.

Space Limitations

Consideration should be given to the space available for moving the cable tray from delivery to it's final installation location. Obviously, shorter cable tray allows for more maneuverability in tight spaces.

Installation

Shorter cable tray lengths are typically easier to maneuver on the job site during installation. Two people may be needed to manipulate longer cable tray sections, while shorter sections might be handled by one person. Although longer cable tray lengths are more difficult to maneuver, they can reduce installation time due to the fact that there are fewer splice connections. This trade-off should be evaluated for each set of job site restrictions.

Power Application:

Power application can create the heaviest loading. The heaviest cable combination found was for large diameter cables (i.e. steel armor, 600V, 4 conductor 750 kcmil). The cables weigh less than 3.8 lbs. per inch-width of cable tray. As power cables are installed in a single layer, the width of the cable affects the possible loading.

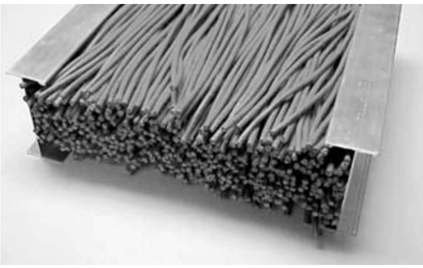
36" Wide	30" Wide	24" Wide	18" Wide	12" Wide	9" Wide	6" Wide
140 lbs/ft	115 lbs/ft	90 lbs/ft	70 lbs/ft	45 lbs/ft	35 lbs/ft	23 lbs/ft

Data/Communication Cabling:

Low voltage cables can be stacked as there is no heat generation problems. The NEC employs a calculation of the total cross sectional area of the cables not exceeding 50% of the fill area of the cable tray. As the cable fill area of the cable tray system affects the possible loading, both the loading depth and width of the systems must be considered. For this example 4UTP category 5 cable (O.D. = .21, .026 lbs./ft.) were used.

Calculated Cable Weight in Lbs/Ft

	36" Wide	30" Wide	24" Wide	18" Wide	12" Wide	9" Wide	6" Wide
6" Fill	81	64	52	41	27	20	14
5" Fill	68	53	43	34	23	17	12
4" Fill	54	43	35	27	18	13	9
3" Fill	41	32	26	21	14	10	7



The picture shows a 12" cable tray with a 3" load depth. The tray contains 520 4 UTP Category 5 cables with a .21" diameter.

The National Electrical Code allows for 50% fill of ventilated and ladder cable tray for control or signal wiring (Article 392.9(B)). ANSI/EIA/TIA 569-A Section 4.5* also requires that the fill ratio of cable tray is not to exceed 50%.

Calculation Example:
Tray Area = 12 in. x 3 in. = 36 sq. in.
50% Fill = 36 sq. in. x .5 = 18 sq. in.
Cable Area = (.21 in.)^2 x 3.14/4 = .0346 sq. in.
Number of Cables = 18 sq. in. / .0346 sq. in. = 520 cables

*Section 4.5 is currently under review.

Other Factors To Consider

- **Support Span -** The distance between the supports affects the loading capabilities exponentially. To calculate loading values not cataloged use:

  $W_1 L_1^2 = W_2 L^2_2$
  W_1 - tested loading
  L_1 - span in feet, a tested span
  W_2 - loading in question
  L_2 - known span for new loading

- **Other Loads -** Ice, wind, snow for outdoor systems see page 26 and 27 for information. A 200 lb. concentrated load for industrial systems. The affect of a concentrated load can be calculated as follows

  $$\frac{2 \text{ x (concentrated static load)}}{\text{span in feet}}$$

  When considering concentrated loads the rung strength should be considered.

- **Length Of The Straight Sections:**
  The VE 2, Cable Tray Installation Guide, states that the support span shall not be greater than the straight section length. If a 20C system is manufactured in 12 foot sections the greatest span for supports would be 12 feet. This dramatically affects the loading of the system.

  $W_1 L_1^2 = W_2 L^2_2$
  $100 (20^2) = W_2 (12^2)$
  $40{,}000 = 144 W_2$
  W_2 = 277 lbs. per foot

Cable Tray Selection - Bottom Type

Type of Cable

According to NEC Article 392, multiconductor tray cable may be installed in any standard cable tray bottom type. According to the 2005 NEC Article 392.11(8)(3), single conductor tray cable may be installed in any standard cable tray bottom type. Solid bottom cable trays are not allowed to be installed in Class II, Division 2 locations (2002 NEC Section 502.4(B)). In general, small, highly flexible cables should be installed in solid bottom, vented bottom or 6" rung spacing ladder type cable trays. Sensitive cables (e.g. fiberoptic) are typically installed in flat, solid bottom cable trays, instead of corrugated trough bottoms. Larger, less flexible cables are typically installed in ladder type cable trays having 9" or 12" rung spacing. Ladder type cable trays having 18" rung spacing should be used for large, stiff cables to reduce cost and facilitate cable drop-outs.

Cost vs Strength

Often more than one bottom type is acceptable. In this case the economic difference should be considered. Ladder cable trays have a lower cost than either non-ventilated or ventilated bottom configurations. Typically, the cost of ladder type cable tray decreases as rung spacing increases. However, the effect of rung spacing on load capacity for ladder type cable trays with 18" rung spacing should be evaluated, since NEMA published load capacities are based on 12" rung spacing. Rung spacing can affect individual rung and side rail loading as well as system load capacity. Rung loads applied during cable installation should also be considered. (See page CTS-14 for Cooper B-Line rung load capacities)

Cable Exposure

Tray cables are manufactured to withstand the environment without additional protection, favoring the use of the ladder type cable tray. Some areas may benefit from the limited exposure of solid or vented bottom cable tray. Solid Bottom metal cable tray with solid metal covers can be utilized in other spaces used for environmental air to support non plenum rated tray cables (2002 NEC® 300.22(C)(1))

Cable Attachment

The major advantage of ladder type cable tray is the freedom of entry and exit of the cables. Another advantage of ladder type cable tray is the ability to secure cables in the cable tray. With standard rungs the cables may be attached with either cable ties or cable clamps. The ladder type cable tray is also available with special purpose, slotted marine or strut rungs to facilitate banding or clamping cables. Cable attachment is particularly important on vertical runs or when the tray is installed on its side. Ladder rung spacing should be chosen to provide adequate cable attachment points while allowing the cables to exit the system.

Cable Tray Selection - Fitting Radius

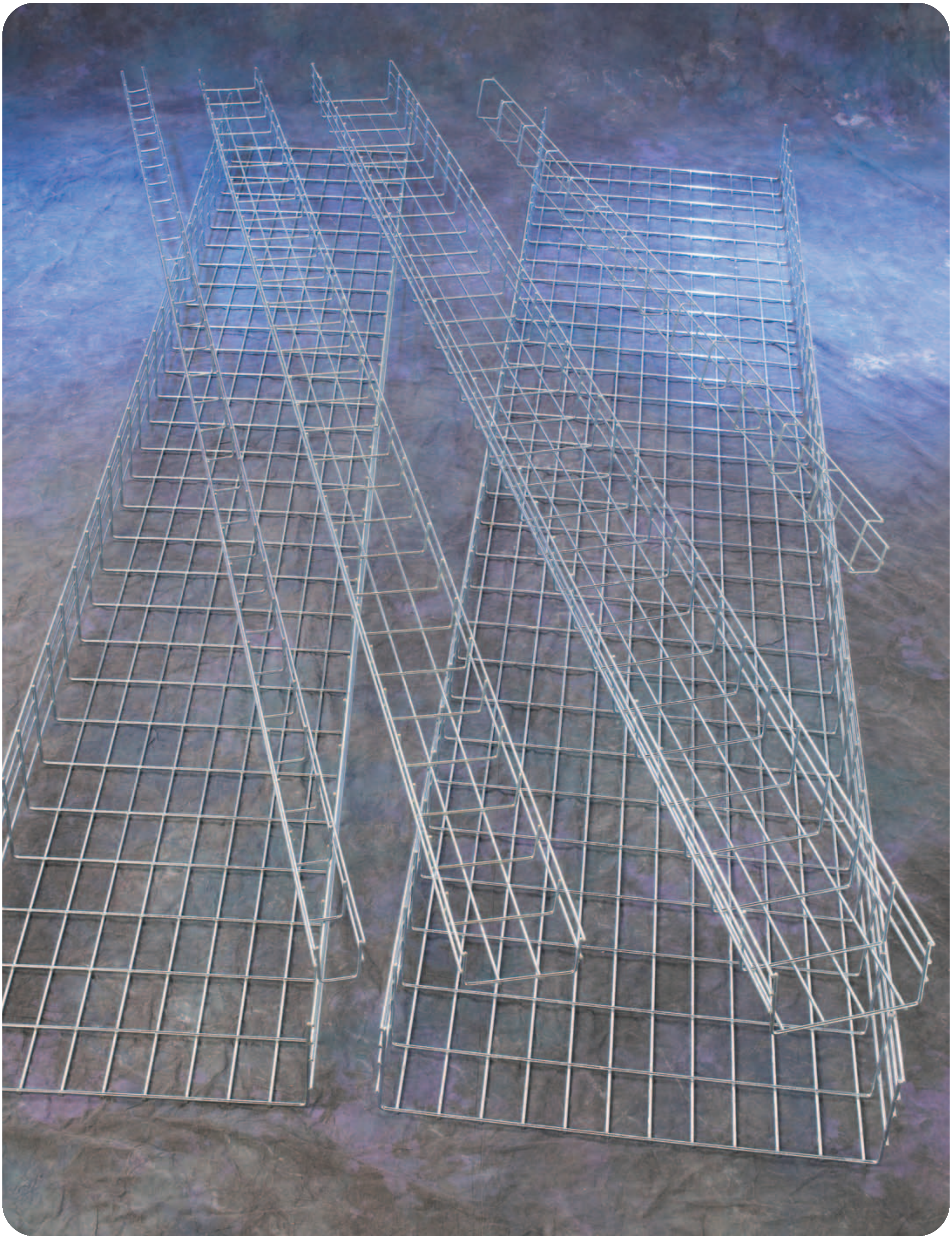
Cable Flexibility

The proper bend radius for cable tray fittings is usually determined by the bend radius and stiffness of the tray cables to be installed. Typically, the tray cable manufacturer will recommend a minimum bend allowance for each cable. The fitting radius should be equal to or larger than the minimum bend radius of the largest cable which may ever be installed in the system. When several cables are to be installed in the same cable tray, a larger bend radius may be desirable to ease cable installation.

Space Limitations

The overall dimensions for a cable tray fitting will increase as the bend radius increases. Size and cost make the smallest acceptable fitting radius most desirable. When large radius fittings are required, the system layout must be designed to allow adequate space.

Wire Basket



How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my wire basket product so that I get the quickest turnaround?

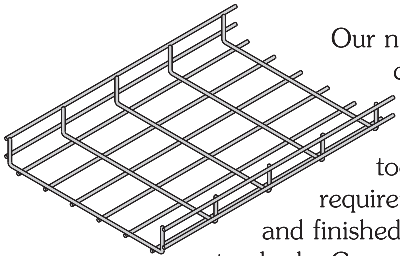
Service Advisor: Each part of our selection chart is shown in colors. Example: if your wire basket part number is shown with a green dot, your product will typically ship in 3-5 working days.

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - Technical Data

Cooper B-Line's Wire Basket Cable Tray Systems are produced from ASTM A510 high strength steel wires. A fully automated welding process produces continuous wire mesh, which is formed into our Wire Basket System. The standard 2" x 4" (50 x 100 mm) wire mesh pattern is designed for maximum flexibility, allowing for easy field cutting, bending, assembly and convenient cable drop outs. Fast - Adaptable - Economical

Wire Basket Cable Tray Systems

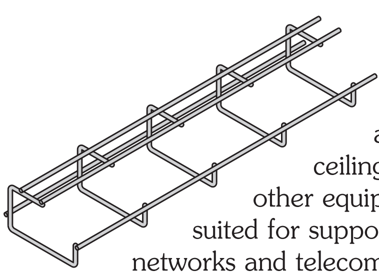


Our new generation cable support system is adaptable for today's cabling requirements and is sized and finished to match industry standards. Cooper B-Line's Wire Basket System provides the necessary cable support while allowing unmatched field installation adaptability. Pre-packaged installation kits and accessory options strengthen this new system's advantages and flexibility, a new concept for today's demanding requirements.

Standard stock finish: Zinc Plated, silver in color, ASTM B633 SC2 with clear chromate sealer.

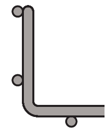
Other finishes available:	Use Suffix
Telco Gray	TG
Flat Black	FB
Computer White	CW
Stainless Steel AISI Type 304	SS4
Stainless Steel AISI Type 316L	SS6

Snap Mount Wire Basket



The Snap Mount Wire Basket attaches directly to ceilings, racks, walls and other equipment. It is ideally suited for support of local area networks and telecom cables.

Construction



Our patented rounded wire ends are designed for the safety of cables and installers. Along the cable tray sides (flanges) each wire end features our unique rounded end which provides for safe handling and protects cables from damage during installation. Cooper B-Line's straight top wire design maximizes the rigidity of the system, provides higher strengths, and better strength to weight ratios than systems with "bent" top wire designs. (Refer to information in Wire Basket Sales Sheet.)

Finishes

The surface coating provides protection against corrosion and is an important part of Cooper B-Line's Wire Basket System and accessories. Standard finishes are indicated on each catalog page and consist of one of the following:

Zinc Plated

The standard stock finish on Wire Basket is electro-plated zinc with clear chromate sealer, silver in color, in accordance with ASTM B633 SC2. Corrosion resistance is 87 hours in a saline spray test per ASTM B117-90. This coating is recommended for indoor or sheltered outdoor installations.

Zinc plated, (standard finish for some accessories) for all non-threaded components is in accordance with ASTM B633 SC3, and for ease of assembly ASTM B633 SC1 for all threaded components. These coatings are recommended for indoor use or in sheltered outdoor installations.

Stainless Steel

Stainless steel AISI Type 304 & 316L Wire Basket and accessories are also available. Stainless steel provides the strongest corrosion protection and is suitable for use in marine environments. Contact factory for details.

Paint

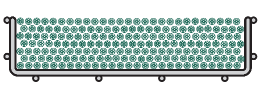
Durable computer white, flat black or telco gray coatings are applied over zinc plating. These coatings provide color match to new or existing equipment and are suitable for indoor or sheltered mild outdoor installations.

Pre-Galvanized Zinc

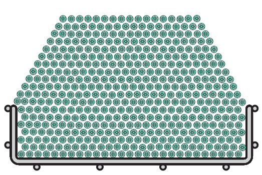
Our pre-galvanized zinc finish, (standard finish for some cataloged supports), is produced by continuously coating the steel with zinc (prior to fabrication) in accordance with ASTM A653 (CSA Type 2). This coating is recommended for indoor or sheltered outdoor installation.

Strength

Cooper B-Line Wire Basket Systems are designed to support the volume capacity of the cables and provide safe mechanical support for spans up to 8 feet (2.4 meters) on center. Tested load deflection data is available either in accordance with NEMA VE1 or proposed IEC 61537 standards. Refer to Appendix page WB-29 for additional loading information.



*Capacity



Tested Capacity

* Cable fill is controlled by applicable code.

UL Classification

The following Wire Basket Systems are classified by Underwriters Laboratories, Inc. (File No. E556) as equipment grounding conductors:

WB212	(2" deep x 12" wide)
WB218	(2" deep x 18" wide)
WB221	(2" deep x 21" wide)
WB224	(2" deep x 24" wide)
WB408	(4" deep x 8" wide)
WB412	(4" deep x 12" wide)
WB418	(4" deep x 18" wide)
WB421	(4" deep x 21" wide)
WB424	(4" deep x 24" wide)
WB612	(6" deep x 12" wide)
WB618	(6" deep x 18" wide)
WB620	(6" deep x 20" wide)
WB624	(6" deep x 24" wide)

In order to maintain continuous grounding, one of the following splicing methods must be used:

WB4CA	Connector Assy.
WB4SP and WB4CP	Splice Plate and Clamp Assy.
WB12SB and WB4CP	Splice Bar and Clamp Assy.

Cutting and removing wire segments may reduce the cross sectional area of the Wire Basket System and require the use of a grounding clamp and conductor.

Grounding

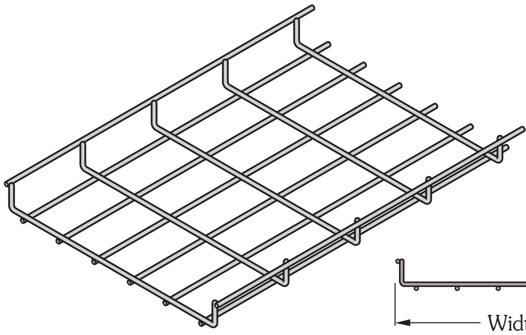
It is recommended practice to ground all metallic cable tray systems.

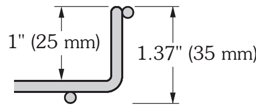
Data and communication circuits (low voltage) require grounding for static discharge, noise, etc. The standard Cooper B-Line bolted tray connectors for splices and field-cut fittings provide electrical continuity for this purpose. The tray system should be grounded as required by the NEC.

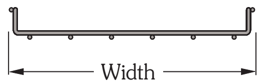
Although Cooper B-Line's Wire Basket System is UL classified as an equipment ground conductor, Cooper B-Line recommends the use of a properly sized continuous ground wire attached to each wire basket section. A painted wire basket system requires that paint be removed at each attachment point.

Wire Basket - Straight Sections

WB100 Series Wire Basket System



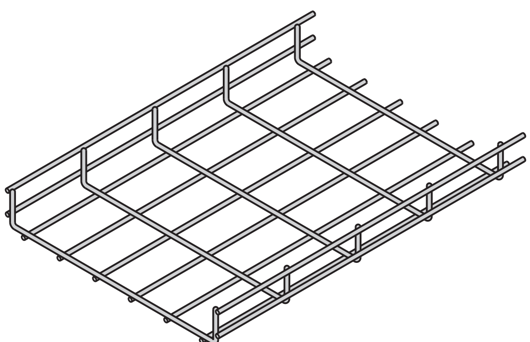


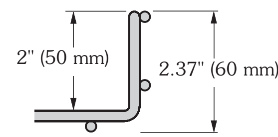


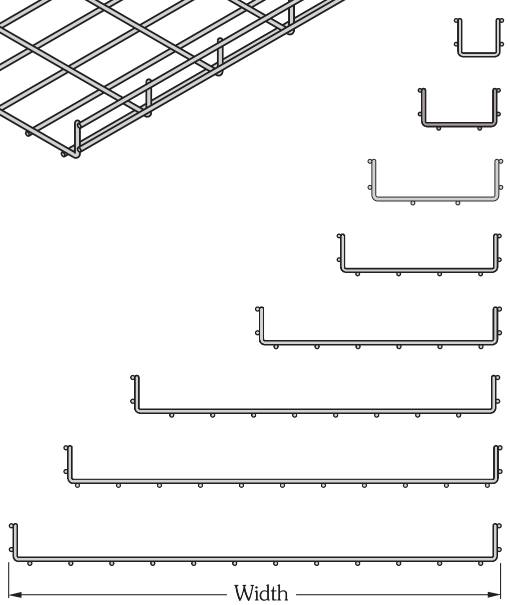
Part Number	Width in.	Width mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg
● **WB112**	12	300	9.12	4.14

Height: 1.37" (35 mm) **Length:** 118" (3 meter) **Wire Dia.:** .173" (4.4 mm)
Standard Finish: Zinc Plated (Other finishes available see page WB-3.)

WB200 Series Wire Basket System







Part Number	Width in.	Width mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg
● **WB202†**	2	50	4.44	2.01
● **WB204†**	4	100	6.27	2.85
● **WB206†**	6	150	7.47	3.39
● **WB208**	8	200	10.71	4.86
● **WB212†**	12	300	13.68	6.21
● **WB218**	18	450	17.22	7.81
● **WB221**	21	540	19.82	8.99
● **WB224**	24	600	22.62	10.26

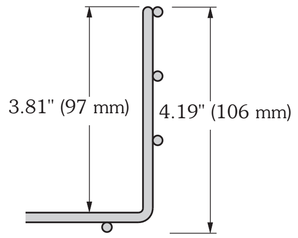
Height: 2.37" (60 mm) **Length:** 118" (3 meter)
Wire Dia.: 2" - 8" wide (50 mm - 200 mm) .173" (4.4 mm), 12" - 24" wide (300 mm - 600 mm) .191" (4.9 mm)
Standard Finish: Zinc Plated, (Other finishes available see page WB-3.)
† Stocked in Stainless Steel

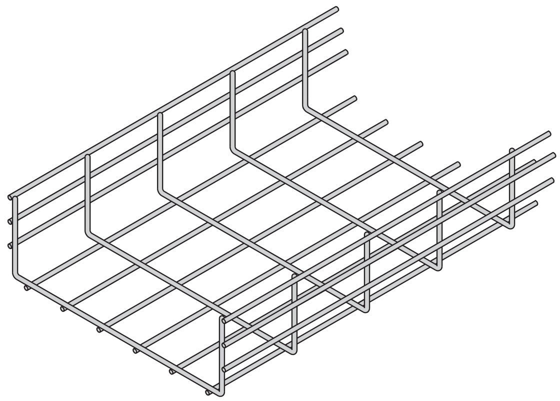
Wire Basket

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

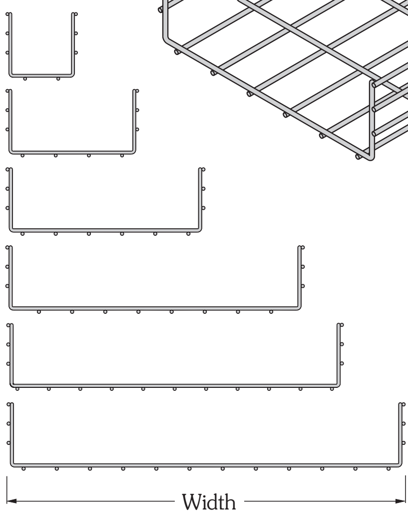
Wire Basket - Straight Sections

WB400 Series Wire Basket System





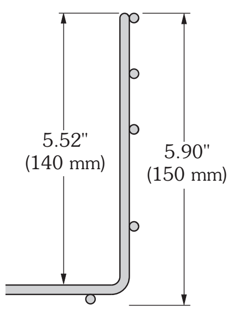
Part Number	Width in.	Width mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg
● **WB404**	4	100	10.71	4.86
● **WB408**	8	200	13.69	6.21
● **WB412†**	12	300	16.67	7.56
● **WB418†**	18	450	20.11	9.12
● **WB421**	21	540	23.05	10.46z
● **WB424**	24	600	25.60	11.61

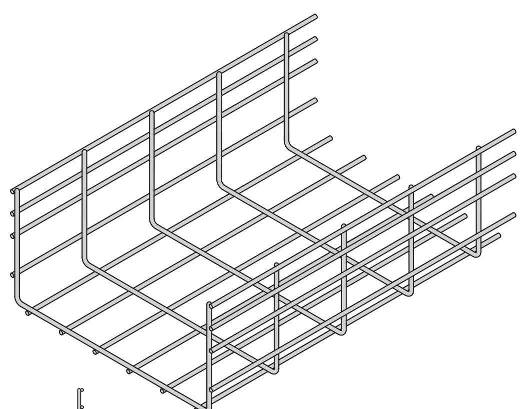


Height: 4.19" (106 mm) **Length:** 118" (3 meter) **Wire Dia.:** .191" (4.9 mm)
Standard Finish: Zinc Plated, (Other finishes available see page WB-3.)

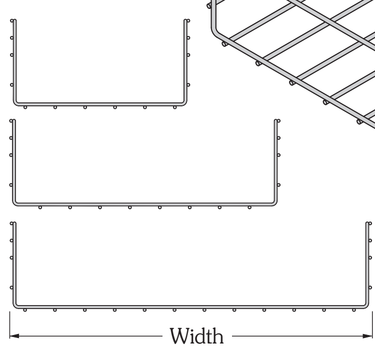
† Stocked in Stainless Steel

WB600 Series Wire Basket System





Part Number	Width in.	Width mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg
● **WB612**	12	300	19.55	8.87
● **WB618**	18	450	23.05	10.46
● **WB620**	20	500	25.60	11.61
● **WB624**	24	600	28.52	12.94



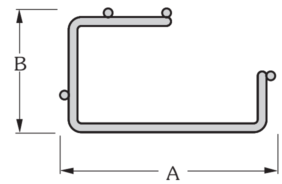
Height: 5.90" (150 mm) **Length:** 118" (3 meter) **Wire Dia.:** .191" (4.9 mm)
Standard Finish: Zinc Plated (Other finishes available see page WB-3.)

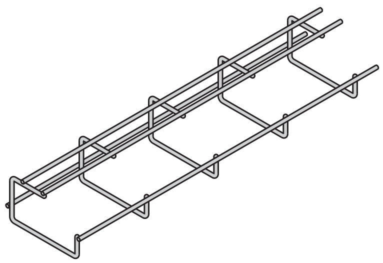
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - *Straight Sections*

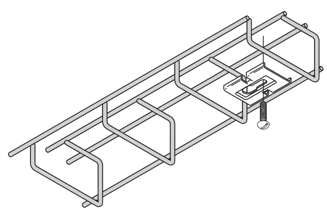
WB504 Series Snap Mount Wire System

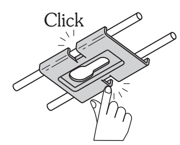
Snap Mount Wire System attaches directly to ceilings, walls and equipment racks without brackets. Attach with WB4SC Snap Clamps. Ideally suited for support of local area networks and telecom cables.





Part Number	A in.	A mm	B in.	B mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg
● **WB504**	4.3	110	2.5	63	1.76	.8



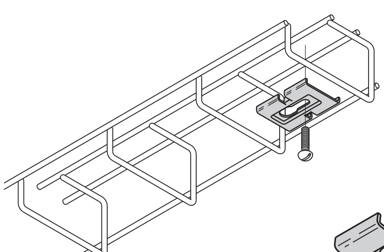


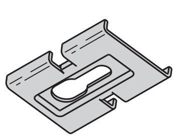
Snap Clamp WB4SC

Height: 2.5" (63 mm)
Length: 78" (2 meter)
Wire Dia.: .173" (4.4 mm)
Standard Finish: Zinc Plated, (Other finishes available see page WB-3.)

Wire Basket - *Accessories*

Snap Clamp





Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB4SC**	11.0	5.0	25

Snap Clamp is designed for quick attachment of Series WB504 Snap Mount Wire Basket to ceilings, racks, walls and other equipment. Secure with 1/4" hardware (not included).

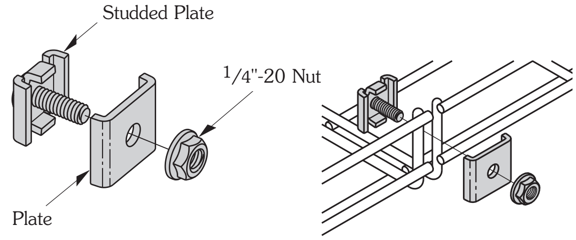
Finish: Zinc Plated

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Connector Assembly

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB4CA	4.9	2.2	50

Patented welded stud plate is designed for ease of installation and is the most widely used method for assembly of Wire Basket Systems. Use to connect two straight sections and to assemble horizontal fittings.

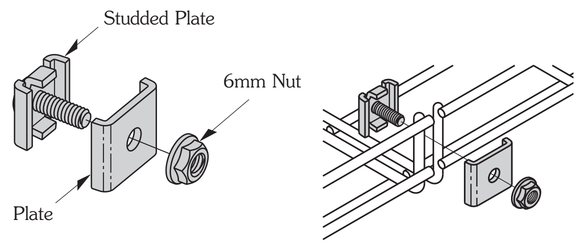


Finish: Zinc Plated

Connector Assembly

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WBM6CASS4	4.9	2.2	50

Patented welded stud plate is designed for ease of installation and is the most widely used method for assembly of Wire Basket Systems. Use to connect two straight sections and to assemble horizontal fittings.

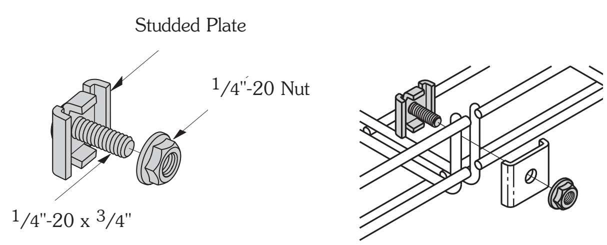


Finish: Stainless Steel Type 304

Clamp Assembly

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB4CP	3.3	1.5	50

Adaptable and designed for use with Connector Plate (WB4PL), Splice Plate (WB4SP), Splice Bars (WB12SB, WB43SB, and WB9TB) for splicing of straight sections and assembly of horizontal fittings.



Finish: Zinc Plated

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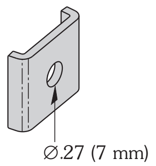
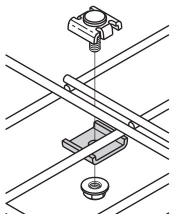
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - Accessories

Connector Plate (Only)



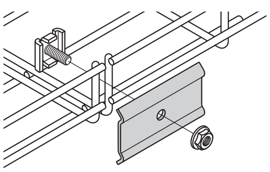


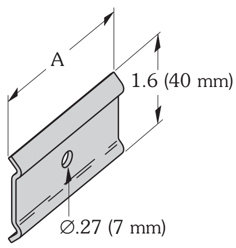
Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB4PL**	1.6	.70	50

Connector Plate combined with Clamp Assembly (WB4CP) creates a Connector Assembly WB4CA, see page WB-8.
Connector Plate can also be used as a Hold Down Clamp.

Finish: Zinc Plated

Splice Plate (Hardware Not Included)



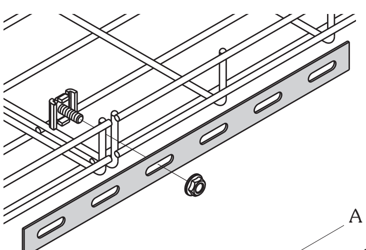


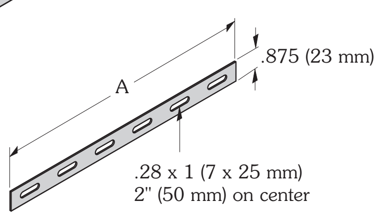
Part Number	A in.	A mm	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB4SP**	2.7	70	12.2	5.5	50

Splice Plate is designed for use with Clamp Assembly (WB4CP) to provide added stability of splice connections.
Use with Series 200, 400 and 600 Wire Basket Systems.

Finish: Zinc Plated
Stocked in Stainless Steel

Splice Bar





Part Number	A in.	A mm	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB12SB**	11.8	300	13.4	6.1	50

Splice Bars are designed for use with Clamp Assembly (WB4CP) to provide extra stability of splice connections.
Use with Series 200, 400 and 600 Wire Basket Systems.

Finish: Zinc Plated
Stocked in Stainless Steel

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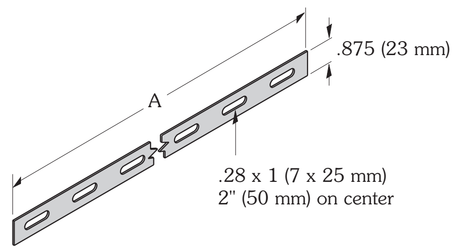
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Splice Bar (Only)

Part Number	A in.	A mm	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB43SB	43.4	1102	50.1	22.7	1

WB43SB long Splice Bar is used for assembly of large radius horizontal bends or field cut into short splice bars. Splice Bars are designed for use with Clamp Assembly (WB4CP)

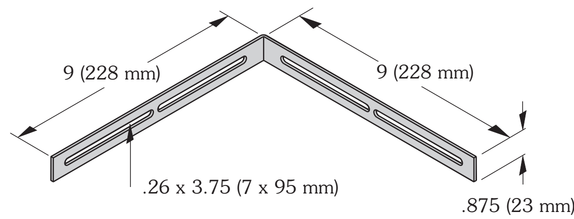


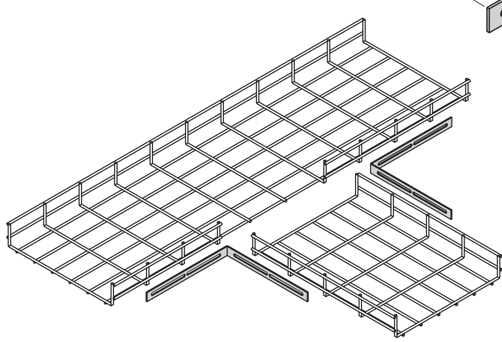
Finish: Zinc Plated

Tee Bar (Only)

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB9TB	43.8	19.9	10

Use to make Horizontal Tee Fittings. Sold individually without hardware.
To complete HT, use:
- 2 - WB9TB
- 8 - WB4CP (order separately)





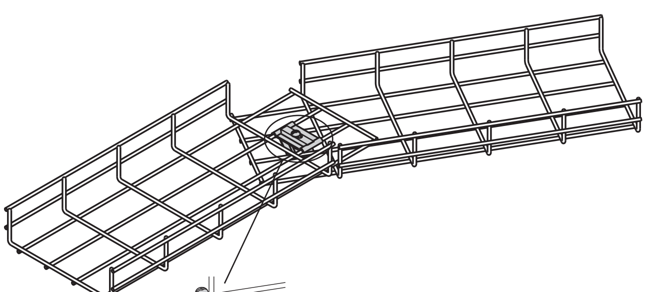
Finish: Pre-Galvanized Zinc

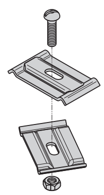
Horizontal Adjustable Kit

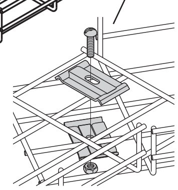
Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB4HAK	16.2	7.3	10

This conveniently poly-bagged horizontal adjustable kit can be used to create horizontal angles from prepared wire basket straight sections.

An additional installation illustration is located on page WB-36.







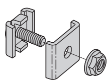
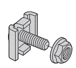
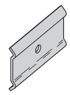
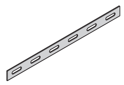
Finish: Zinc Plated

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

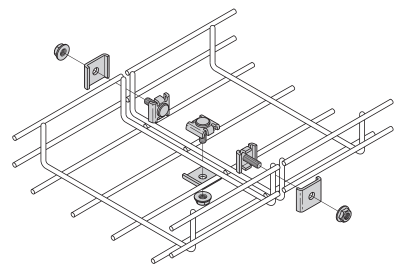
Components Required to Connect Two Sections of Wire Basket Systems

Order each component separately, or as poly-bagged splice kits.

See page WB-13 for new boltless option.

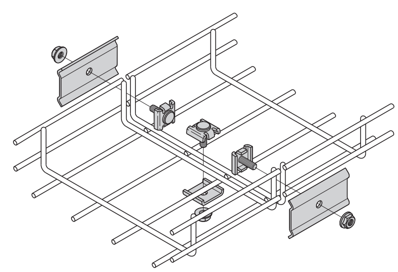
System Part Number	System Width in.	mm	Connector Assembly WB4CA	Clamp Assembly WB4CP	Splice Plate WB4SP	Splice Bar WB12SP
						

Connectors



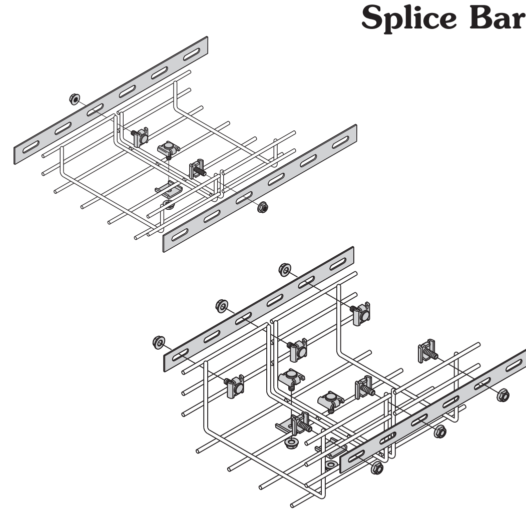
System Part Number	System Width in.	mm	Connector Assembly WB4CA	Clamp Assembly WB4CP	Splice Plate WB4SP	Splice Bar WB12SP
WB112	12	300	4[2]	-	-	-
WB202	2	50	2	-	-	-
WB204	4	100	2	-	-	-
WB206	6	150	3[1]	-	-	-
WB208	8	200	3[1]	-	-	-
WB212	12	300	4[2]	-	-	-
WB218	18	450	4[2]	-	-	-
WB221	21	525	4[2]	-	-	-
WB224	24	600	4[2]	-	-	-
WB404	4	100	4	-	-	-
WB408	8	200	6[5]	-	-	-
WB*12	12	300	6[5]	-	-	-
WB*18	18	450	7[6]	-	-	-
WB620	20	500	7[6]	-	-	-
WB421	21	525	7[6]	-	-	-
WB*24	24	600	7[6]	-	-	-

Splice Plates



System Part Number	System Width in.	mm	Connector Assembly WB4CA	Clamp Assembly WB4CP	Splice Plate WB4SP	Splice Bar WB12SP
WB202	2	50	-	2	2	-
WB204	4	100	-	2	2	-
WB206	6	150	1[1]	2	2	-
WB208	8	200	1[1]	2	2	-
WB212	12	300	2[2]	2	2	-
WB218	18	450	2[2]	2	2	-
WB221	21	525	2[2]	2	2	-
WB224	24	600	2[2]	2	2	-
WB404	4	100	-	2	2	-
WB408	8	200	2[2]	2	2	-
WB*12	12	300	3[3]	2	2	-
WB*18	18	450	4[4]	2	2	-
WB620	20	500	4[4]	2	2	-
WB421	21	525	4[4]	2	2	-
WB*24	24	600	4[4]	2	2	-

Splice Bars



System Part Number	System Width in.	mm	Connector Assembly WB4CA	Clamp Assembly WB4CP	Splice Plate WB4SP	Splice Bar WB12SP
WB202	2	50	-	2	-	2
WB204	4	100	-	2	-	2
WB206	6	150	1[1]	2	-	2
WB208	8	200	1[1]	2	-	2
WB212	12	300	2[2]	2	-	2
WB218	18	450	2[2]	2	-	2
WB221	21	525	2[2]	2	-	2
WB224	24	600	2[2]	2	-	2
WB404	4	100	-	6	-	2
WB408	8	200	2[2]	6	-	2
WB*12	12	300	2[2]	6	-	2
WB*18	18	450	3[3]	6	-	2
WB620	20	500	3[3]	6	-	2
WB421	21	525	3[3]	6	-	2
WB*24	24	600	3[3]	6	-	2

[1] Install one connector on the system bottom.
[2] Install two connectors on the system bottom.
[3] Install three connectors on the system bottom.
[4] Install four connectors on the system bottom.
[5] Install two connectors on the system bottom and two on each side.
[6] Install three connectors on the system bottom and two on each side.

* 4 for 400 Series Wire Basket
6 for 600 Series Wire Basket

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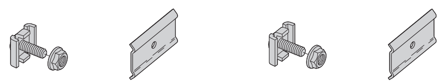
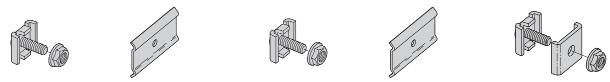
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

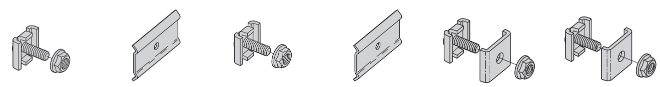
Splice Plate Kits For WB200 Series

Part Number	System Width in.	System Width mm	Weight Per 100 lbs.	Weight Per 100 kg	Box Quantity
● WB41SK	2 4	50 100	3.04	1.38	10
● WB42SK	6 8	150 200	3.09	1.40	10
● WB43SK	12 18 21 24	300 450 525 600	3.14	1.43	10

Conveniently poly-bagged for use with WB200 Series Wire Basket Systems



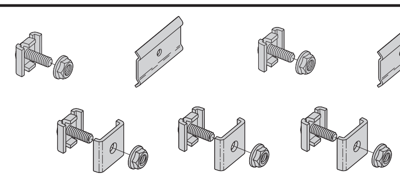


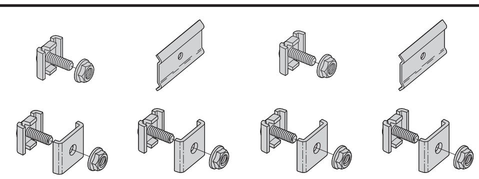


Splice Plate Kits For WB400 and WB600 Series

Part Number	System Width in.	System Width mm	Weight Per 100 lbs.	Weight Per 100 kg	Box Quantity
● WB44SK	4 8 12	100 200 300	3.19	1.45	10
● WB45SK	18 20 21 24	450 500 525 600	3.24	1.47	10

Conveniently poly-bagged for use with WB400 and WB600 Series Wire Basket Systems





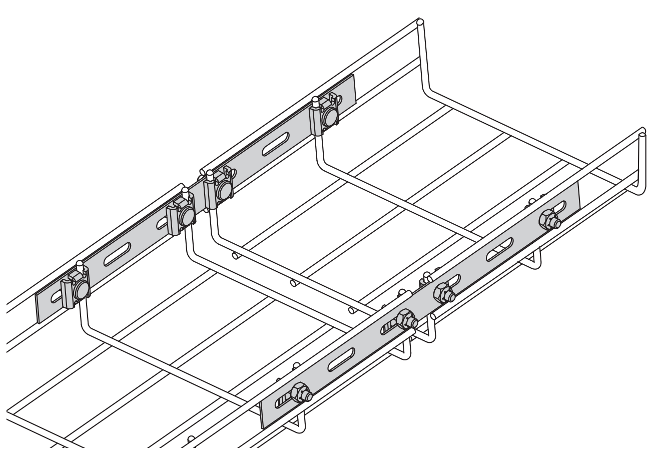
Expansion Splice Kit

- Use on 200, 400 and 600 series wire basket systems
- Kit allows $1^{3}/_{4}$" (44 mm) expansion between two pieces of wire basket

Includes: Two WB12SB and Hardware

Finish: Zinc Plated

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB4ESK	53.2	24.1	5



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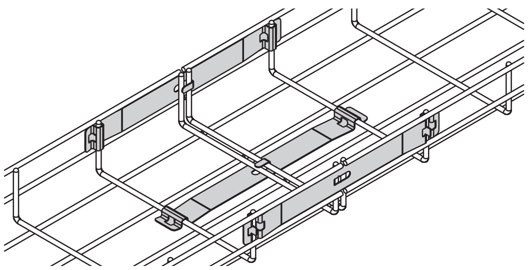
● Red = Normally long lead-time items (15 working days minimum)

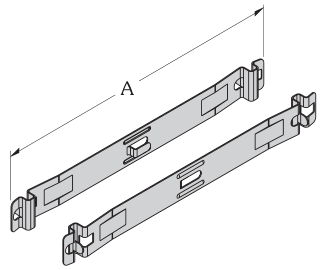
Wire Basket - Accessories

Tab-Loc Connector



Finish: Zinc Plated

Part Number	A in.	A mm	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB-TLC**	9.29	236	16.5	7.5	50



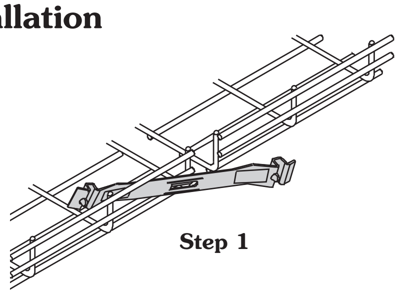
Application Requirements For WB200 Series, WB400 Series and WB600 Series

The recommendations listed are equal for all depths (except as noted).

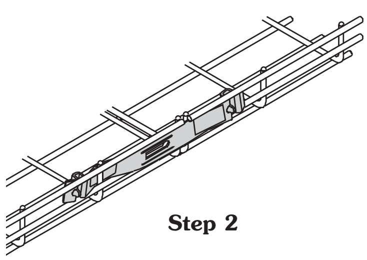
NOTE: UL Classification refers to the NEC 392-7(b)(4) which requires by definition, a bolted mechanical connection.

Widths	Available Depths	Side Splice	Bottom Splice
02	2”	2	N/A
04	2” & 4”	2	1
06	2”	2	1
08	2” & 4”	2	1
12	2”, 4” & 6”	2	1
18	2”, 4” & 6”	2	2
20	6”	2	2
21	2” & 4”	2	2
24	2”, 4” & 6”	2	2

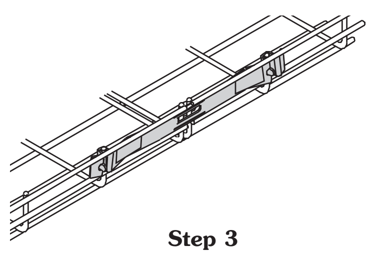
Installation



Step 1

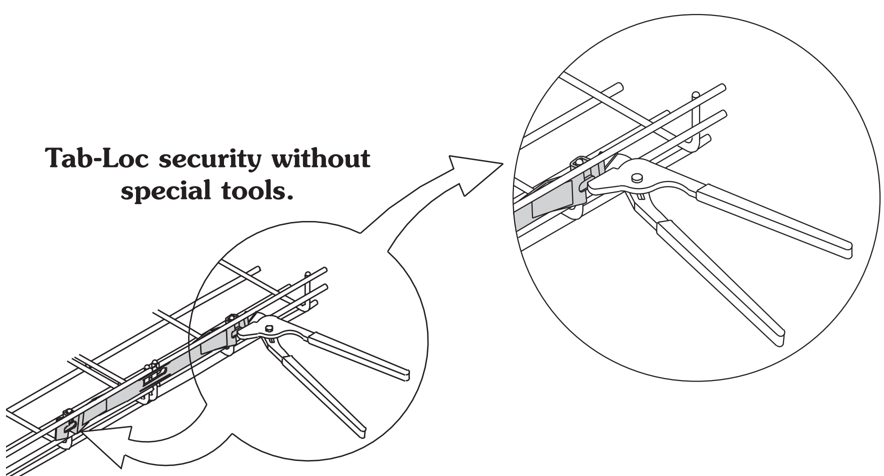


Step 2



Step 3

Tab-Loc security without special tools.

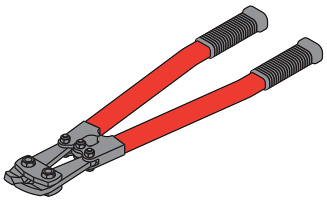


Screw-driver can also be used to bend tab-locs (hold connector ends while bending).

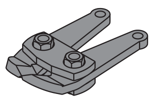
Step 4

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Angular Bolt Cutter WB30BC



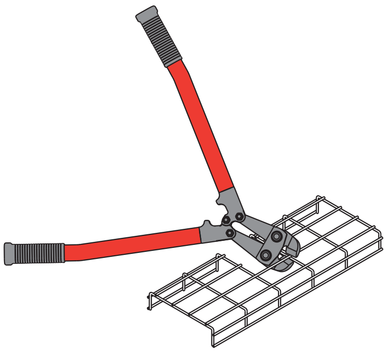
WB30BC
Angular Bolt Cutter

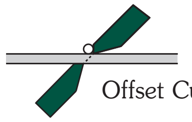


WB30RB
Replacement Blade

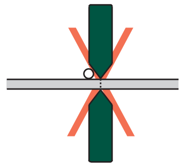
Part Number	Size in.	Size mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **WB30BC**	24	600	6.8	3.1	1
● **WB30RB**	-	-	1.3	.6	1

Completely adaptable, Cooper B-Line's Wire Basket System is designed to accommodate jobsite changes. Straight sections can be modified to produce bends, tees, crosses or reducers. Simply follow illustrated procedures on pages WB-31 through WB-35 for cutting, bending and assembly. Cut wires with Cooper B-Line's Angular Bolt Cutter, bend to preferred radius and assemble.





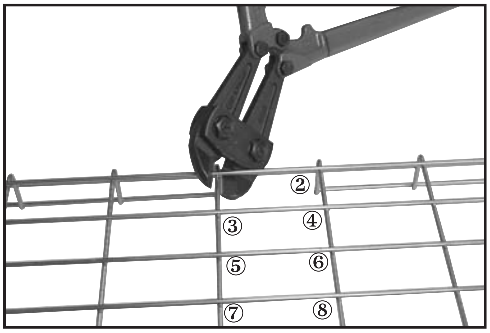
Offset Cut



Do not use center cut blades.

For the best results, use a WB30BC Angular Blade Offset Bolt Cutter with 24" (600 mm) long handles. The Offset Blade Cutter produces a clean cut. Position bolt cutter blades near the cross wire and perpendicular to wire to be cut (see illustration below). Proper cut will make the assembly faster, easier and safer while minimizing grinding.

Cut and remove each wire as illustrated below. Follow cutting pattern and blade positioning. Placing Wire Basket open side down provides the optimum cutting angle.



Cutting Order

Illustrations (refer to pages WB-31 through WB-35) show some of the many possible methods for the cutting and assembly of bends, reducers, tees and crosses. Recommended cuttings are intended as a guide only. Actual field conditions may require slight modifications.

Cooper B-Line's Wire Basket is designed with total flexibility and offers unlimited job site adjustment. Wire Basket is adaptable to assist you in solving unexpected job site conditions.

Part Number	Length in.	Length mm	Wt. Per Cutter lbs.	Wt. Per Cutter kg	Box Quantity
● **WB50WC**	12$^{3}/_{4}$	325	3.0	1.3	1

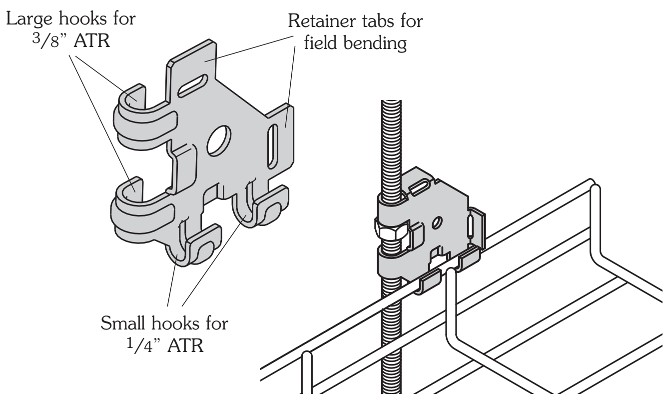
The Greenlee cable wire cutter makes flush cuts without burrs. Will cut .191" diameter wire in 2 seconds. Cutting head rotates 330° for ease of positioning and the tool automatically retracts when cut is complete. Comes with 2 batteries, charger and carrying case. Approximately 250 cuts per charge.

Part Number	Description	Box Quantity
● **WB50RB**	Replacement Blade	1
● **WB50BA**	Replacement Battery	1

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - Accessories

Flip Clip™

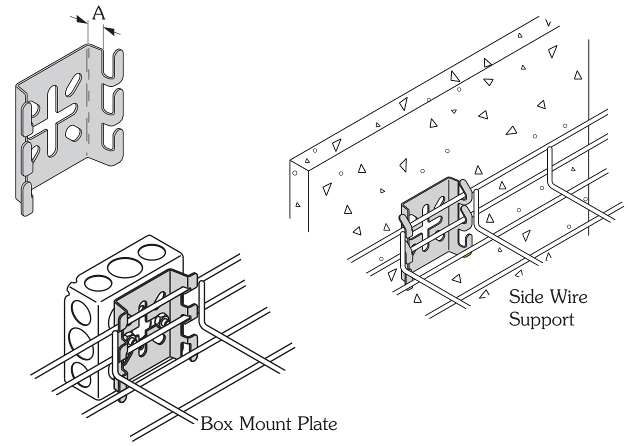


Part Number	Wt.Per 100 lbs.	kg	Box Quantity
● WB46H	10.4	4.7	50

Accommodates 1/4" and 3/8" rod sizes. Installs quickly with a screwdriver or pliers thus reducing installation time. Requires only one hex nut (not included) to hang and level the wire basket. Retainer tabs can be bent over to lock-in the threaded rod and wire basket.

Finish: Zinc Plated
Stocked in Stainless Steel

Wall Bracket and Box Mount Plate

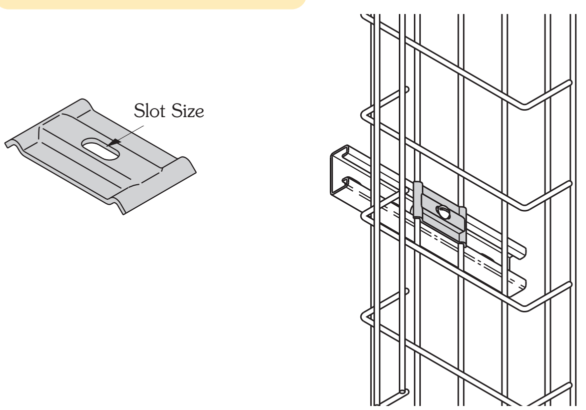


Part Number	A in.	A mm	Wt. Per 100 lbs.	kg	Box Quantity
● WB4WB	.55	14	22.0	10.0	25

- Designed for wall attachment of 2", 4" and up to 6" (50, 100, 150 mm) wide wire baskets. Bend tabs to secure. Wall mounting hole patterns provided in bracket for up to 1/4" hardware. Wall mount hardware not included.
- Designed for attachment of equipment to Wire Basket System. Hole patterns provided for up to 1/4" hardware.

Finish: Pre-Galvanized Zinc

Hold Down Plate



Part Number	Slot Size in.	Slot Size mm	Wt. Per 100 lbs.	kg	Box Quantity
● WB4HD	.28 x .55	7 x 14	7.3	3.3	50

Designed to secure Wire Basket System to Wall Brackets and Trapeze Kit.

To complete 1/4" Hold Down Plate assembly, use:

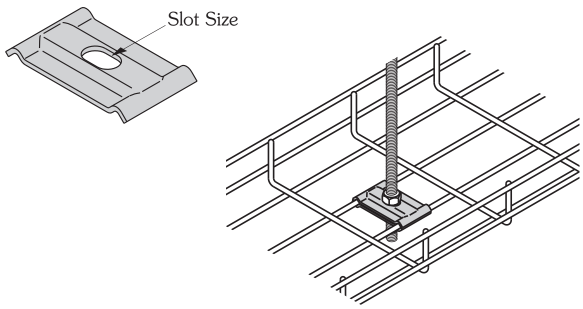
1 - WB4HD 1/4" Hold Down Plate
1 - SRHMS 1/4"-20 x 1" Machine Screw (order separately)
1 - HN 1/4"-20 Hex Nut or N524WO channel nut (order separately)

Finish: Zinc Plated

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Center Hanger

Part Number	Slot Size in.	Slot Size mm	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB6CH**	.40 x .70	10 x 18	7.1	3.2	50



Designed to support 4" and 6" wide Wire Basket System for 3/8" threaded rod. Order threaded rod separately. To protect cables use threaded rod protector (see page WB-27). Optional ATR stiffener (see page WB-36).

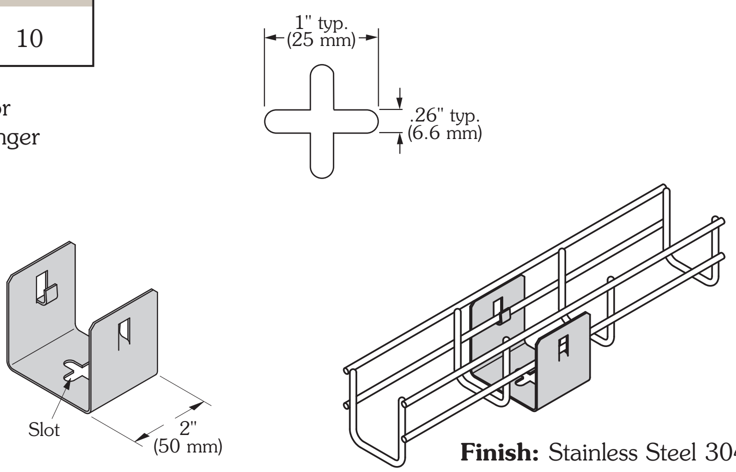
To complete 3/8" Center Hanger assembly, use:
- 2 - WB6CH 3/8" Center Hangers
- 2 - HN 3/8"-16 Hex Nuts (order separately)

Finish: Zinc Plated
Stocked in Stainless Steel

Mounting Bracket

Part Number	Wt.Per 100 lbs.	Wt.Per 100 kg	Box Quantity
● **WB202MB SS4**	21	9.5	10

Designed to support WB202 Wire Basket. Click tabs for wire basket attachment. See page WB-18 for Click Hanger instructions. Use 1/4" hardware and washer to mount bracket (not included).

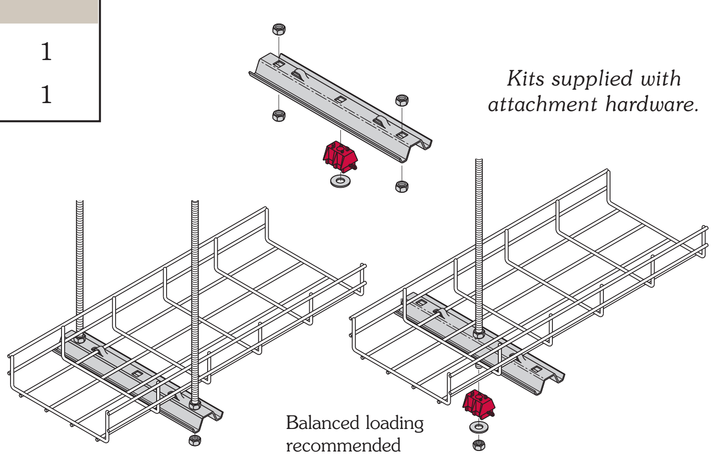


Finish: Stainless Steel 304

Click Hanger Center Hanger/Trapeze Kits

Part Number	System Width in.	System Width mm	Channel Length in.	Channel Length mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **WB5308**	8	200	11.5	292	.9	.4	1
● **WB5312**	12	300	13.8	350	1.8	.8	1

Click hanger design, no wire basket attachment hardware required. See page WB-18 for Click Hanger instructions. Engineered and supplied in kit form to install as a center hung or trapeze hanger.
Supplied with 1 security plug, 1 washer and 4 - 3/8"-16 hex nuts.
Optional ATR stiffener (see page WB-36).
To protect cables use threaded rod protector (see page WB-27).



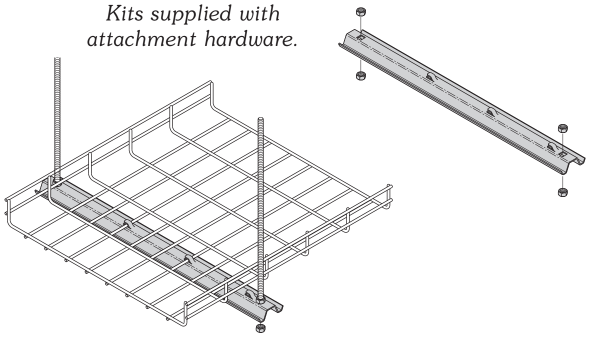
Finish: Pre-Galvanized Zinc

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - Accessories

Click Hanger Trapeze Kits

Kits supplied with attachment hardware.



Finish: Pre-Galvanized Zinc

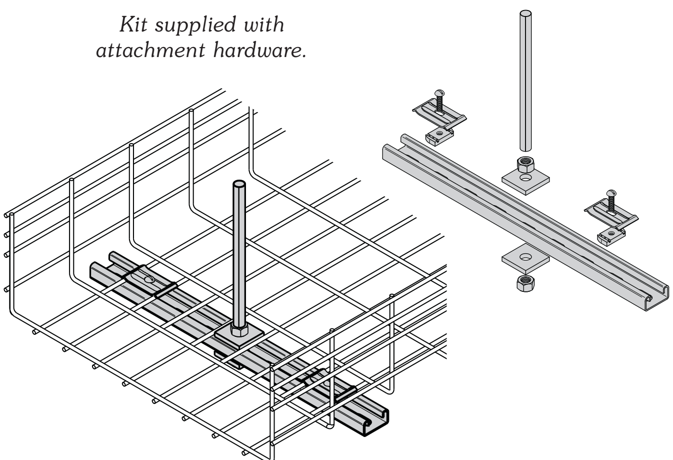
Part Number	System Width in.	System Width mm	Channel Length in.	Channel Length mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **WB5318**	18	450	21.7	550	2.5	1.1	1
● **WB5324**	†	†	25.6	650	3.0	1.4	1

† For 20” (500 mm), 21” (525 mm), and 24” (600 mm)

Click hanger design, no wire basket attachment hardware required. See page WB-18 for Click Hanger instructions. Engineered and supplied in kit form to install as a trapeze hanger. Supplied with 4 - 3/8" hex nuts.

Heavy Duty Center Hung Support Kit

Kit supplied with attachment hardware.



Finish: Zinc Plated

Part Number	Channel Length in.	Channel Length mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **WB5518CH**	18	457	2.2	1.0	1

Designed for 1/2" ATR. Channel length of 18" supports 12, 18, 20, 21, and 24 inch Wire Basket Systems. Protection sleeve for ATR to prevent damage to cables. 1/2" ATR attachment hardware provided.
Wire Basket mounting attachment hardware provided.
Optional ATR stiffener (see page WB-36).

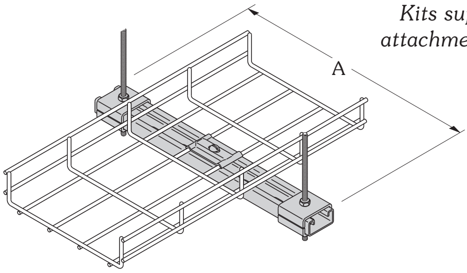
Heavy Duty Center Hung Support assembly includes:

1 - B3011/2x8 Threaded Rod Protector
2 - B202 Square Washers
2 - HN 1/2"-13 Hex Nuts
2 - N224WO, 1/4"-20 Channel Nuts (no spring)
2 - SRHMS 1/4"-20 x 1" Machine Screws
2 - WB4HD Hold Down Plates
1 - B54SH Channel, 18” long

Trapeze Support Kits

Trapeze Support Kit includes all components required for single trapeze support in one package. Designed for use with 1/4" ATR. Also available for 3/8" ATR, add -3/8 suffix to part number. Order threaded rod separately.

Kits supplied with attachment hardware.



Finish: Channel: Pre-Galvanized Zinc
Other components: Zinc Plated

Part Number	System Width in.	System Width mm	A in.	A mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **WB5506**	6	150	10	250	1.6	.73	1
● **WB5508**	8	200	12	200	1.7	.77	1
● **WB5512**	12	300	16	400	2.0	.91	1
● **WB5518**	18	450	22	560	2.5	1.13	1
● **WB5524**	†	†	28	710	2.9	1.32	1

† For 20” (500 mm), 21” (525 mm), and 24” (600 mm)

Trapeze Kit for 1/4" ATR includes:

4 - B450-1/4" U-Washers
4 - HN 1/4"-20 Hex Nuts
1 - WB4HD Hold Down Plate
1 - FN224 1/4"-20 EZ Twirl Nut
1 - SRHMS 1/4"-20 x 1" Machine Screw
1 - B54SH Channel

Trapeze Kit for 3/8" ATR add -3/8" suffix, includes:

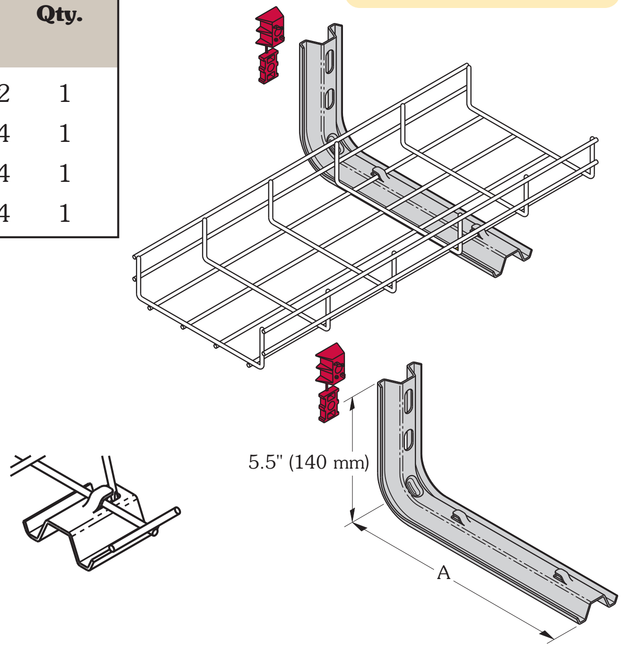
4 - B450-3/8" U-Washers
4 - HN 3/8"-16 Hex Nuts
1 - WB4HD Hold Down Plate
1 - FN224 1/4"-20 EZ Twirl Nut
1 - SRHMS 1/4"-20 x 1" Machine Screw
1 - B54SH Channel

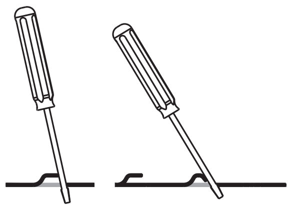
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Click Brackets

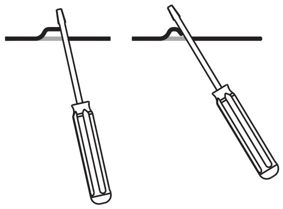
Part Number	System Width		A		Wt. Per Pc.		Load Capacity		Box Qty.
	in.	mm	in.	mm	lbs.	kg	lbs.	kN	
● WB506CB	4	100	6	150	.56	.25	140	0.62	1
● WB508CB	6	150	8	200	.66	.30	100	0.44	1
● WB510CB	8	200	10	250	1.05	.47	100	0.44	1
● WB514CB	12	300	14	350	1.25	.57	100	0.44	1

Install directly to a wall or in combination with Support Bracket. Click Brackets are designed for fast and economical support of Wire Basket System. Simply position Wire Basket on the Click Bracket and lock into position with flat blade screwdriver as illustrated. Designed for 3/8" mounting hardware (not included). Security plug provided for wall mounting or strut channel mounting. Load Capacity Safety Factor of 3.





Top Bend



Bottom Bend

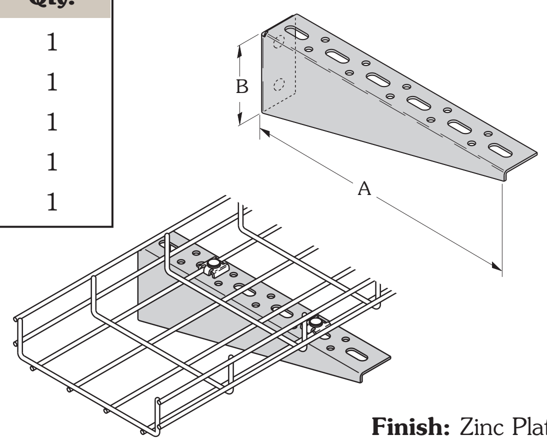
Finish: Pre-Galvanized Zinc

Slotted Wall Brackets

Part Number	A		B		Wt. Per Pc.		Load Cap.		Box Qty.
	in.	mm	in.	mm	lbs.	kg	lbs.	kN	
● B199-6	6	150	1.94	50	.58	.26	225	1.00	1
● B199-8	8	200	3.30	84	.82	.37	225	1.00	1
● B199-12	12	300	3.44	88	1.03	.47	350	1.55	1
● B199-18	18	450	4.94	126	2.32	1.05	250	1.11	1
● B199-24	†	†	6.44	164	3.70	1.68	225	1.00	1

† For 20” (500 mm), 21” (525 mm), and 24” (600 mm)

Adjustable bracket to optimize wire basket positioning. Attach directly to a wall or Cooper B-Line channels with 1/2" hardware. Use WB4CP Clamp Assemblies to secure Wire Basket System to the bracket. Order hardware separately. Load Capacity Safety Factor of 3.



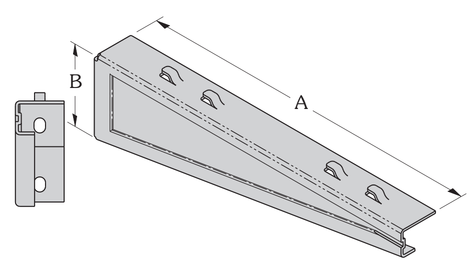
Finish: Zinc Plated

Reinforced Click Bracket

Part Number	System Width		A		B		Wt. Per Pc.		Load Capacity		Box Qty.
	in.	mm	in.	mm	in.	mm	lbs.	kg	lbs.	kN	
● WB5108	8	200	9.8	250	3.5	87	.97	.44	215	0.95	1
● WB5112	12	300	13.8	350	3.5	87	1.32	.60	156	0.69	1
● WB5118	18	450	19.7	500	5.0	125	2.43	1.00	197	0.87	1
● WB5124	†	†	25.6	650	5.0	125	2.87	1.30	180	0.80	1

† For 20” (500 mm), 21” (525 mm), and 24” (600 mm)

Wall bracket for up to 24 inch wide systems. Two wall attachment holes provided for 3/8" hardware. Wall mount hardware not provided. Load Capacity Safety Factor of 3.



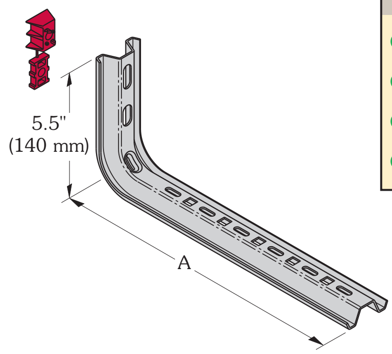
Finish: Pre-Galvanized Zinc

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket

Support Brackets

Part Number	Usable Width in.	Usable Width mm	A in.	A mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Load Capacity lbs.	Load Capacity kN	Box Qty.
● **WB506SB**	4	100	6	150	.56	.25	140	0.62	1
● **WB508SB**	6	150	8	200	.66	.30	100	0.45	1
● **WB510SB**	8	200	10	250	1.05	.47	100	0.45	1
● **WB514SB**	12	300	14	350	1.25	.57	100	0.45	1



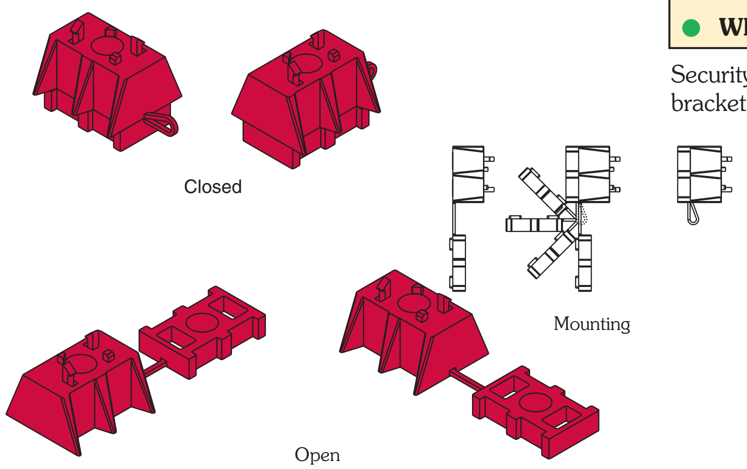
Finish: Pre-Galvanized Zinc

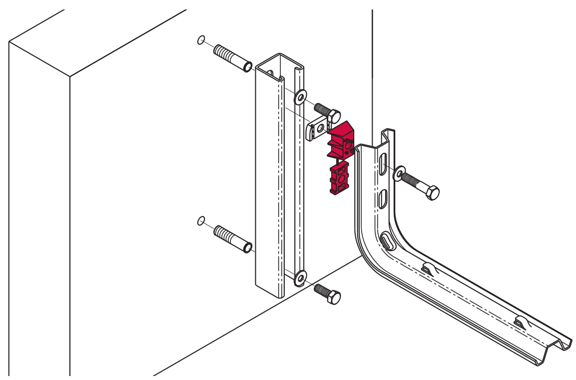
Install Support Bracket directly to the wall or in combination with Click Bracket. Install with 3/8" hardware. Security plug provided for wall mounting or strut channel mounting. Mounting hardware not provided.
(See installation illustration below.)
Load Capacity Safety Factor of 3.

Security Plug

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	BAG Quantity
● **WBSP**	.022	.010	50

Security plug is supplied with and used to mount support brackets to walls or other structures.

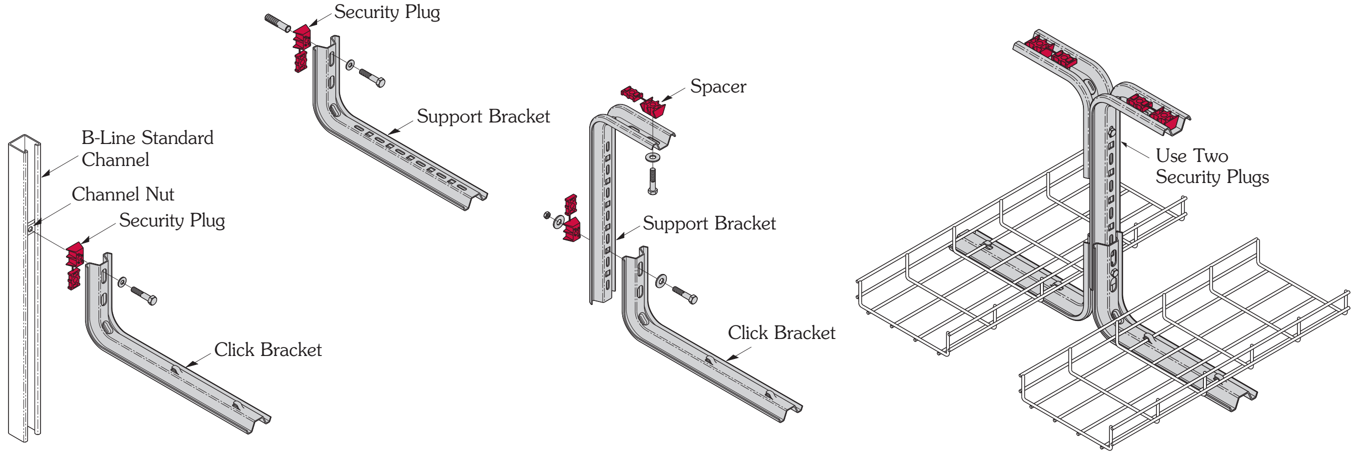




Material: Polypropylene

Support and Click Brackets Installation Details

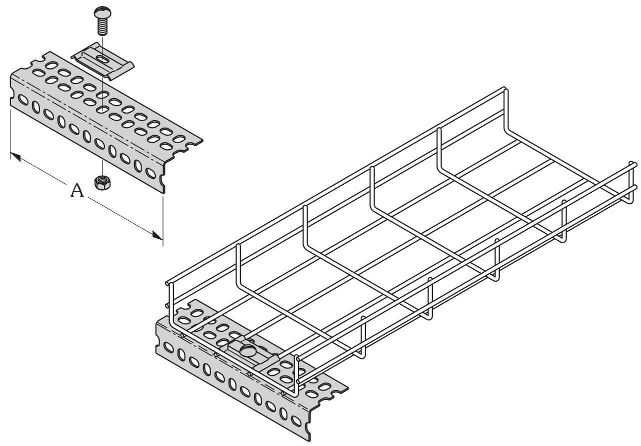
Brackets can be mounted directly to a wall or used in combination as illustrated. When installing two brackets back-to-back, use two Security Plugs. Order brackets and hardware separately.



● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wall Termination Kit

Part Number	A in.	A mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **WBWTK**	9	229	1.3	.590	1



Kit includes all hardware necessary to support wire basket system when terminated at a wall. Mount slotted angle to wall with up to 3/8" hardware (not included).

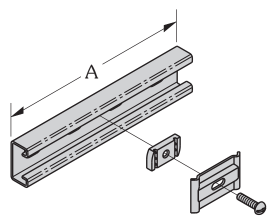
Wall Termination Kit includes:

1 - SA276-9 Slotted Angle
1 - WB6CH - Hold Down
1 - 3/8"-16 x 1" Slotted Head Screw
1 - 3/8"-16 Hex Nut

Finish: Zinc Plated

Wall Mount Kit

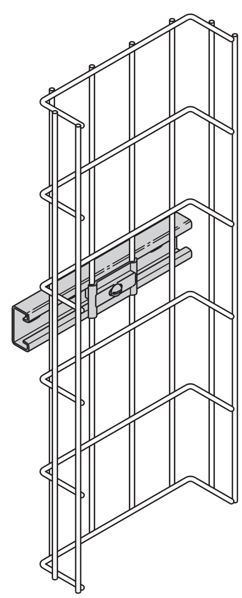
Part Number	A in.	A mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **WB48WMK**	8	203	.76	.35	1
● **WB1224WMK**	12	305	1.22	.55	1



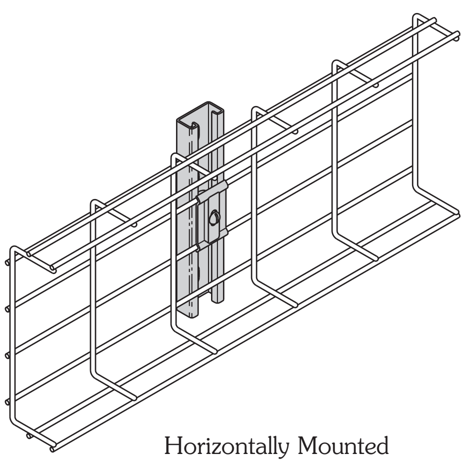
Kit includes all components necessary to mount wire basket to a wall horizontally or vertically. Mount strut to wall with up to 1/2" hardware (not included).

Wall Mount Kit includes:

WB48WMR	WB1224WMR	
1	1	B54SH Strut
1	2	WB4HD Hold Downs
1	2	1/4"-20 x 1" Slotted Head Screw
1	2	N224WO Channel Nut



Vertically Mounted



Horizontally Mounted

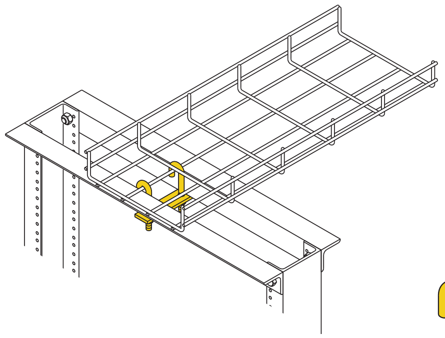
Finish: Strut: Pre-Galvanized
Hardware: Zinc Plated

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - Accessories

Adaptor Kit

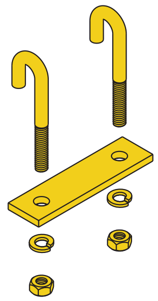
Part Number	Wt. Per Pc. lbs.	kg	Box Quantity
● **SB2204**	.37	.17	1



Adaptor Kit includes all hardware necessary to connect Wire Basket System to top of relay rack at right angle or parallel position.

Adaptor Kit includes:

- 1 - Mounting Plate
- 2 - $^5/_{16}$"-18 x 2" J-Bolts
- 2 - HN $^5/_{16}$"-18 Hex Nuts
- 2 - LW $^5/_{16}$" Lock Washers

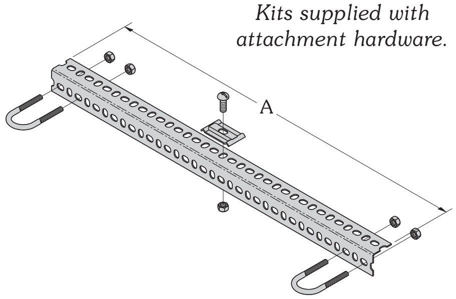


Finish: Yellow Zinc Dichromate

2 Pole Support Kits

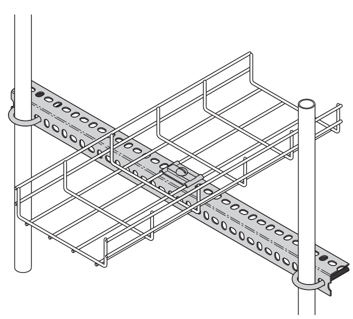
Part Number	A in.	mm	Wt. Per Pc. lbs.	kg	Box Quantity
● **WB138FPSK**	27	686	1.96	.89	1
● **WB200FPSK**	27.75	705	2.00	.91	1

Kits supplied with attachment hardware.



WB138FPSK is for round post sizes 1" - 1.375" and for $^7/_8$" square posts. WB200FPSK is for round post sizes 1.5" - 2".

Kit includes all hardware necessary to support wire basket system from raised floor posts on either 24 inch or 600 mm centers.



For up to 21" wide wire basket

2 Pole Support Kit includes:

- 1 - SA158 Slotted Angle
- 2 - B501 U-Bolt
- 4 - $^5/_{16}$" Flat Washer
- 4 - $^5/_{16}$" Lock Washer
- 4 - $^5/_{16}$"-18 Hex Nut
- 1 - WB4HD Hold Down
- 1 - $^1/_4$"-20 x 1" Slotted Head Screw
- 1 - $^1/_4$" Flat Washer
- 1 - $^1/_4$"-20 Hex Nut

Finish: Zinc Plated

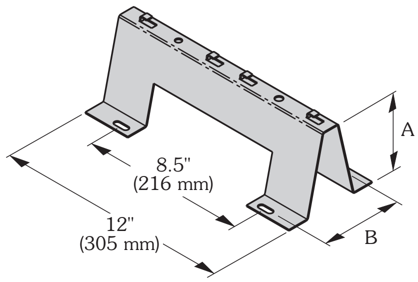
Wire Basket

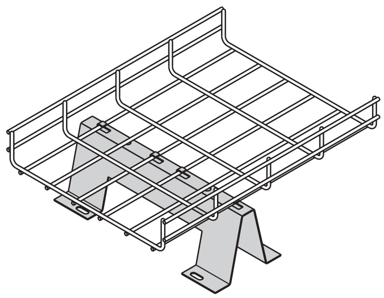
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Under Floor Stand

Part Number	A in.	A mm	B in.	B mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **WB312-18UF**	3	76	3.69	94	1.50	.47	1
● **WB412-18UF**	4	102	4.14	105	1.90	.86	1
● **WB512-18UF**	5	127	4.59	117	2.30	1.04	1
● **WB612-18UF**	6	152	5.04	128	2.70	1.22	1

Designed to elevate wire basket 3, 4, 5, or 6" off floor. No hardware required to mount wire basket to bracket. Simply bend tabs down around wires using a screwdriver. Floor mount slot size: .313" x .813" (8 mm x 20 mm) for 1/4" hardware. (order separately)



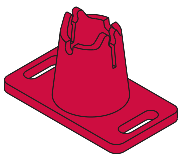


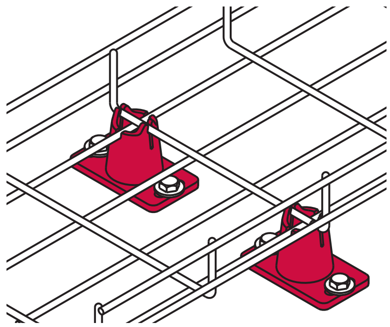
Finish: Pre-Galvanized, Optional - Dura-Green

Floor Support

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB2FS**	4.40	2.00	10

Non-metallic snap lock Floor Support is designed for use under access floors. Floor Support elevates Wire Basket System 1 5/8" (41.3 mm) above the floor. To attach Floor Support, use Liquid Nails™ or anchors. Polyamide material.
Sized for 1/4" hardware (not included).
Elevation increments of 1 3/8" (35 mm) can be obtained by stacking Floor Supports.



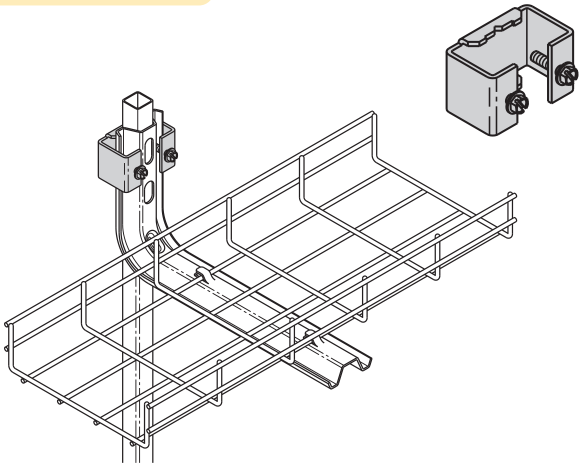


Material: Polyamide

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - Accessories

Post Clamp

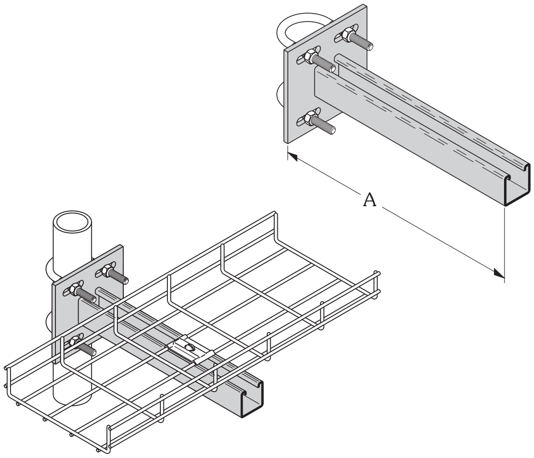


Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB2PC	41.0	18.6	10

Designed for use with Support and Click Brackets for support of Wire Basket Systems from access floor post. Use with round post sizes .9 to 1.2 and with $\frac{7}{8}$" square posts. Only recommended on flat side of square post as shown. Do not over tighten bolts. To order Support or Click Brackets, see pages WB-17 and WB-18.

Finish: Zinc Plated

Under Floor Support Bracket



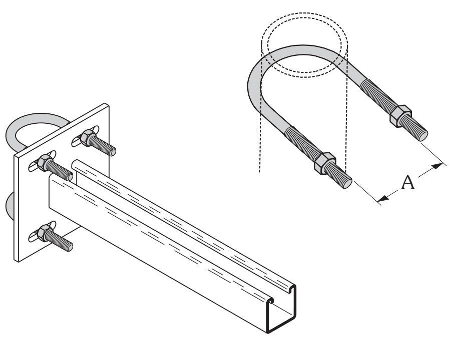
Part Number	Width in.	Width mm	A in.	A mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● B409UF-12	12	300	12	300	3.6	1.63	1
● B409UF-18	18	450	18	450	4.5	2.04	1
● B409UF-21	21	533	21	533	5.4	2.45	1

Under Floor Support Bracket provides rugged support for Wire Basket System from access floor post.
To complete the installation, the following hardware must be ordered separately.

2	B501 U-Bolts
1	WB4HD Hold Down
1	$\frac{1}{4}$"-20 x 1" Slotted Head Screw
1	N224WO Channel Nut

Finish: Zinc Plated

U-Bolts



Part Number	A in.	A mm	Thread Size	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● B501-1	$1\frac{3}{8}$	30	$\frac{5}{16}$"-18	14	6.3	50
● B501-$1\frac{1}{2}$	2	50	$\frac{5}{16}$"-18	16	7.2	50
● B501-2	$2\frac{7}{16}$	62	$\frac{3}{8}$"-16	27	12.2	20
● B501-$2\frac{1}{2}$	$2\frac{15}{16}$	75	$\frac{3}{8}$"-16	32	14.5	25

Designed for attachment of Under Floor Support Brackets to access floor post. Each U-Bolt includes two hex nuts.

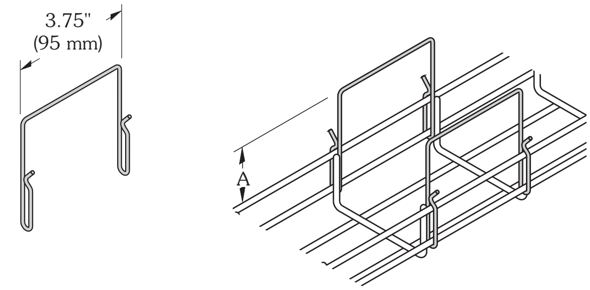
Finish: Zinc Plated

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Rail Riser

Part Number	A in.	A mm	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB2RR	2	50	3.0	1.5	50

Provides expansion capabilities for existing 2", 4”, or 6" systems where additional cable fill area is required. Simple, fast, economical and no tools required - simply snaps on. Increases cable fill depth two inches. Recommended installation frequency: two required every three feet, depending on cable density. Provides controlled cable exit locations. Does not interfere with cable fill area. Can be used on any fitting configuration.

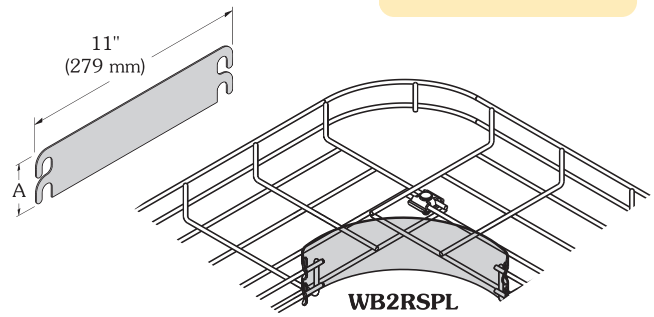


Finish: Zinc Plated

Radius Shield

Part Number	A in.	A mm	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB2RSPL	2.5	63	7.2	3.2	20
● WB4RSPL	4.3	110	12.3	5.5	20

Provides a smooth inside radius surface. No tools or fasteners needed to install. Sizes for 2 & 4 inch fill systems; 90° horizontal bends, tees and crosses. Installs in seconds. Simply hold in place and bend back tabs. Slick surface to reduce cable friction.



WB2RSPL shown

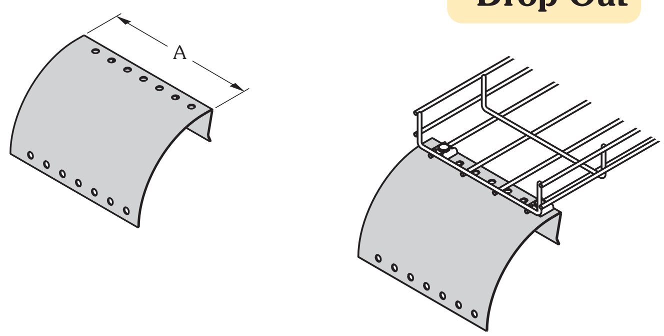
Material: Gray Tinted Polycarbonate

Drop-Out

Part Number	A in.	A mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● WB06DO	6	150	.68	.3	1
● WB08DO	8	200	.91	.4	1
● WB12DO	12	300	1.36	.6	1

This easy to install drop-out provides a 4" (101.6) radius to protect cables exiting wire basket. For side drop-out, insert slotted flange between top two wires and use one WB4CP. For underside attachment, use two WB4CP’s for each wire basket section attached. WB4CP’s not included. Use in combination for wider widths.

Additional installation drawings on page WB-37.

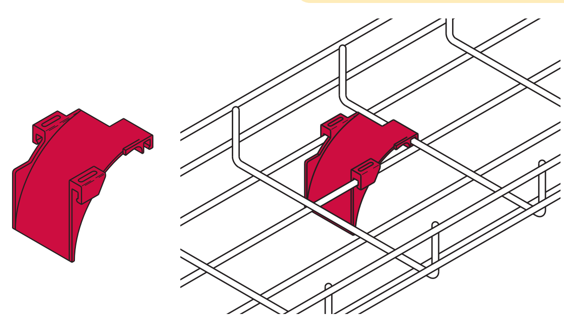


Finish: Pre-Galvanized Zinc
Other finishes available. See page 44.

Cable Drop-Out

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB2DO	1.76	.80	10

Non-metallic 2" (50 mm) radius Cable Drop-Out snap locks into mesh bottom and protects cables from sharp bend. Polyamide material.

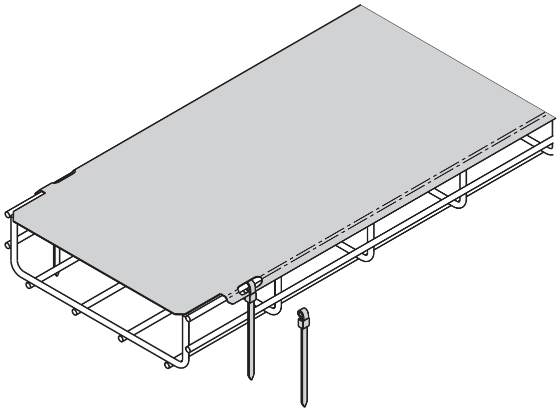


Material: Polyamide

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - Attachments

Covers

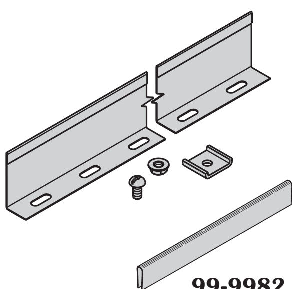


Part Number	System Width in.	System Width mm	Length in.	Length M	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Unit Of Measure
● **WBP200259**	2	50	59	1.5	1.3	.6	1
● **WBP200459**	4	100	59	1.5	2.0	.9	1
● **WBP200659**	6	150	59	1.5	2.8	1.3	1
● **WBP200859**	8	200	59	1.5	3.6	1.6	1
● **WBP201259**	12	300	59	1.5	5.2	2.4	1
● **WBP201859**	18	450	59	1.5	7.5	3.4	1
● **WBP202059**	20	500	59	1.5	8.3	3.7	1
● **WBP202159**	21	525	59	1.5	8.7	3.9	1
● **WBP202459**	24	600	59	1.5	9.9	4.5	1

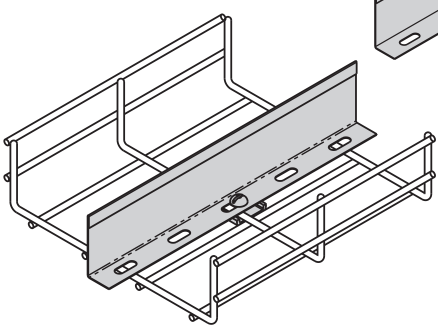
20 gauge pre-galvanized covers 59" long (1.5 meter) supplied with four cable ties to secure to wire basket.

Finish: Pre-Galvanized Zinc

Barriers



99-9982 shown



Part Number	Height in.	Height mm	Length in.	Length mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg
● **WB2B-3M**	2	50	118.11	3000	3.31	1.50
● **WB4B-3M**	4	100	118.11	3000	5.65	2.56
● **WB6B-3M**	6	150	118.11	3000	7.96	3.61

Separates cables randomly. Furnished with attachment hardware.

Additional installation drawings on page WB-39.

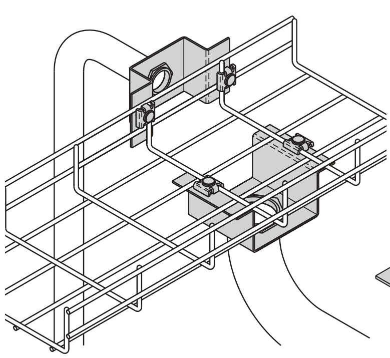
Barrier Kit includes:

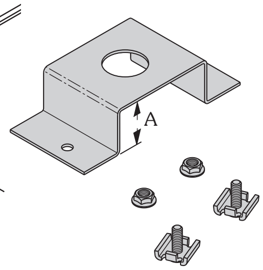
1 - Barrier
3 - 1/4" - 20 x 1" SRHM Screw
3 - WB4PL
3 - SFHN 1/4" Hex Nuts
1 - 99-9982 Barrier Strip Splice

Finish: Pre-Galvanized Zinc

Conduit Connector

Part Number	A in.	A mm	Conduit Size	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB050CC**	1.25	32	.50	47.7	21.6	10
● **WB075CC**	1.25	32	.75	46.9	21.3	10
● **WB100CC**	1.25	32	1.00	45.9	20.8	10
● **WB125CC**	1.25	32	1.25	44.0	20.0	10
● **WB150CC**	2.00	50	1.50	69.2	31.4	5
● **WB200CC**	2.00	50	2.00	65.5	29.7	5





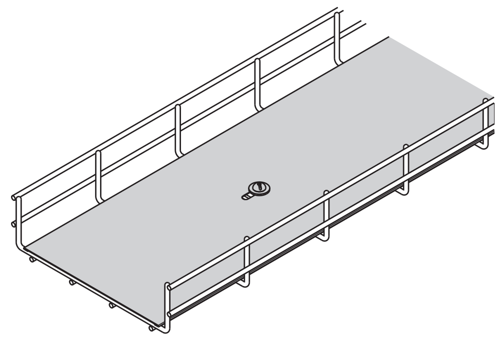
Conduit connector is designed to connect conduit to the side or bottom of wire basket. It is designed to keep the conduit bushing outside the wire basket. Furnished with 2 of the WB4CP.

Finish: Pre-Galvanized Zinc

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Pan

Part Number	System Width in.	System Width mm	Length in.	Length mm	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Unit of Measure
● WB04P	4	100	118	3.0	3.9	1.8	1
● WB06P	6	150	118	3.0	6.2	2.8	1
● WB08P	8	200	118	3.0	8.6	3.9	1
● WB12P	12	300	118	3.0	13.3	6.0	1
● WB18P	18	450	118	3.0	20.3	9.2	1
● WB20P	20	500	118	3.0	22.7	10.3	1
● WB21P	21	525	118	3.0	23.9	10.8	1
● WB24P	24	600	118	3.0	27.5	12.5	1

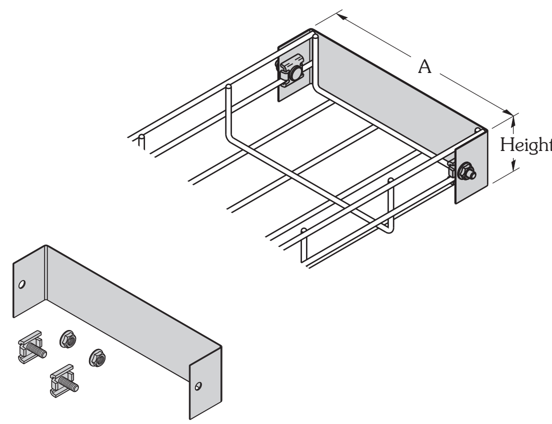


20 gauge pre-galvanized pan 118.1" long (3.0 meter) supplied with necessary hardware to secure to wire basket.

Finish: Pre-Galvanized Zinc

Blind End

Part Number	A in.	A mm	Height in.	Height mm	Box Quantity
● WB202BE	2	50	2	50	1
● WB(*)04BE	4	100	(*)		1
● WB206BE	6	150	2	50	1
● WB(*)08BE	8	200	(*)		1
● WB(**)12BE	12	300	(**)		1
● WB(**)18BE	18	450	(**)		1
● WB620BE	20	500	6	150	1
● WB(*)21BE	21	525	(*)		1
● WB(**)24BE	24	600	(**)		1



Forms a closure for a dead-end wire basket. Furnished with hardware.

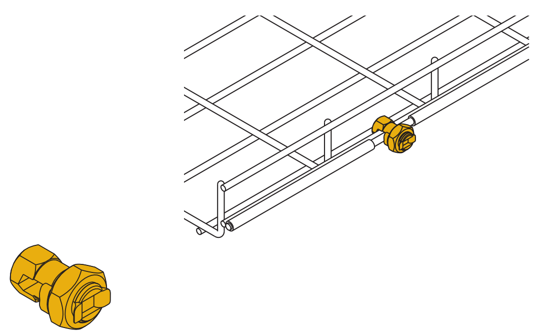
(*) Insert: 2 = 2" (50 mm), 4 = 4" (100 mm) for height
(**) Insert: 2 = 2" (50 mm), 4 = 4" (100 mm), 6 = 6" (150 mm) for height

Finish: Zinc Plated

Grounding Clamp

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● WB2GC	6.6	3.0	25

If system grounding is required, use grounding clamps to conveniently attach bare or insulated grounding conductor to each section of Wire Basket System. Secure grounding conductor between clamps with cable ties. Accepts up to #4 wire (AWG).



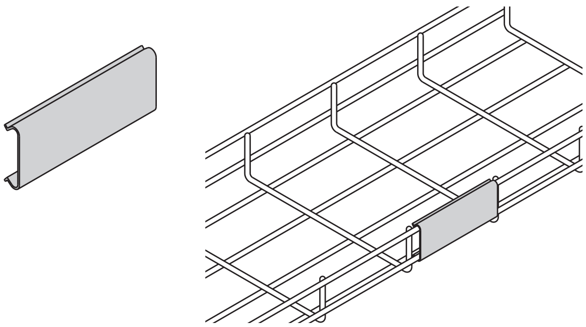
Material: High strength copper alloy

Wire Basket

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - *Accessories*

Marking Plate

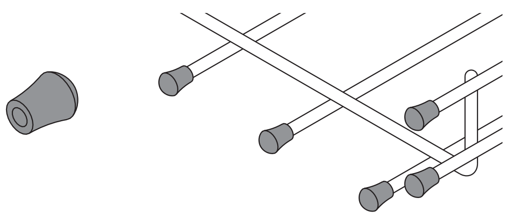


Material: Plastic (white)

Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **WB2MP**	1.10	.50	50

Snap on white plastic plate can be used with Series WB200, WB400, WB600 and WB504 for identification of individual cable runs. Mark directly on the plate or use pre-printed labels.

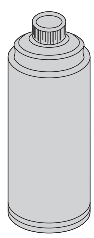
Rubber Cap



Part Number	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **B719EB**	.20	.10	100

Install on wire ends if required. Fits all wire diameters.

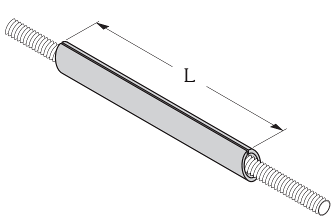
Touch-Up Paints



Size: 12 ounces

Part Number	Color	Wt. Per Pc. lbs.	Wt. Per Pc. kg	Box Quantity
● **SB420ATG**	Gray Lacquer	.9	.41	1
● **SB420AFB**	Flat Black Lacquer	.9	.41	1
● **SB420ACW**	Computer White Lacquer	.9	.41	1
● **B999**	Silver Zinc-Rich Paint	.9	.41	1

Threaded Rod Protector



Finish Color: Gray

Part Number	L in.	L mm	Wt. Per 100 lbs.	Wt. Per 100 kg	Box Quantity
● **SB301-$^1/_2$ x 8**	8	200	.30	.14	1

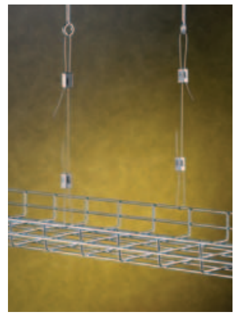
Use to protect cables from $^1/_4$", $^3/_8$", $^1/_2$" threaded rod. PVC UL94V-0 material.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

- KwikWire system replaces jack chain or ATR to support lighting, ductwork, cable tray, etc.
- Can be quickly installed around beams - No drilling required.
- Ideal for sloped ceilings - can hang objects at up to 60° angles.
- Simple height adjustments are made by releasing locking tab, no tools required.
- Spools of wire can be cut to length in field, reducing waste and up front planning.

KwikPak™

Part Number	Kit Includes	Unit of Measure
● **BKP10063**	BKC100 (100 pcs.) 1/16”Ø Wire Rope (500 ft.)	1 Kit
● **BKP10094**	BKC100 (100 pcs.) 3/32”Ø Wire Rope (500 ft.)	1 Kit
● **BKP15094**	BKC150 (100 pcs.) 3/32”Ø Wire Rope (500 ft.)	1 Kit
● **BKP15125**	BKC150 (100 pcs.) 1/8”Ø Wire Rope (500 ft.)	1 Kit
● **BKP20125**	BKC200 (50 pcs.) 1/8”Ø Wire Rope (500 ft.)	1 Kit
● **BKP20188**	BKC200 (50 pcs.) 3/16”Ø Wire Rope (250 ft.)	1 Kit



Cooper B-Line’s KwikPak includes a spool of wire rope and a supply of KwikWire clamps. KwikPaks are shipped in a specially designed dispenser box to ease field cutting of wire.

KwikWire™ Clamps

Part Number	For Use With Wire Rope Diamteres	Box Quantity
● **BKC100**	1/16” & 3/32”	100
● **BKC150**	3/32” & 1/8”	100
● **BKC200**	1/8” & 3/16”	50

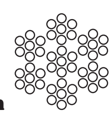
KwikWire™ Clamp Working Loads*

Clamp Part No.	Wire Rope Dia.	Lbs. Safety Factor 5
BKC100	1/16”	0-75
BKC100	3/32”	25-150
BKC150	3/32”	25-150
BKC150	1/8”	25-250
BKC200	1/8”	25-250
BKC200	3/16”	50-640

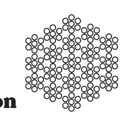
KwikWire™ Wire Rope

Part Number	Wire Rope Dia. & Working Load Lbs.	Spool Quantity
● **BKW063(1)**	1/16” Ø - 96	500 ft.
● **BKW094(1)**	3/32” Ø - 184	500 ft.
● **BKW125(1)**	1/8” Ø - 340	500 ft.
● **BKW188(2)**	3/16” Ø - 840	250 ft.

(1) 7 x 7 Construction



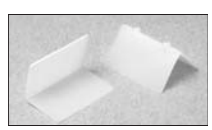
(2) 7 x 19 Construction



Uncoated galvanized wire

KwikWire™ Accessories

Part Number	Wire Rope Dia. & Working Load Lbs.	Spool Quantity
● **BKCP**	Air Duct Corner Protector	100
● **B601-62**	Air Duct Support	50
● **BKCC**	Wire Rope Cutter	1



BKCP

B601-62

BKCC

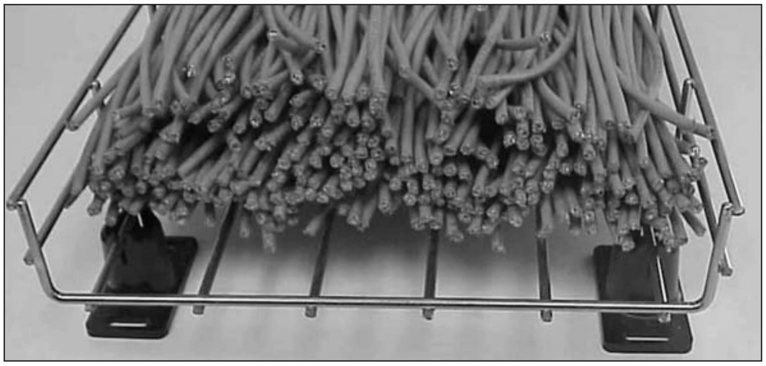
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Wire Basket - Loading Information

Wire Basket System Cable Fill & Load Rating

The National Electrical Code allows for 50% fill of ventilated cable tray for control or signal wiring (Article 392-9(B)). This rule requires that all the individual cable cross-sectional areas added up may not exceed one half the cable tray area. The cable tray area is equal to the width times the load depth.

In actual practice with Category 5 cables, however, the cable tray becomes completely full in reaching the "50% cable fill". See the picture below. The tray is completely full, but the sum of the cable areas is only 50% of the tray area, due to the empty spaces between the cables.



NEC 50% Cross Sectional Area Illustration

This being the case, there is a practical limit to the amount of cables that can be installed in the tray, based on the trays' width and load depth. The following chart shows the approximate cable weight that can be installed without exceeding the 50% fill rule and the tested load capacity:

Tray Series	Tray Size	Max. # Cables*	Approx. Max. Cable Weight **lbs/ft	Tested Load Capacity***Lbs/Ft 5'	6'	7'	8'
WB202	(2x2)	48	1.2	56	38	30	23
WB204	(2x4)	93	2.4	56	38	30	23
WB206	(2x6)	150	3.9	56	38	30	23
WB208	(2x8)	208	5.4	64	49	33	25
WB212	(2x12)	314	8.2	85	62	48	37
WB218	(2x18)	481	12.5	89	64	52	40
WB221	(2x21)	599	15.6	89	64	52	40
WB224	(2x24)	650	16.9	93	66	55	42
WB408	(4x8)	390	10.1	93	66	47	36
WB412	(4x12)	606	15.8	110	90	54	42
WB418	(4x18)	930	24.2	116	80	55	42
WB421	(4x21)	1127	29.3	116	80	55	42
WB424	(4x24)	1255	32.6	132	83	55	42
WB612	(6x12)	880	22.9	157	109	80	61
WB618	(6x18)	1352	35.2	157	109	80	61
WB620	(6x20)	1573	40.9	157	109	80	61
WB624	(6x24)	1822	47.4	157	109	80	61

* This chart was based on 50% fill of 4 UTP Category 5 cable (O.D. = .21" .026 lbs/ft).

** This is not a maximum load rating for the tray, rather a practical guide to the amount of cable weight that can realistically be installed.

*** Tested in accordance with *NEMA VE-1/CSA E22.2 No. 126.1*
Individual test reports available upon request.
Safety Factor: 1.5

Wire Basket

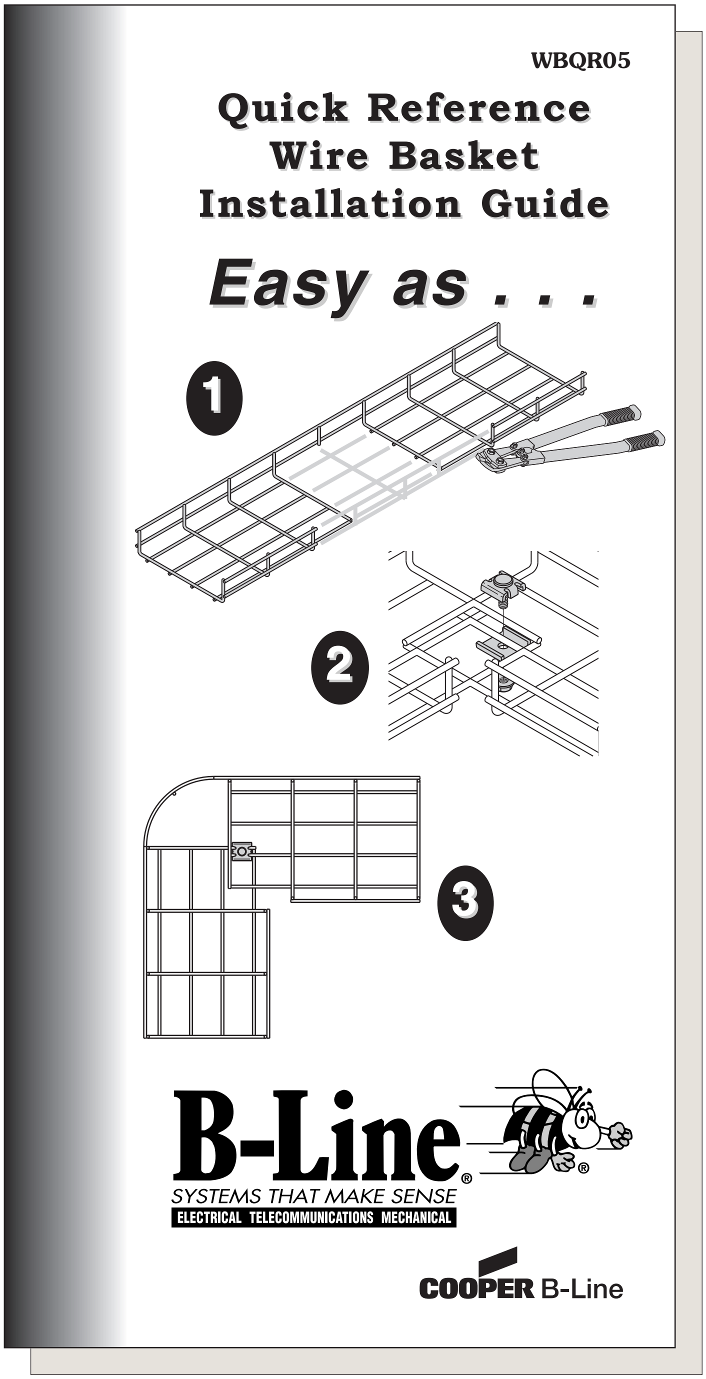
Installation Guide

NEMA VE-2

Wire mesh cable tray systems have been added to the NEMA VE-2, Cable Tray installation guidelines. The NEMA VE-2 is available for free download from www.cabletrays.com.

WBQR05

Cooper B-Line packs a quantity of WBQR05 Wire Basket Quick Reference Installation Guides, a pocket sized guide for the installer, with each shipment.



WBQR05

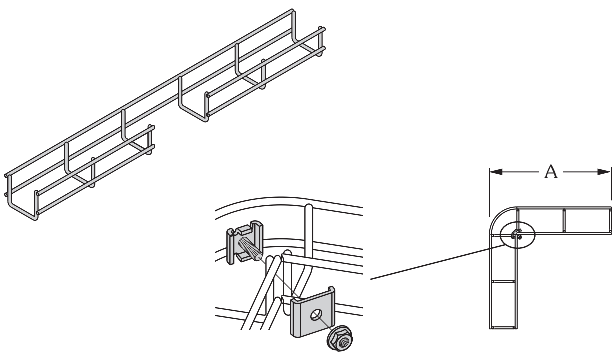
Wire Basket - Installation Information

90° Short Radius Bends

To field cut and form a bend from a Wire Basket straight section, cut side and bottom wires (deburr if necessary). Form and assemble using recommended Connector Assemblies as illustrated below.

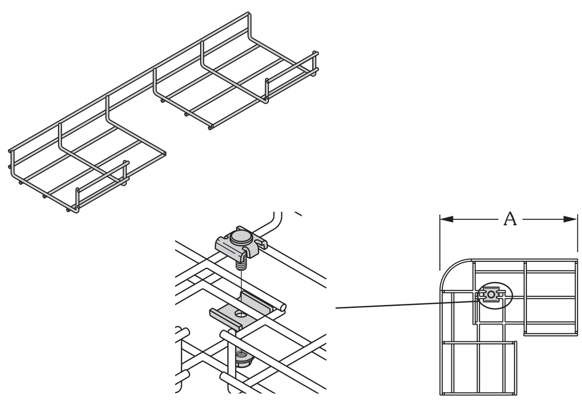
2" (50 mm) Wide

Width in.	Width mm	A in.	A mm	Connector Assembly WB4CA
2	50	10.5	265	1



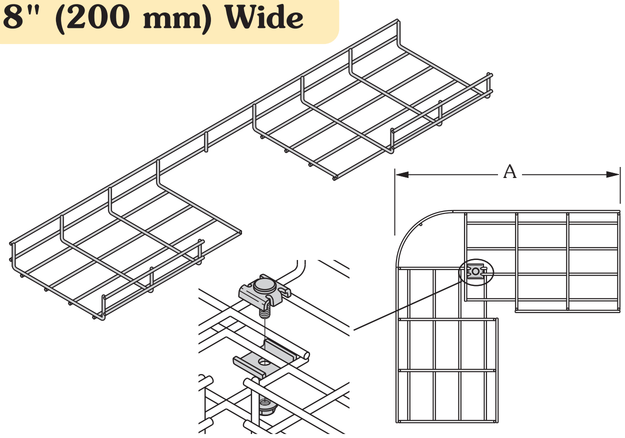
4"and 6" (100 and 150 mm) Wide

Width in.	Width mm	A in.	A mm	Connector Assembly WB4CA
4	100	10.5	265	1
6	150	14.5	370	1



8" (200 mm) Wide

Width in.	Width mm	A in.	A mm	Connector Assembly WB4CA
8	200	17.3	440	1



NOTE: WB200 Series Wire Basket shown, WB400 Series has an additional side wire.

Wire Basket - Installation Information

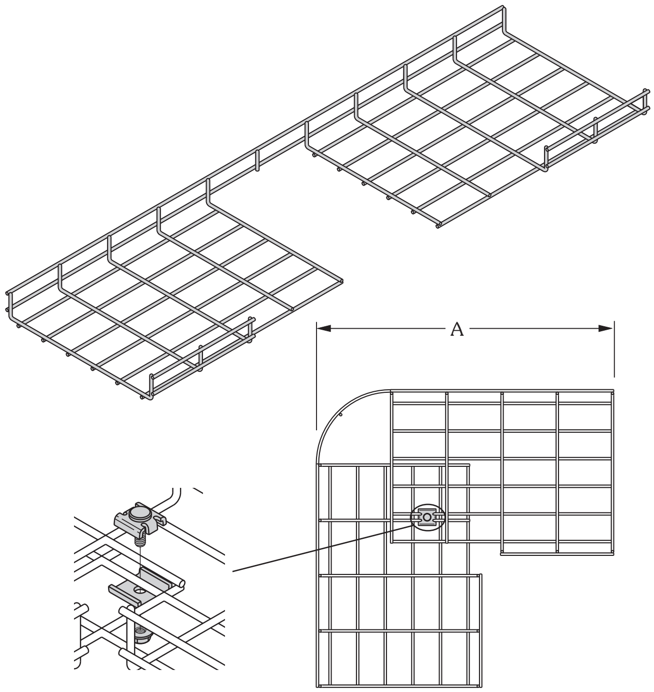
90° Short Radius Bends

To field cut and form a bend from a Wire Basket straight section, cut side and bottom wires (deburr if necessary). Form and assemble using recommended Connector Assemblies as illustrated below.

12" (300 mm) Wide

Width in.	Width mm	A in.	A mm	Connector Assembly WB4CA
12	300	21	530	1

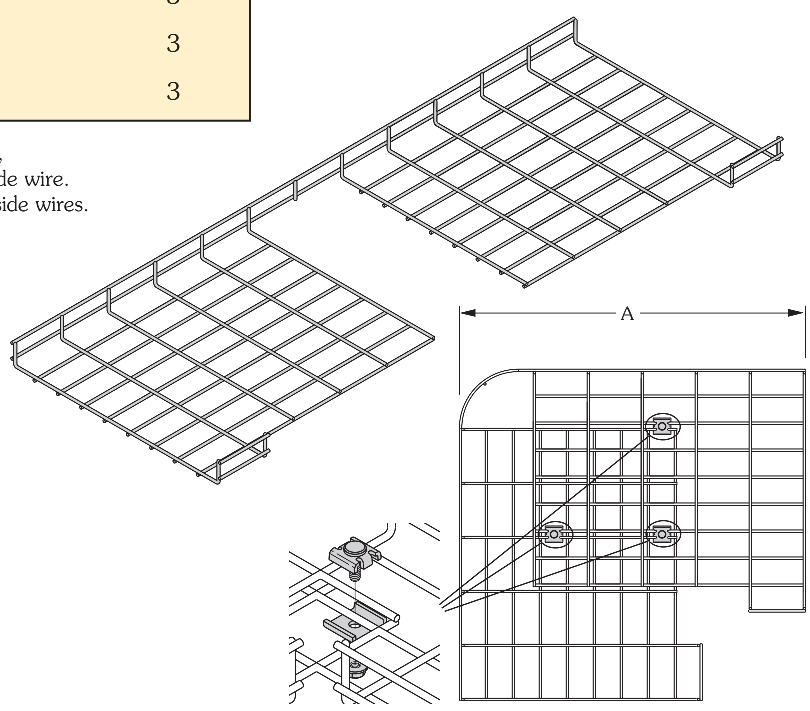
NOTE: WB200 Series Wire Basket shown,
WB400 Series has an additional side wire.
WB600 Series has two additional side wires.



18" (450 mm), 20" (500 mm), 21" (525 mm) Wide

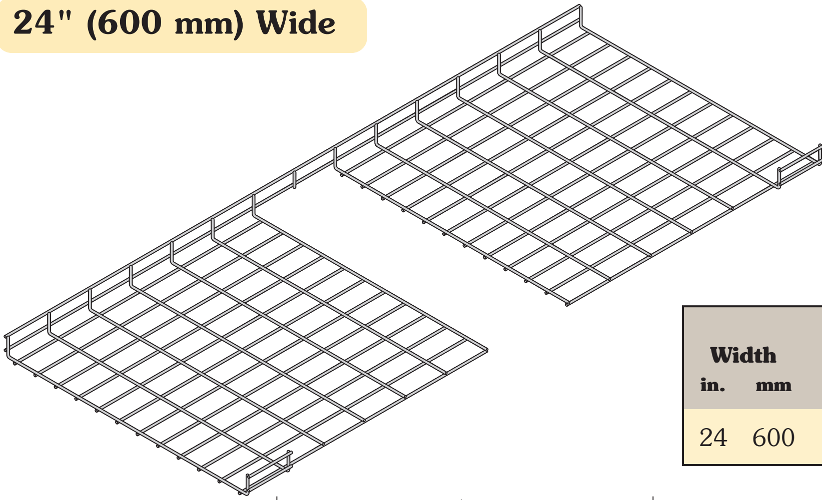
Width in.	Width mm	A in.	A mm	Connector Assembly WB4CA
18	450	25	640	3
20	500	25	640	3
21	525	25	640	3

NOTE: WB200 Series Wire Basket shown,
WB400 Series has an additional side wire.
WB600 Series has two additional side wires.

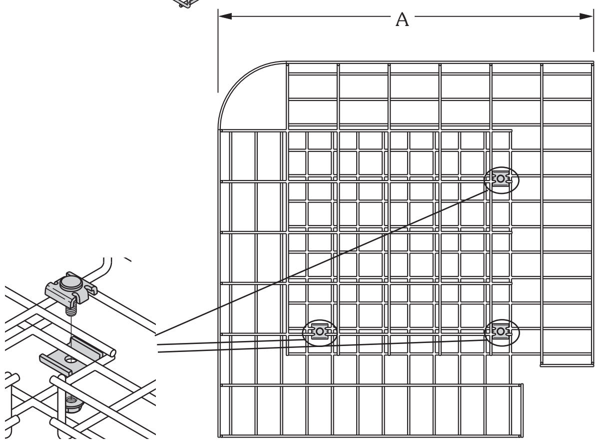


Wire Basket - Installation Information

24" (600 mm) Wide

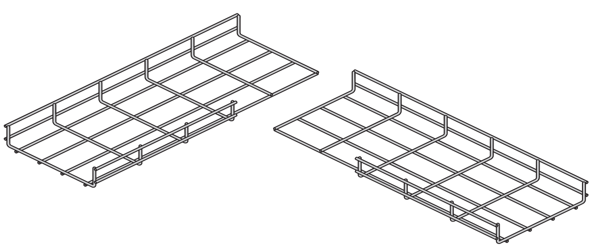


Width in.	Width mm	A in.	A mm	Connector Assembly WB4CA
24	600	29	735	3

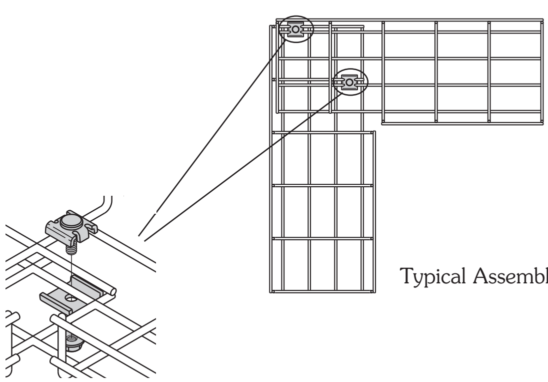


NOTE: WB200 Series Wire Basket shown,
WB400 Series has an additional side wire.
WB600 Series has two additional side wires.

90° Bends Assembled From Two Straight Sections



Two sections of Wire Basket can be used to assemble a 90° horizontal bend. Cut side wires as illustrated. Information in the chart below shows the number of segments (side wires) to cut and remove. Assemble using Connector Assemblies as illustrated.



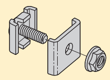
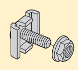
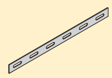
Typical Assembly

Width in.	Width mm	Remove Segments	Connector Assembly WB4CA
4	100	1	2
6	150	2	2
8	200	2	2
12	300	3	2
18	450	4	3
20	500	5	3
21	525	5	3
24	600	6	3

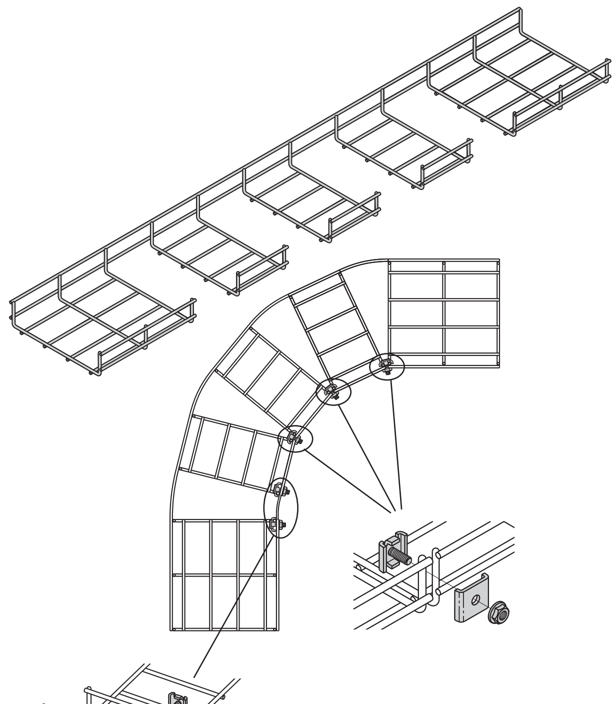
NOTE: WB200 Series Wire Basket shown,
WB400 Series has an additional side wire.
WB600 Series has two additional side wires.

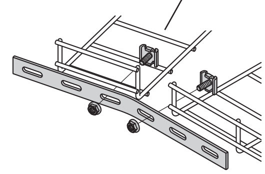
90° Long Radius Bends

To field cut and form a bend from a Wire Basket System straight section, cut side and bottom wires (deburr if necessary). Form and assemble using recommended Splice Bars, Connector and Clamp Assemblies as illustrated below.

Width in.	Width mm	Radius in.	Radius mm	Remove Segments	Connector Assembly WB4CA	Clamp Assembly WB4CP	Splice Bar WB12SB
							
4	100	9.5	241	2	1	2	1
6	150	10.7	272	3	2	2	1
8	200	15	381	4	3	2	1
12	300	22	560	6	5	2	1
18	450	25	635	8	7	2	1
20	500	30	762	10	9	2	1
21	525	30	762	10	9	2	1
24	600	32	813	11	10	2	1

NOTE: WB200 Series Wire Basket shown,
WB400 Series has an additional side wire.
WB600 Series has two additional side wires.

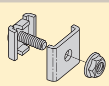
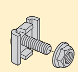
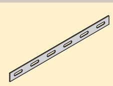




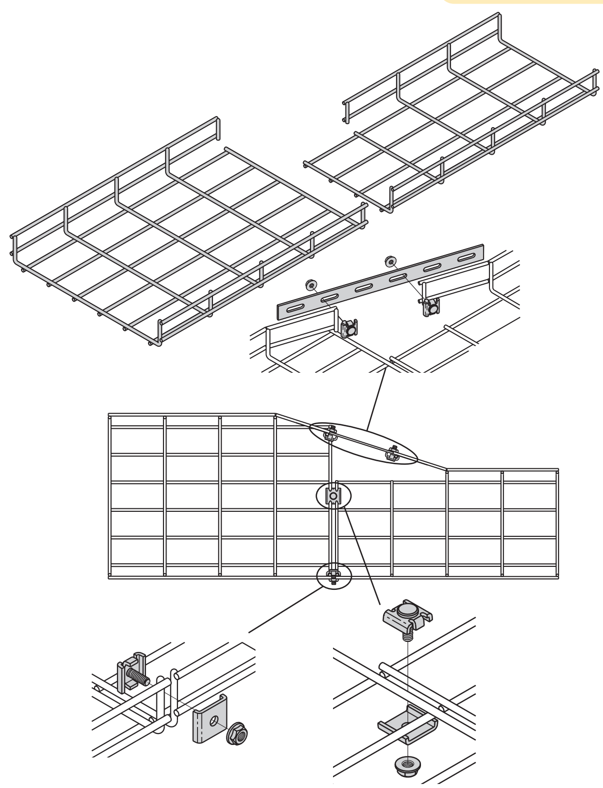
Use splice bar for exact angle adjustment.

Reducers

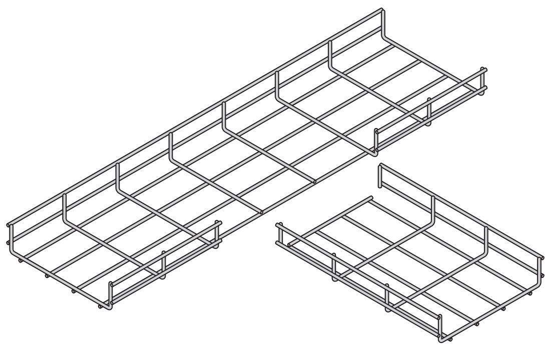
To connect two unequal widths of Wire Basket Systems, simply cut and assemble two runway sections using recommended Splice Bars, Connector and Clamp Assemblies as illustrated.

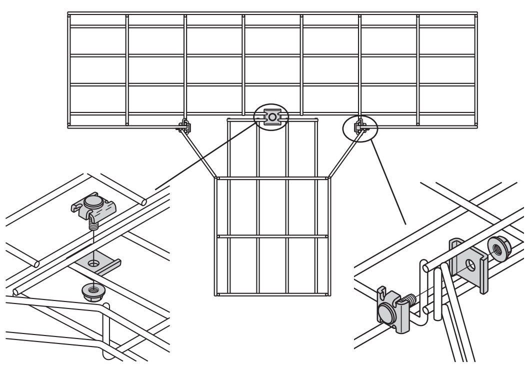
Large Width in.	Large Width mm	Connector Assembly WB4CA	Clamp Assembly WB4CP	Splice Bar WB12SB
				
4	100	1	2	1
6	150	2	2	1
8	200	2	2	1
12	300	3	2	1
18	450	3	2	1
20	500	3	2	1
21	525	3	2	1
24	600	3	2	1

NOTE: WB200 Series Wire Basket shown,
WB400 Series has an additional side wire.
WB600 Series has two additional side wires.

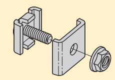


Horizontal Tees





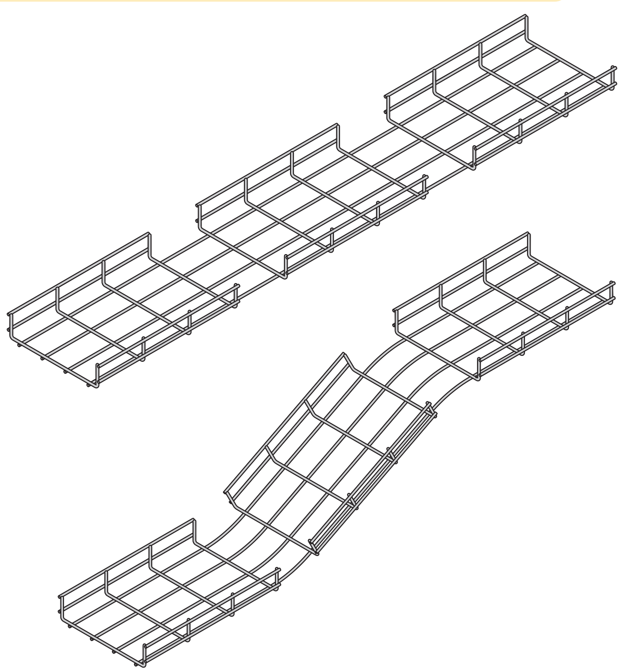
To produce a horizontal tee from Wire Basket straight sections, simply cut, form and assemble as illustrated. To produce a horizontal cross, duplicate the tee and assemble on the opposing side of the tee junction. Double the quantity of Connector Assemblies for a horizontal cross.

Wlidth in.	mm	Connector Assembly WB4CA
		
2	50	2
4	100	2
6	150	2
8	200	3
12	300	4
18	450	4
20	500	4
21	525	4
24	600	4

NOTE: WB200 Series Wire Basket shown,
WB400 Series has an additional side wire.
WB600 Series has two additional side wires.

Vertical Bend Assembly Guide

Vertical Inside and Outside Bends

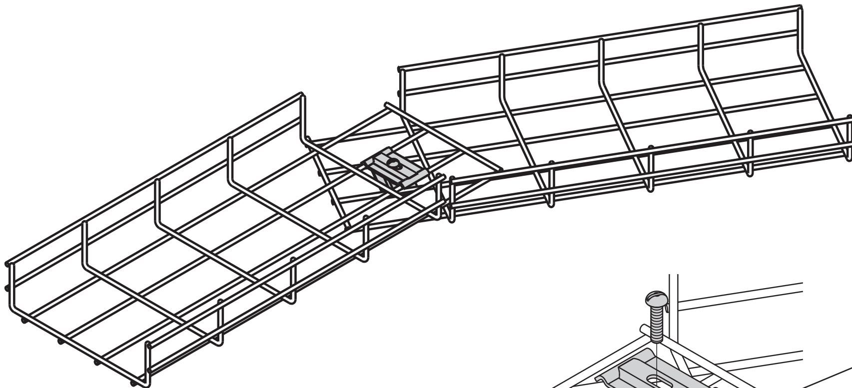


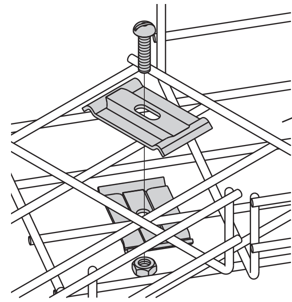
To produce vertical inside and outside bends from Wire Basket straight sections, simply cut and remove side wires as illustrated. Form to desired radius to change elevation. No assembly or splicing components required.

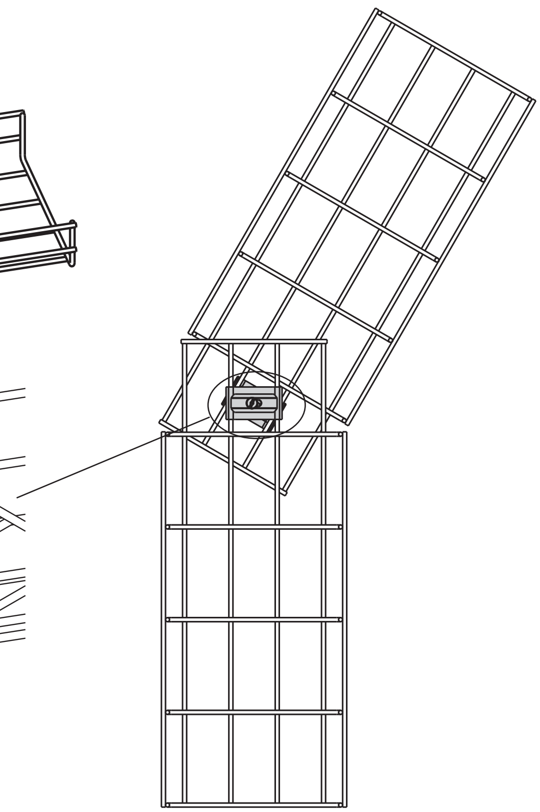
NOTE: WB200 Series Wire Basket shown,
WB400 Series has an additional side wire.
WB600 Series has two additional side wires.

WB4HAK - Horizontal Adjustable Kit

This conveniently poly-bagged horizontal adjustable kit can be used to create horizontal angles from prepared wire basket straight sections.





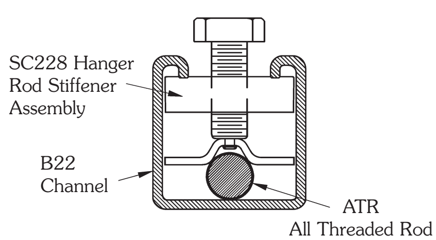


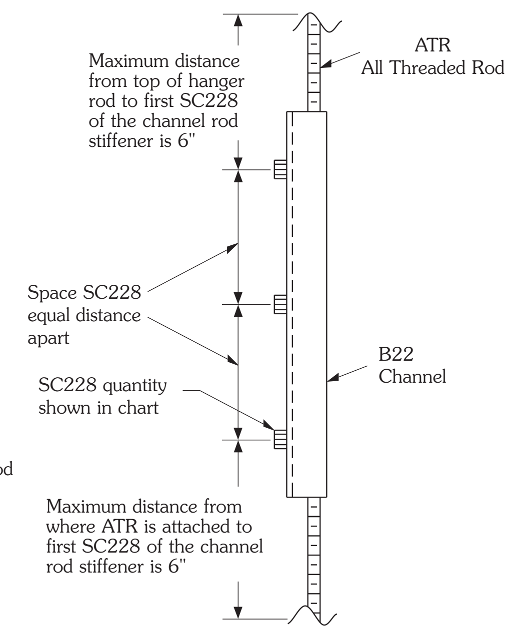
Rod Stiffener

SC228 Hanger Rod Stiffener Assembly

Threaded rod stiffener for 3/8" and 1/2" ATR (Order B22 Channel Separately). When required this can be used to stiffen all threaded rod when used with center hanging brackets.

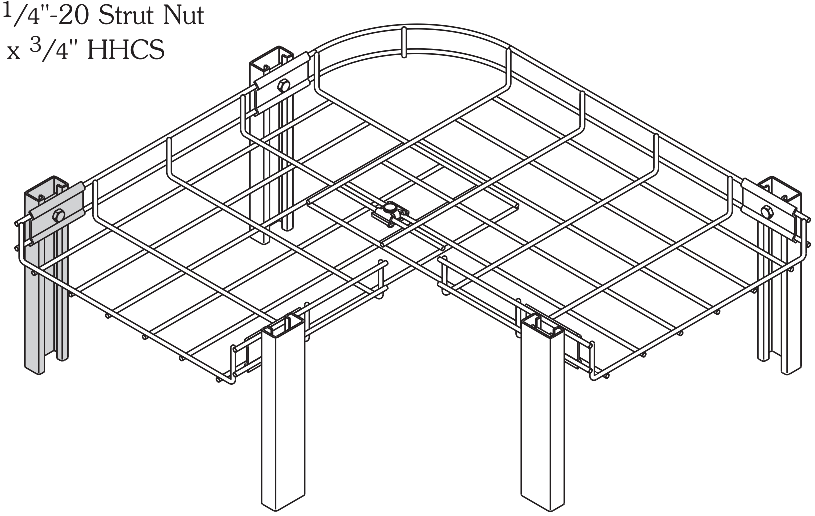
Length of Rod	Number of SC228 Required	
ATR Size	3/8" -16	1/2" - 13
24	2	2
30	3	2
36	3	3
48	4	3
60	5	4
72	6	5
84	7	5
96	7	6



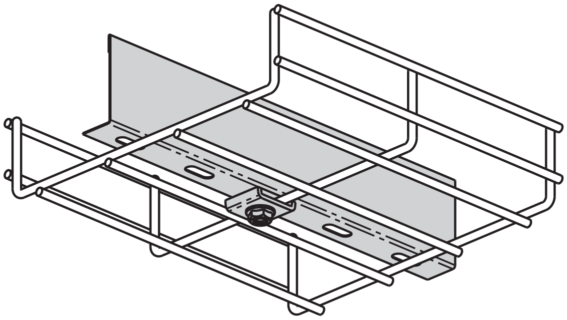


Floor Stand Support Options

Per support bill of material for one leg:
- 1 - cut length of B54 Channel
- 1 - WB4SP
- 1 - FN224 1/4"-20 Strut Nut
- 1 - 1/4"-20 x 3/4" HHCS



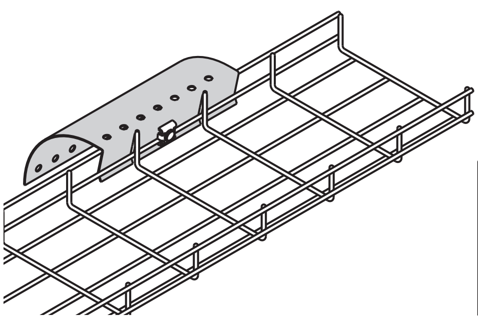
Barrier Installation For Wire Basket System



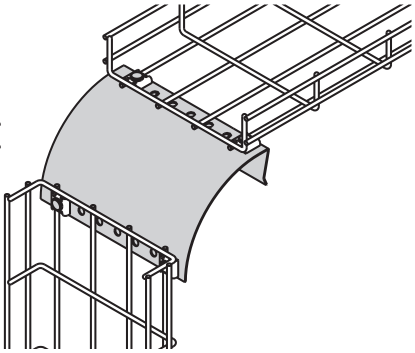
Barrier Kit includes:
- 1 - Barrier*
- 3 - 1/4" - 20 x 1" SRHM Screw
- 3 - WB4PL
- 3 - SFHN 1/4"-20 Hex Nut

*Barrier - WB2B-3M for WB200 Series
- WB4B-3M for WB400 Series
- WB6B-3M for WB600 Series

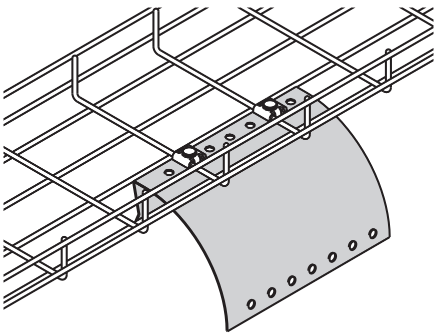
Drop-Out Options



Requires 1-WB4CP
(not included)



Requires 4-WB4CP'S
(not included)

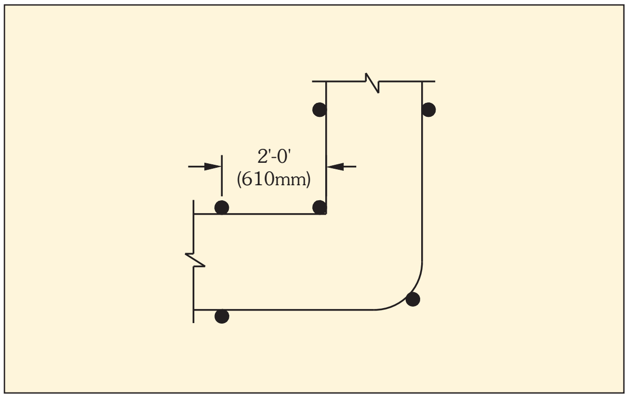


Requires 2-WB4CP'S
(not included)

Recommended Support Locations for Wire Basket Fabricated Fittings

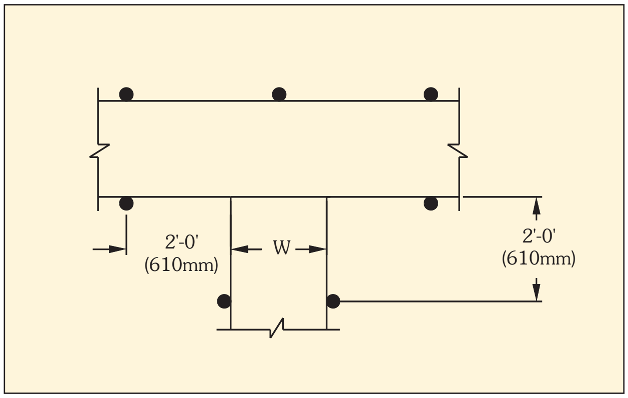
The following are recommended support diagrams to serve as guidelines for installing wire basket cable support systems in the field. The information is intended to provide the installer some practical assistance when estimating the amounts of supports and to help in identifying support locations for various field conditions for the installer. It does not, however, cover every situation that may arise when installing the product. It may be possible to install narrow trays with lighter loads and fewer supports. Wider trays with heavier loading, trays with long radii, or those with multiple side wires cut may require additional support to avoid unwanted deflection.

Horizontal Elbow Support
Inside corner supports are not required on 90° short radius bends.



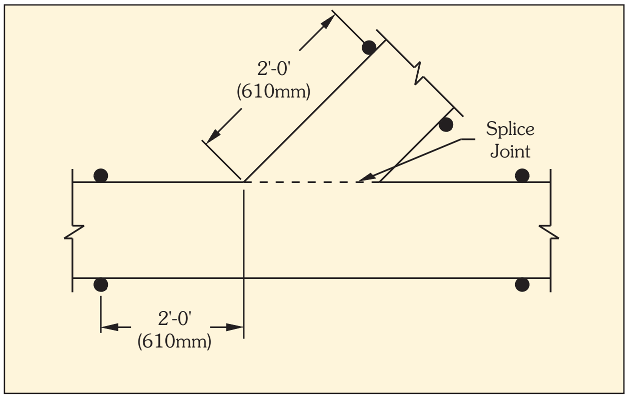
Horizontal Elbow Support

Horizontal Tee Support
On 24" wide items, one support may be placed at the mid-point of the back span as illustrated.



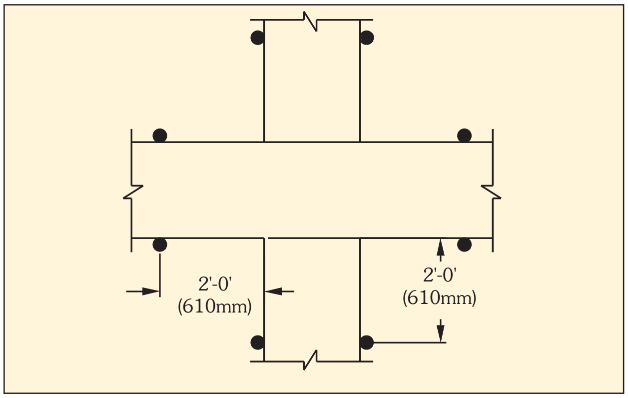
Horizontal Tee Support

Horizontal Wye Support
On 24" wide items, recommended distance is 1 ft. 6 in. (457mm) from splice connection.



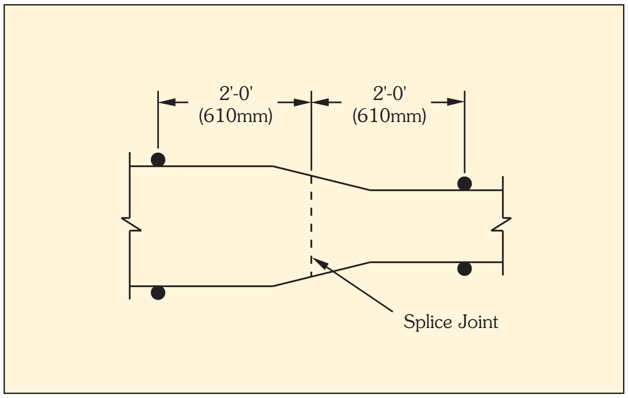
Horizontal Wye Support

Horizontal Cross Support
On 24" wide items, recommended distance is 1 ft. 6 in. (457mm) from splice connection.



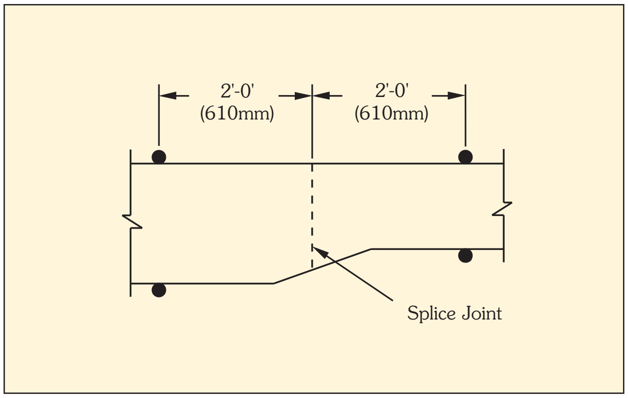
Horizontal Cross Support

Reducer Support
Place reducer supports within 2 ft. (610mm) of each splice connection.



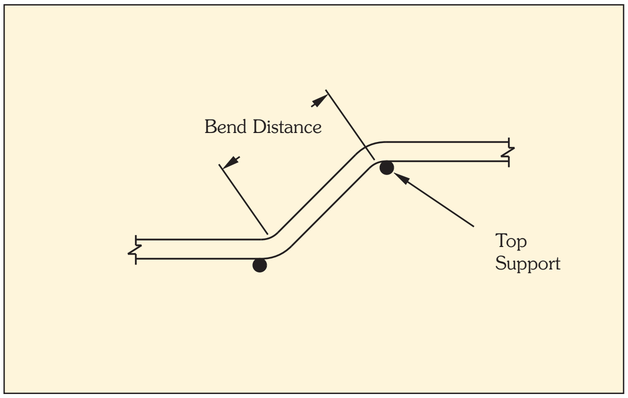
Reducer Support

Reducer Support
Place reducer supports within 2 ft. (610mm) of each splice connection.



Reducer Support

Vertical Elbows
Support vertical elbows at top support location. Bend distances of 4 ft. (1219mm) and over should be supported at each end as illustrated.



Vertical Elbows

SECTION 16114
WIRE BASKET CABLE SUPPORT SYSTEM

PART I - GENERAL

1.01 SECTION INCLUDES

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, tests and services to install complete wire basket support systems as shown on the drawings.

B. Wire basket support systems are defined to include, but are not limited to straight sections of continuous wire mesh, field formed horizontal and vertical bends, tees, drop outs, supports and accessories.

1.02 REFERENCES

A. ANSI/NFPA 70 – National Electrical Code

B. ASTM B633 – Specification for Electrodeposited Coatings of Zinc on Iron and Steel

C. ASTM A653 – Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process

D. ASTM A123 – Specification for Zinc (Hot Galvanized) Coatings on Iron and Steel

E. ASTM A510 – Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel

F. NEMA VE 2-2001 – Cable Tray Installation Guidelines

1.03 DRAWINGS

A. The drawings, which constitute a part of these specifications, indicate the general route of the wire basket support systems. Data presented on these drawings is as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification of all dimensions, routing, etc., is required.

B. Specifications and drawings are for assistance and guidance, but exact routing, locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings.

1.04 SUBMITTALS

A. Submittal Drawings: Submit drawings of wire basket and accessories including connector assemblies, clamp assemblies, brackets, splice plates, splice bars, grounding clamps and hold down plates showing accurately scaled components.

B. Product Data: Submit manufacturer's data on wire basket support system including, but not limited to, types, materials, finishes and inside depths.

1.05 QUALITY ASSURANCE

A. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable tray and cable channel systems (Article 392, NEC).

B. NFPA Compliance Comply with NFPA 70B, "Recommended Practice for Electrical Equipment Maintenance" pertaining to installation of cable tray systems.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver wire basket support systems and components carefully to avoid breakage, bending and scoring finishes. Do not install damaged equipment.

B. Store wire basket and accessories in original cartons and in clean dry space; protect from weather and construction traffic.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with these specifications, wire basket support systems to be installed shall be as manufactured by Cooper B-Line, Inc. [or engineer-approved equal].

2.02 WIRE BASKET SECTIONS AND COMPONENTS

A. General: Provide wire basket of types and sizes indicated; with connector assemblies, clamp assemblies, connector plates, splice plates and splice bars. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features.

B. Materials and Finishes: Material and finish specifications for each wire basket type are as follows:

1. Zinc Plated: Straight sections shall be made from steel meeting the minimum mechanical properties of ASTM A510 and shall be electro-plated zinc in accordance with ASTM B633 SC2. Support accessories shall be coated in accordance with ASTM B633 SC3. All threaded components shall be coated in accordance with ASTM B633 SC1.
2. Stainless Steel: Straight sections and accessories shall be made from AISI Type 304 Stainless Steel.
3. Paint: Straight sections shall be painted **[Computer White] [Flat Black] [Telco Gray]** over Zinc Plated.
4. Pre-Galvanized Zinc: Wall brackets and other pre-galvanized accessories shall be coated with zinc in accordance with ASTM A653.

2.03 TYPE OF WIRE BASKET SUPPORT SYSTEM

A. All straight section longitudinal wires shall be straight (with no bends).

B. Wire basket shall be made of high strength steel wires and formed into a standard 2 inch by 4 inch wire mesh pattern with intersecting wires welded together. All wire ends along wire basket sides (flanges) shall be rounded during manufacturing for safety of cables and installers.

C. Wire basket sizes shall conform to the following nominal criteria:

1. Straight sections shall be furnished in standard 118 inch lengths.
2. Wire basket shall have a 1 inch usable loading depth by **[12]** inches wide.
3. Wire basket shall have a 2 inch usable loading depth by **[2][4][6][8][12][18][21][24]** inches wide.
4. Wire basket shall have a 4 inch usable loading depth by **[8][12][18][21][24]** inches wide.
5. Wire basket shall have a 6 inch usable loading depth by **[12][18][20][24]** inches wide.

D. All fittings shall be field formed as needed.

E. All splicing assemblies shall be the bolted type using serrated flange locknuts. Hardware shall be either zinc plated in accordance with ASTM B633 SC2 or AISI Type 304 Stainless Steel.

F. Wire basket supports shall be center support hangers, trapeze hangers or wall brackets as manufactured by Cooper B-Line, Inc. [or engineer approved equal].

G. Trapeze hangers or center support hangers shall be supported by 1/4" or 3/8" diameter rods.

H. Special accessories shall be furnished as required to protect, support and install a wire basket support system.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install wire basket as indicated; in accordance with recognized industry practices (NEMA VE-2 2001), to ensure that the cable tray equipment complies with requirements of NEC, and applicable portions of NFPA 70B and NECA's "Standards of Installation" pertaining to general electrical installation practices.

B. Coordinate wire basket with other electrical work as necessary to properly interface installation of wire basket cable tray with other work.

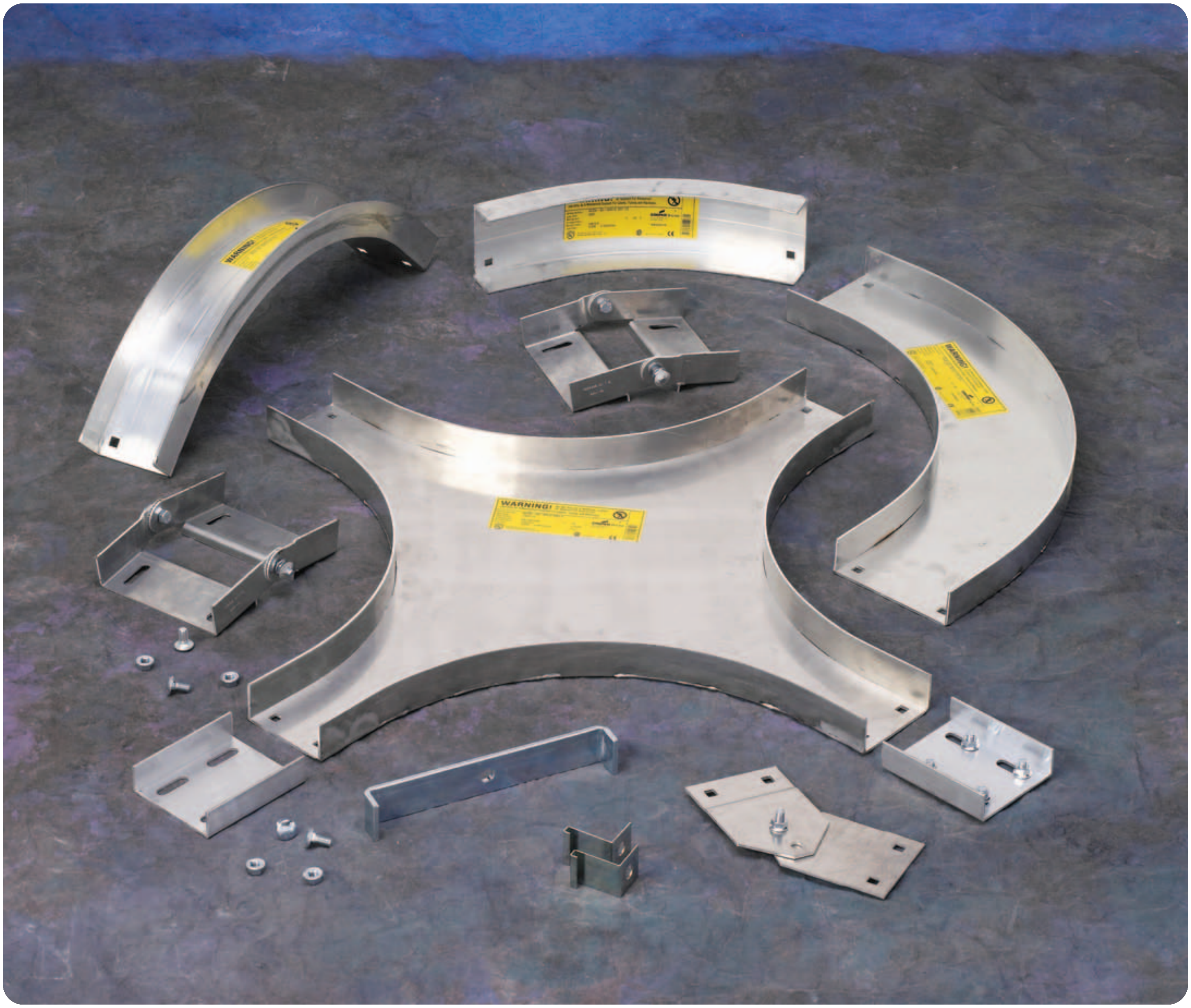
C. Provide sufficient space encompassing wire basket to permit access for installing and maintaining cables.

3.02 TESTING

A. Manufacturer shall provide test reports of the "worst case" loading conditions outlined in this specification and performed in accordance with the latest revision of NEMA VE-1.

Channel Cable Tray - Straight Sections

Cable Channel



How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my cable channel product so that I get the quickest turnaround?

Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Example: (from page CCT-3)	A ●	CC ●	03 ●	-	144 ●
Lead time(days)	3-5	3-5	**5-10**		3-5

Part will typically ship in 5-10 days, because of the 03 width.

Changing the part number to 04 width instead of 03 will change the coding to green for all sections of the straight section, therefore, the lead time will typically be 3-5 working days, instead of the original 5-10.

Cable Channel

Channel Cable Tray - *Straight Sections*

Straight Section Part Numbering

Prefix

Example: **A CC - 04 - 120**

Material
- ● **A** = Aluminum 6063-T4
- ● **G** = Type 1 - HDGAF
- ● **P** = Type 2 - Pre-Galvanized
- ● **SS4** = 304 Stainless Steel
- ● **SS6** = 316 Stainless Steel

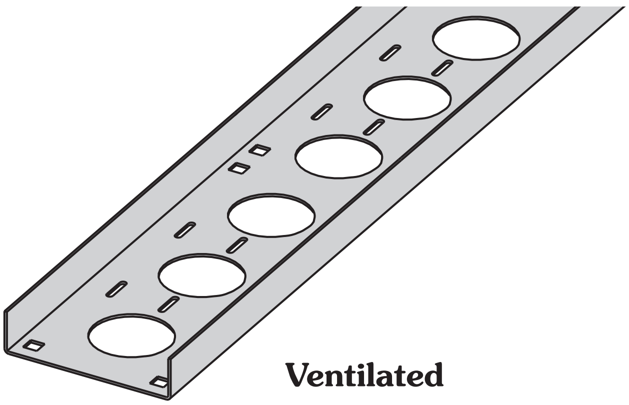
Type
- ● **CC** = Ventilated Cable Channel
- ● **CCN** = Non-Ventilated Cable Channel

Width
- ● **03** = 3"
- ● **04** = 4"
- ● **06** = 6"

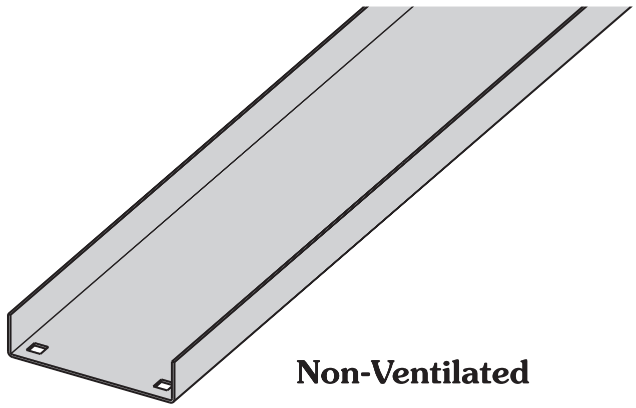
Length
- ● ① **144** = 12 ft.
- ● ② 120 = 10 ft.

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.



Ventilated



Non-Ventilated

Ventilated straight sections contain 2 1/4" diameter holes and 3/16" x 7/8" slots for cable attachment. Ventilated straight sections also have splice holes repeating every 12" to simplify field modifications.

Material Type	Width in.	Depth in.	UL Area in.^{2}	Load Data * Safety Factor = 1.5	Support Span (Ft) 5	6	10	12	Load Data * Safety Factor = 1.5	Support Span (m) 1.5	1.8	3.0	3.7
Aluminum	**3**	1.25	0.6	Load (lbs/ft)	**22**	**15**	**5**	**4**	Load (kg/m)	**33**	**22**	**7**	**6**
	(75)	(32)		Deflection Multiplier	0.025	0.051	0.395	0.820	Deflection Multiplier	.427	0.871	6.743	13.997
	4	1.75	0.6	Load (lbs/ft)	**48**	**33**	**12**	**8**	Load (kg/m)	**71**	**49**	**18**	**12**
	(100)	(44)		Deflection Multiplier	0.0071	0.015	0.114	0.236	Deflection Multiplier	0.121	0.256	1.946	4.028
	6	1.75	1.00	Load (lbs/ft)	**52**	**36**	**13**	**9**	Load (kg/m)	**77**	**54**	**19**	**13**
	(150)	(44)		Deflection Multiplier	0.0055	0.011	0.088	0.183	Deflection Multiplier	0.094	0.188	1.502	3.124
Steel 14 Gauge	**3**	1.25	0.20	Load (lbs/ft)	**24**	**17**	**6**	**4**	Load (kg/m)	**36**	**25**	**9**	**6**
	(75)	(32)		Deflection Multiplier	0.013	0.028	0.216	0.447	Deflection Multiplier	0.222	0.478	3.687	7.630
	4	1.75	0.40	Load (lbs/ft)	**52**	**36**	**13**	**9**	Load (kg/m)	**77**	**54**	**19**	**13**
	(100)	(44)		Deflection Multiplier	0.0039	0.0082	0.063	0.130	Deflection Multiplier	0.067	0.140	1.075	2.219
	6	1.75	0.40	Load (lbs/ft)	**59**	**41**	**15**	**10**	Load (kg/m)	**88**	**61**	**22**	**15**
	(150)	(44)		Deflection Multiplier	0.003	0.0063	0.049	0.101	Deflection Multiplier	0.051	0.108	0.836	1.724

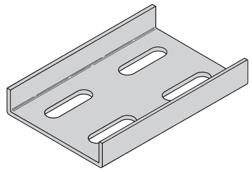
To calculate simple Beam Deflection in inches, multiply the design load (lbs/ft) by the Deflection Multiplier shown for the span.
To calculate simple Beam Deflection in millimeters, multiply the design load (kg/m) by the Deflection Multiplier shown for the span.
All dimensions in parentheses are millimeters unless otherwise specified.
*** Load data is determined by realistic deflection, not by failure.**

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Channel Cable Tray - Accessories

Splice Plate

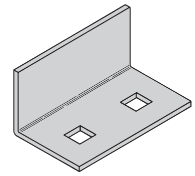
The Splice Plate has the standard 4-hole pattern for all cable channel.
- Provided with straight sections and fittings.
- Furnished as one plate with hardware.
- (*) Insert A G P SS4 SS6



Catalog No.	Channel Width	
	in.	mm
9(*)-1043	3	76
9(*)-1044	4	101
9(*)-1044-6	6	152

Blind End Plate

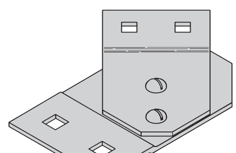
The Blind End Plate forms a closure for any cable channel dead end.
- Furnished as one plate with hardware.
- (*) Insert A G P SS4 SS6



Catalog No.	Channel Width	
	in.	mm
9(*)-1583	3	76
9(*)-1584	4	101
9(*)-1586	6	152

Horizontal Adjustable Splice Plate

The Horizontal Adjustable Splice Plate adapts to changes in direction in a horizontal plane, beyond the capability of the standard horizontal fittings.
- Furnished as one plate with hardware.
- (*) Insert A G P SS4 SS6

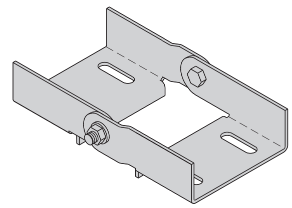


Catalog No.	Channel Width	
	in.	mm
9(*)-1743	3	76
9(*)-1744	4	101
9(*)-1746	6	152

Requires supports within 24" on both sides, per NEMA VE 2.

Vertical Adjustable Splice Plate

The Adjustable Splice Plate allows changes in elevation where standard vertical fittings are not applicable.
- Furnished as one plate with hardware.
- (*) Insert A G P SS4 SS6

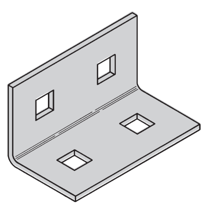


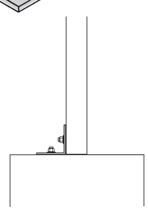
Catalog No.	Channel Width	
	in.	mm
9(*)-1643	3	76
9(*)-1644	4	101
9(*)-1646	6	152

Requires supports within 24" on both sides, per NEMA VE 2.

Box Connector

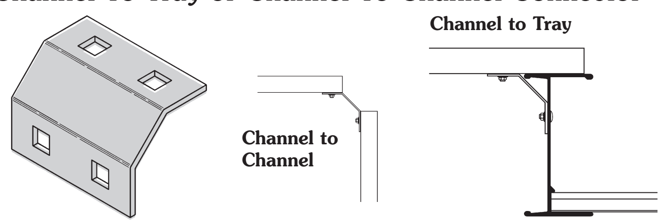
The Box Connector is used to attach the end of a cable channel run to a distribution box or a control center.
- Furnished as one connector with hardware.
- (*) Insert A G P SS4 SS6





Catalog No.	Channel Width	
	in.	mm
9(*)-1543	3	76
9(*)-1544	4	101
9(*)-1546	6	152

Channel To Tray or Channel To Channel Connector

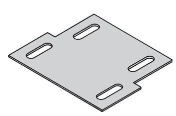


Catalog No.	Channel Width	
	in.	mm
9(*)-1261-3	3	76
9(*)-1261-4	4	101
9(*)-1261-6	6	152

The Channel Connector is used to link a cable channel to a cable tray, or a cable channel to cable channel.
- Furnished as one plate with hardware.
- (*) Insert A G P SS4 SS6

Channel Reducer Plate

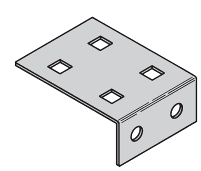
The Channel Reducer Plate is used to join cable channel sections of different widths.
- Furnished as one plate with hardware.
- (*) Insert A G P SS4 SS6



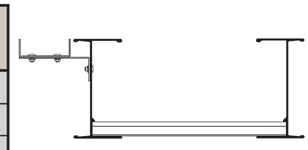
Catalog No.	Channel Width	
	in.	mm
9(*)-1843	4 to 3	101 to 76
9(*)-1863	6 to 3	152 to 76
9(*)-1864	6 to 4	152 to 101

Mounting Bracket - Channel To Tray

The Mounting Bracket allows a parallel run of cable channel to be attached to the side of a cable tray. It can also serve as a support splice connection.
- Furnished as one bracket.
- Order hardware separately.
- (*) Insert A G ZN SS4 SS6



Catalog No.	Channel Width	
	in.	mm
9(*)-1237-3	3	76
9(*)-1237-4	4	101
9(*)-1237-6	6	152



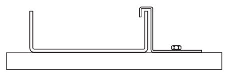
All dimensions in shaded areas are millimeters unless otherwise specified.

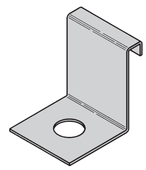
- Green = Fastest shipped items (normally 3 to 5 working days)
- Black = Normal lead-time items (normally 5 to 10 working days)
- Red = Normally long lead-time items (15 working days minimum)

Channel Cable Tray - *Accessories*

Expansion Guide Clamp

The Expansion Guide Clamp allows cable channel to expand and contract in the horizontal plane, but not in the transverse plane.
- Furnished as one clamp.
- Order 1/2" hardware separately.
- (*) Insert A G ZN SS4 SS6

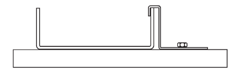


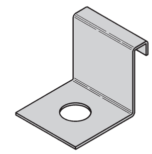


Catalog No.	Channel Width in.	Channel Width mm
9(*)-1243	3	76
9(*)-1244	4	101
9(*)-1244	6	152

Hold-Down Clamp

The Hold-Down Clamp secures cable channel to a support member.
- Furnished as one clamp.
- Order 1/2" hardware separately.
- (*) Insert A G ZN SS4 SS6

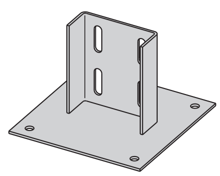




Catalog No.	Channel Width in.	Channel Width mm
9(*)-1245	3	76
9(*)-1246	4	101
9(*)-1246	6	152

Channel To Floor Base Plate

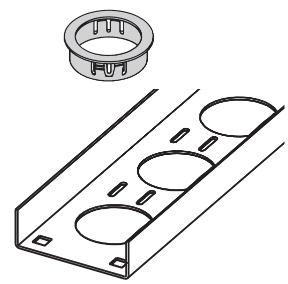
The Channel to Floor Base Plate is used to attach the end of a cable channel run to the floor or to an equipment mounting pad.
- Anchors and hardware are ordered separately.
- (*) Insert A G ZN SS4 SS6



Catalog No.	Channel Width in.	Channel Width mm
9(*)-3305-3	3	76
9(*)-3305-4	4	101
9(*)-3305-6	6	152

Cable Channel Bushing

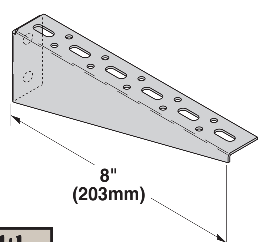
The Cable Channel Bushing is a snap-in plastic bushing used to protect cable insulation from mechanical wear.



Catalog No.	99-1125

Cable Channel Bracket

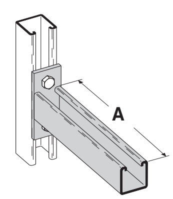
- Uniform Load: 225 lbs (1.00 kN) Safety Factor of 2.5
- Finishes available: ZN G



Catalog No.	Channel Width in.	Channel Width mm
B185CCL	3	76
	4	101
	6	152

Cable Channel Bracket

- Safety Factor of 2.5
- Finishes available: ZN G GRN

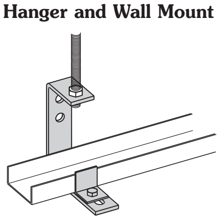


Catalog No.	Channel Width in.	Channel Width mm	Uniform Load lbs	Uniform Load kN	A in.	A mm
B409-6	3	76	1920	8.54	6	152
B409-9	4, 6	101, 152	1280	5.69	9	228

Cable Channel Hanger

Designed for 1/2" Threaded Rod, Double Nut Installation

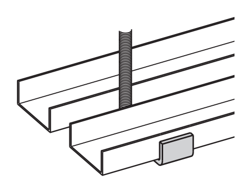
Single Cable Channel Hanger and Wall Mount



150 lb.
Safety Factor 3.0

Material	Channel Width in. 3	mm 76	in. 4	mm 101	in. 6	mm 152
Zinc Plated Steel Double Channel	● 9ZN-1232-3		● 9ZN-1232-4		● 9ZN-1232-6	
Single Channel	● 9ZN-1231-3 & 4		● 9ZN-1231-3 & 4		● 9ZN-1231-6	
HDGAF Steel (18 Ga.) Double Channel	● 9G-1232-3		● 9G-1232-4		● 9G-1232-6	
Single Channel	● 9G-1231-3 & 4		● 9G-1231-3 & 4		● 9G-1231-6	

Double Cable Channel Hanger



265 lb.
Safety Factor 3.0

All dimensions in shaded areas are millimeters unless otherwise specified.

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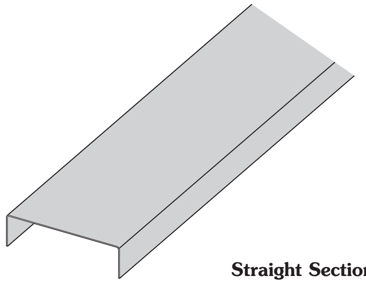
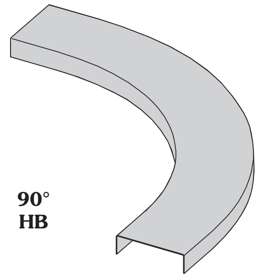
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cable Channel Covers



Straight Section



90° HB

Covers Part Numbering

Prefix

Example: **80 8 A 40 - 04 - 144**

Cover Type

80 = Solid

Detail

8 = Flanged

Material

- ● A = Aluminum
- ● G = Type 1 HDGAF
- ● P = Type 2 Pre-Galvanized
- ● SS4 = 304 Stainless Steel
- ● SS6 = 316 Stainless Steel

Material Thickness

40 = .040 Aluminum
20 = 20 Gauge Pre-Galvanized, Gauge SS4 and SS6
18 = 18 Gauge HDGAF

Tray Width

● 03 = 3"
● 04 = 4"
● 06 = 6"

Item Description

For Straight Section Cover:
Pre-Galv & Aluminum Only:
144 = 12 ft.
120 = 10 ft.
Pre-Galv, HDGAF & Alum
72 = 6 ft.
60 = 5 ft.
For fitting covers: Insert suffix of fitting to be covered.

All items normal lead time except for those indicated

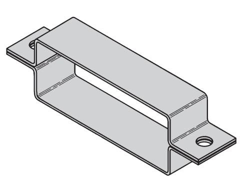
Straight Section Part Number Material	Length	Channel Width in.	mm	in.	mm	in.	mm
		3	76	4	101	6	152
● **Aluminum (.040)** Solid	12' (3.56m) 10' (3.05m)	808A40-03-144 808A40-03-120		808A40-04-144 808A40-04-120		808A40-06-144 808A40-06-120	
● **Type II Pre-Galvanized Steel (20 Ga.)** Solid	12' (3.56m) 10' (3.05m)	808P20-03-144 808P20-03-120		808P20-04-144 808P20-04-120		808P20-06-144 808P20-06-120	
● **Type I Hot Dip Galvanized Steel (18 Ga.)** Solid	12' (3.56m) 10' (3.05m)	808G18-03-72 808G18-03-60		808G18-04-72 808G18-04-60		808G18-06-72 808G18-06-60	

Fitting covers are available. To order, use the cover prefix followed by the fitting description. Ex: 808A40 - 03 - 90HB12.

Wrap-Around Cover Clamp

Wrap-Around Cover Clamps are used to securely hold a cover on cable channel in locations where strong winds can prevail.

- Furnished as one clamp with hardware.
- (*) Insert A G P SS4 SS6

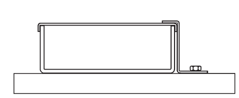


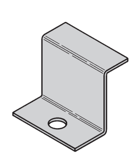
Catalog No.	Channel Width in.	mm
9(*)-9033	3	76
9(*)-9034	4	101
9(*)-9036	6	152

Combination Hold-Down & Cover Clamp

This clamp is used to hold both the cable channel and cover in place at the same time.

- Furnished as one clamp.
- Order 1/4" hardware separately.
- (*) Insert A G P SS6





Catalog No.	Channel Width in.	mm
9(*)-9023	3	76
9(*)-9024	4	101
9(*)-9024	6	152

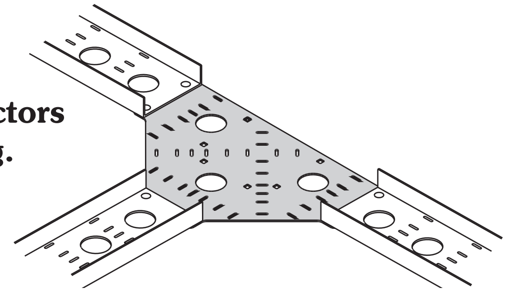
All dimensions in shaded areas are millimeters unless otherwise specified.

Cable Channel

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

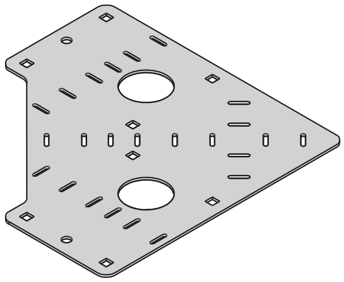
Channel Cable Tray - *Accessories*

Channel Cable Tray Connectors

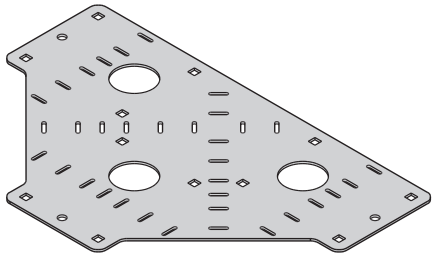


Fast, economical, space saving Channel Cable Tray Connectors
Patent No. 5,628,481; 5,782,439. Other patents pending.

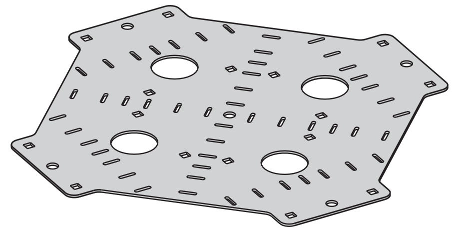
Horizontal:



90˚ Bend

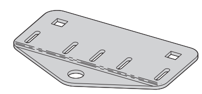


Tee



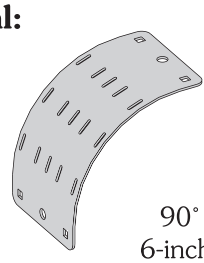
Cross

- Provides 0 or 6-inch radius connection for Cable Channel
- The Pivot Connector is available for custom angle adjustment
  - up to +/– 45˚ angle adjustment
  - order the desired quantity separately
- Slotted for easy cable fastening
- Shipped with the required hardware

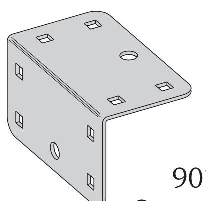


Pivot Connector

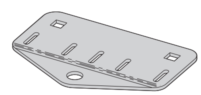
Vertical:



90˚ Bend
6-inch radius



90˚ Vertical
Square Connector
0-inch radius



Pivot Connector

- Use the same part for VO and VI applications
- Slotted for easy cable fastening
- The Pivot Connector is available for custom angle adjustment (order separately)
- Shipped with the required hardware

Connector Part Numbering

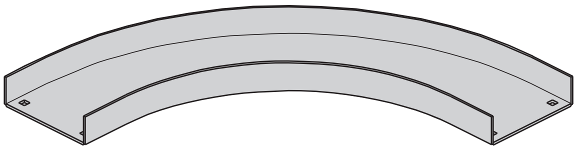
Prefix

Example: **A CC - 04 - 90HC 060**

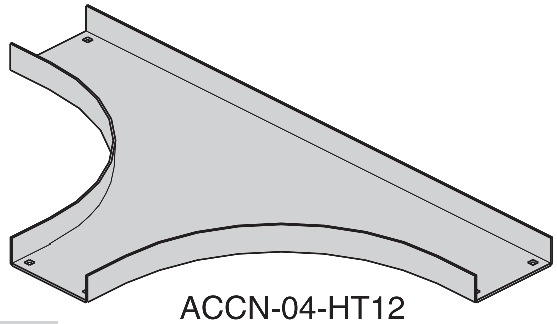
Material	Tray Type	Width	Connector Type	Radius
● A = Aluminum ● G = Type 1 HDGAF	CC = Ventilated Cable Channel	● 03 = 3" ● 04 = 4" ● 06 = 6"	● 90HC = 90˚ Horizontal ● HTC = Horizontal Tee ● HXC = Horizontal Cross ● 90VC = 90˚ Vertical ● PC = Pivot Connector	Horizontal Connectors 060 = 0" & 6" Radii Vertical Connectors 00 = 0" Radius 06 = 6" Radius

All items normal lead time except for those indicated

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

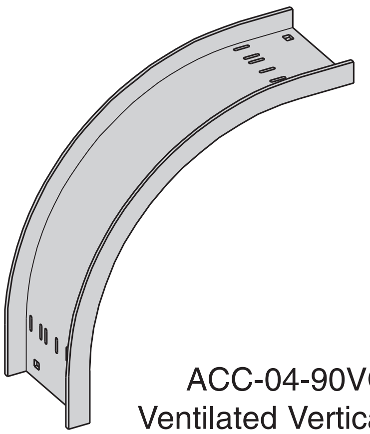


ACCN-04-90HB12
Non-Ventilated Horizontal Bend

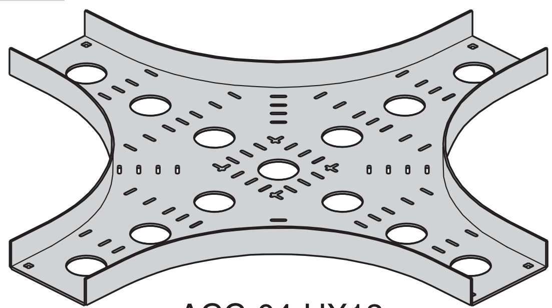


ACCN-04-HT12
Non-Ventilated Tee

Fittings engineered with 3" tangents for splicing integrity.



ACC-04-90VO12
Ventilated Vertical Bend



ACC-04-HX12
Ventilated Horizontal Cross

Fittings Part Numbering

Prefix

Example: **A CCN - 04 - 90 HB 24**

Material

- 🟢 A = Aluminum
- 🔴 G = Type 1 HDGAF
- 🔴 SS4 = 304 Stainless Steel
- 🔴 SS6 = 316 Stainless Steel
- P = †

Tray Type

- 🔴 *CC = Ventilated Cable Channel
- 🟢 CCN = Non-ventilated Cable Channel

Width

- ⚫ 03 = 3"
- 🟢 04 = 4"
- 🟢 06 = 6"

Angle

- ⚫ 30 = 30°
- 🟢 45 = 45°
- ⚫ 60 = 60°
- 🟢 90 = 90°

Fitting Type

- HB = Horizontal Bend
- HT = Horizontal Tee
- HX = Horizontal Cross
- VI = Vertical Inside Bend
- VO = Vertical Outside Bend

Radius

- 🟢 12 = 12"
- 🟢 24 = 24"
- ⚫ 36 = 36"
- 🔴 48 = 48"

* Ventilated Cable Channel Fittings are available only in 12" and 24" radii.
† - Due to multiple piece welded construction, P fittings are not available - substitute G.

Cable Channel

All items normal lead time except for those indicated

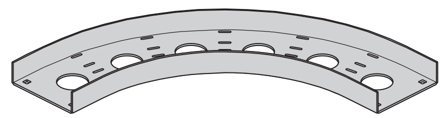
🟢 Green = Fastest shipped items (normally 3 to 5 working days)
⚫ Black = Normal lead-time items (normally 5 to 10 working days)
🔴 Red = Normally long lead-time items (15 working days minimum)

Horizontal Bends 90°, 60° (HB)

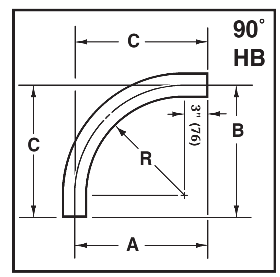
1 splice plate with hardware included.

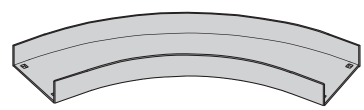
Bend Radius R in.	mm	Tray Width in.	mm	Catalog No.	A in.	A mm	B in.	B mm	C in.	C mm
90° Horizontal Bend Dimensions										
12	305	3	76	**(Pre)-03-90HB12**	16½	419	16½	419	16½	419
		4	101	**(Pre)-04-90HB12**	17	432	17	432	17	432
		6	152	**(Pre)-06-90HB12**	18	457	18	457	18	457
24	609	3	76	**(Pre)-03-90HB24**	28½	723	28½	723	28½	723
		4	101	**(Pre)-04-90HB24**	29	737	29	737	29	737
		6	152	**(Pre)-06-90HB24**	30	762	30	762	30	762
36	915	3	76	**(Pre)-03-90HB36**	40½	1029	40½	1029	40½	1029
		4	101	**(Pre)-04-90HB36**	41	1041	41	1041	41	1041
		6	152	**(Pre)-06-90HB36**	42	1067	42	1067	42	1067
48	1218	3	76	**(Pre)-03-90HB48**	52½	1334	52½	1334	52½	1334
		4	101	**(Pre)-04-90HB48**	53	1346	53	1346	53	1346
		6	152	**(Pre)-06-90HB48**	54	1372	54	1372	54	1372
60° Horizontal Bend										
12	305	3	76	**(Pre)-03-60HB12**	16¼	412	9⅜	239	10¾	273
		4	101	**(Pre)-04-60HB12**	16⅝	422	9⅝	245	11⅛	283
		6	152	**(Pre)-06-60HB12**	17½	445	10	254	11⅝	296
24	609	3	76	**(Pre)-03-60HB24**	26⅝	819	15⅜	391	17¾	451
		4	101	**(Pre)-04-60HB24**	27	686	15⅝	397	18	450
		6	152	**(Pre)-06-60HB24**	27⅞	708	16	406	18⅝	466
36	915	3	76	**(Pre)-03-60HB36**	37	940	21⅜	543	24⅝	625
		4	101	**(Pre)-04-60HB36**	37⅜	949	21⅝	549	25	635
		6	152	**(Pre)-03-60HB36**	38¼	972	22	559	25½	648
48	1218	3	76	**(Pre)-03-60HB48**	47⅜	1203	27⅜	695	31⅝	803
		4	101	**(Pre)-04-60HB48**	47⅞	1216	27⅝	702	31⅞	810
		6	152	**(Pre)-06-60HB48**	48⅝	1235	28	711	32½	826

All dimensions in shaded areas are millimeters unless otherwise specified.
(Pre) See page CCT-8 for catalog number prefix.

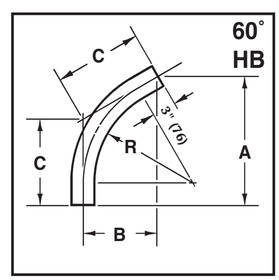


90° Horizontal Bend
Ventilated Horizontal Bend



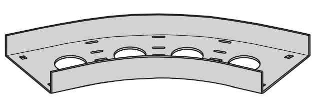


60° Horizontal Bend
Non-Ventilated Horizontal Bend

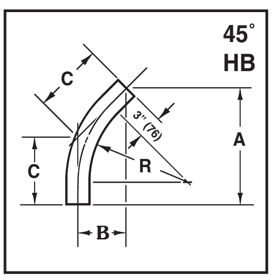


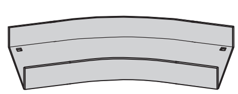
Horizontal Bends 45°, 30° (HB)

1 splice plate with hardware included.

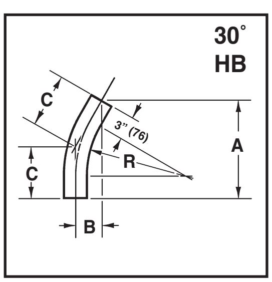


45° Horizontal Bend
Ventilated Horizontal Bend





30° Horizontal Bend
Non-Ventilated Horizontal Bend



Bend Radius R		Tray Width		45° Horizontal Bend	Dimensions					
				Catalog No.	A		B		C	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm
12	305	3	76	**(Pre)-03-45HB12**	14 5/8	371	6 1/8	156	8 5/8	219
		4	101	**(Pre)-04-45HB12**	15	381	6 1/4	159	8 7/8	225
		6	152	**(Pre)-06-45HB12**	15 3/4	400	6 1/2	165	9 1/4	235
24	609	3	76	**(Pre)-03-45HB24**	23 1/8	587	9 5/8	244	13 5/8	346
		4	101	**(Pre)-04-45HB24**	23 1/2	597	9 3/4	248	13 3/4	249
		6	152	**(Pre)-06-45HB24**	24 1/8	613	10	254	14 1/8	359
36	915	3	76	**(Pre)-03-45HB36**	31 5/8	803	13 1/8	334	18 5/8	473
		4	101	**(Pre)-04-45HB36**	32	813	13 1/4	337	18 3/4	476
		6	152	**(Pre)-06-45HB36**	32 3/4	832	13 1/2	343	19 1/8	486
48	1218	3	76	**(Pre)-03-45HB48**	40 1/8	1019	16 5/8	422	23 1/2	597
		4	101	**(Pre)-04-45HB48**	40 1/2	1029	16 3/4	425	23 3/4	603
		6	152	**(Pre)-06-45HB48**	41 1/8	1045	17	432	24 1/8	613

Bend Radius R		Tray Width		30° Horizontal Bend	A		B		C	
in.	mm	in.	mm	Catalog No.	in.	mm	in.	mm	in.	mm
12	305	3	76	**(Pre)-03-30HB12**	12 3/8	314	3 1/4	83	6 5/8	168
		4	101	**(Pre)-04-30HB12**	12 5/8	321	3 3/8	86	6 3/4	171
		6	152	**(Pre)-06-30HB12**	13 1/8	334	3 1/2	89	7	178
24	609	3	76	**(Pre)-03-30HB24**	18 3/8	467	4 7/8	124	9 7/8	251
		4	101	**(Pre)-04-30HB24**	18 5/8	473	5	127	10	254
		6	152	**(Pre)-06-30HB24**	19 1/8	486	5 1/8	130	10 1/4	260
36	915	3	76	**(Pre)-03-30HB36**	24 3/8	619	6 1/2	165	13	330
		4	101	**(Pre)-04-30HB36**	24 5/8	626	6 5/8	168	13 1/8	334
		6	152	**(Pre)-06-30HB36**	25 1/8	638	6 3/4	171	13 1/2	343
48	1218	3	76	**(Pre)-03-30HB48**	30 3/8	772	8 1/8	207	16 1/4	413
		4	101	**(Pre)-04-30HB48**	30 5/8	778	8 1/4	210	16 3/8	416
		6	152	**(Pre)-06-30HB48**	31 1/8	791	8 3/8	213	16 5/8	422

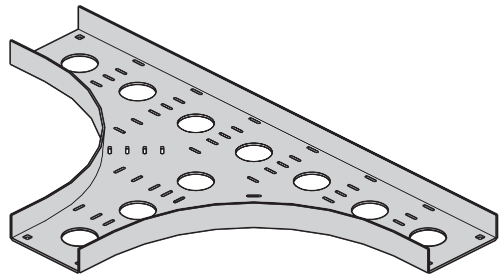
All dimensions in shaded areas are millimeters unless otherwise specified.
(Pre) See page CCT-8 for catalog number prefix.

Horizontal Tee (HT)

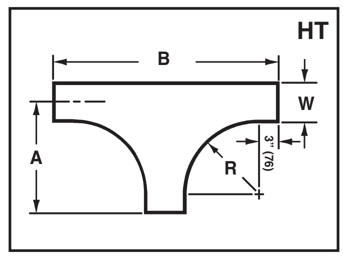
2 splice plates with hardware included.

Bend Radius R in.	mm	Tray Width in.	mm	Catalog No.	Horizontal Tee Dimensions A in.	A mm	B in.	B mm
12	305	3	76	**(Pre)-03-HT12**	16½	419	33	838
		4	101	**(Pre)-04-HT12**	17	432	34	864
		6	152	**(Pre)-06-HT12**	18	457	36	914
24	609	3	76	**(Pre)-03-HT24**	28½	723	57	1448
		4	101	**(Pre)-04-HT24**	29	737	58	1473
		6	152	**(Pre)-06-HT24**	30	762	60	1524
36	915	3	76	**(Pre)-03-HT36**	40½	1029	81	2057
		4	101	**(Pre)-04-HT36**	41	1041	82	2083
		6	152	**(Pre)-06-HT36**	42	1067	84	2134
48	1218	3	76	**(Pre)-03-HT48**	52½	1334	105	2667
		4	101	**(Pre)-04-HT48**	53	1346	106	2692
		6	152	**(Pre)-06-HT48**	54	1372	108	2743

All dimensions in shaded areas are millimeters unless otherwise specified.
(Pre) See page CCT-8 for catalog number prefix.



Horizontal Tee
Ventilated Horizontal Tee

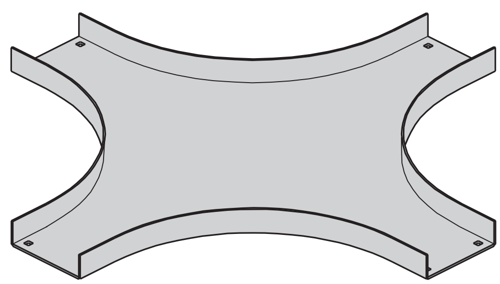


Horizontal Cross (HX)

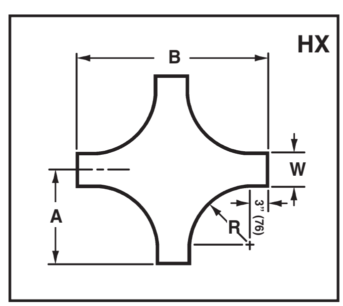
3 splice plates with hardware included.

Bend Radius R in.	mm	Tray Width in.	mm	Catalog No.	Horizontal Cross Dimensions A in.	A mm	B in.	B mm
12	305	3	76	**(Pre)-03-HX12**	16½	419	33	838
		4	101	**(Pre)-04-HX12**	17	432	34	864
		6	152	**(Pre)-06-HX12**	18	457	36	914
24	609	3	76	**(Pre)-03-HX24**	28½	723	57	1448
		4	101	**(Pre)-04-HX24**	29	737	58	1473
		6	152	**(Pre)-06-HX24**	30	762	60	1524
36	915	3	76	**(Pre)-03-HX36**	40½	1029	81	2057
		4	101	**(Pre)-04-HX36**	41	1041	82	2083
		6	152	**(Pre)-06-HX36**	42	1067	84	2134
48	1218	3	76	**(Pre)-03-HX48**	52½	1334	105	2667
		4	101	**(Pre)-04-HX48**	53	1346	106	2692
		6	152	**(Pre)-06-HX48**	54	1372	108	2743

All dimensions in shaded areas are millimeters unless otherwise specified.
(Pre) See page CCT-8 for catalog number prefix.

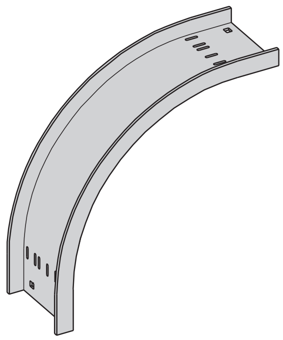


Horizontal Cross
Non-Ventilated Horizontal Cross

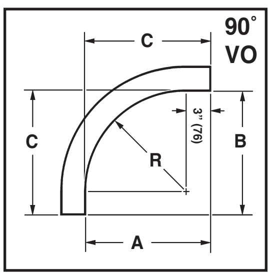


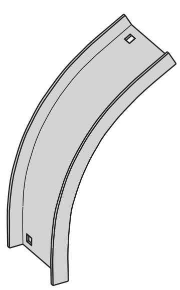
Vertical Outside Bends 90°, 60° (VO)

1 splice plate with hardware included.

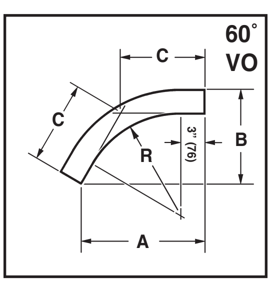


90° Vertical Outside Bend
Ventilated Vertical Outside Bend





60° Vertical Outside Bend
Non-Ventilated Vertical Outside Bend



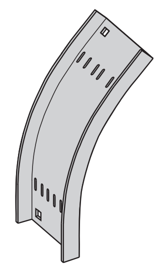
Bend Radius R		Tray Width		90° Vertical Outside Bend	Dimensions					
				Catalog No.	A		B		C	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm
12	305	3	76	**(Pre)-03-90VO12**	15	381	15	381	15	381
		4	101	**(Pre)-04-90VO12**						
		6	152	**(Pre)-06-90VO12**						
24	609	3	76	**(Pre)-03-90VO24**	27	686	27	686	27	686
		4	101	**(Pre)-04-90VO24**						
		6	152	**(Pre)-06-90VO24**						
36	915	3	76	**(Pre)-03-90VO36**	39	991	39	991	39	991
		4	101	**(Pre)-04-90VO36**						
		6	152	**(Pre)-06-90VO36**						
48	1218	3	76	**(Pre)-03-90VO48**	51	1295	51	1295	51	1295
		4	101	**(Pre)-04-90VO48**						
		6	152	**(Pre)-06-90VO48**						
				60° Vertical Outside Bend						
12	305	3	76	**(Pre)-03-60VO12**	$14\frac{7}{8}$	378	$8\frac{1}{2}$	216	$9\frac{7}{8}$	251
		4	101	**(Pre)-04-60VO12**						
		6	152	**(Pre)-06-60VO12**						
24	609	3	76	**(Pre)-03-60VO24**	$25\frac{3}{8}$	645	$14\frac{5}{8}$	372	$16\frac{7}{8}$	428
		4	101	**(Pre)-04-60VO24**						
		6	152	**(Pre)-06-60VO24**						
36	915	3	76	**(Pre)-03-60VO36**	$35\frac{5}{8}$	905	$20\frac{5}{8}$	524	$23\frac{3}{4}$	603
		4	101	**(Pre)-04-60VO36**						
		6	152	**(Pre)-06-60VO36**						
48	1218	3	76	**(Pre)-03-60VO48**	$46\frac{1}{8}$	1172	$26\frac{5}{8}$	676	$30\frac{3}{4}$	781
		4	101	**(Pre)-04-60VO48**						
		6	152	**(Pre)-06-60VO48**						

All dimensions in shaded areas are millimeters unless otherwise specified.
(Pre) See page CCT-8 for catalog number prefix.

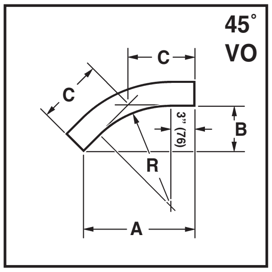
Channel Cable Tray - *Fittings*

Vertical Outside Bends 45°, 30° (VO)

1 splice plate with hardware included.

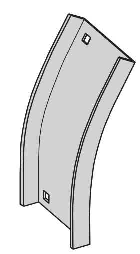


45° Vertical Outside Bend
Ventilated Vertical Outside Bend

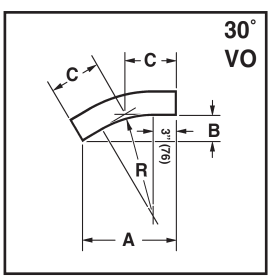


Bend Radius R in.	Bend Radius R mm	Tray Width in.	Tray Width mm	Catalog No.	A in.	A mm	B in.	B mm	C in.	C mm
				45° Vertical Outside Bend						
		3	76	**(Pre)-03-45VO12**						
12	305	4	101	**(Pre)-04-45VO12**	13 5/8	346	5 5/8	143	8	203
		6	152	**(Pre)-06-45VO12**						
		3	76	**(Pre)-03-45VO24**						
24	609	4	101	**(Pre)-04-45VO24**	22 1/4	565	9 1/4	235	13	330
		6	152	**(Pre)-06-45VO24**						
		3	76	**(Pre)-03-45VO36**						
36	915	4	101	**(Pre)-04-45VO36**	30 1/2	775	12 5/8	321	17 7/8	454
		6	152	**(Pre)-06-45VO36**						
		3	76	**(Pre)-03-45VO48**						
48	1218	4	101	**(Pre)-04-45VO48**	39	991	16 1/8	410	22 7/8	581
		6	152	**(Pre)-06-45VO48**						
				30° Vertical Outside Bend						
		3	76	**(Pre)-03-30VO12**						
12	305	4	101	**(Pre)-04-30VO12**	11 5/8	296	3 1/8	79	6 1/4	158
		6	152	**(Pre)-06-30VO12**						
		3	76	**(Pre)-03-30VO24**						
24	609	4	101	**(Pre)-04-30VO24**	17 1/2	445	4 7/8	124	9 3/8	238
		6	152	**(Pre)-06-30VO24**						
		3	76	**(Pre)-03-30VO36**						
36	915	4	101	**(Pre)-04-30VO36**	23 1/2	597	6 3/8	162	12 5/8	321
		6	152	**(Pre)-06-30VO36**						
		3	76	**(Pre)-03-30VO48**						
48	1218	4	101	**(Pre)-04-30VO48**	29 5/8	753	8	203	15 7/8	403
		6	152	**(Pre)-06-30VO48**						

All dimensions in shaded areas are millimeters unless otherwise specified.
(Pre) See page CCT-8 for catalog number prefix.



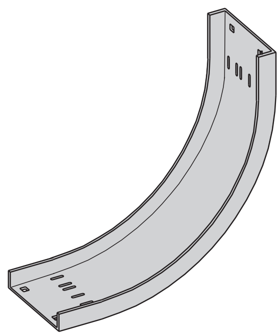
30° Vertical Outside Bend
Non-Ventilated Vertical Outside Bend



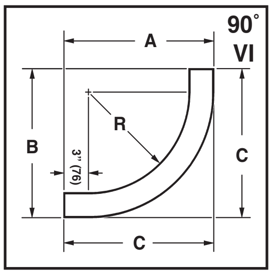
Cable Channel

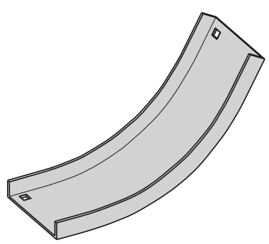
Vertical Inside Bends 90°, 60° (VI)

1 splice plate with hardware included.

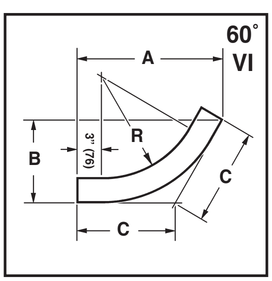


90° Vertical Inside Bend
Ventilated Vertical Inside Bend





60° Vertical Inside Bend
Non-Ventilated Vertical Inside Bend

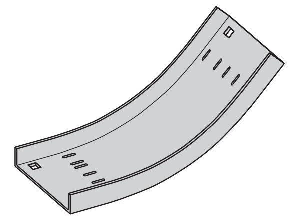


Bend Radius R in.	mm	Tray Width in.	mm	Catalog No.	A in.	A mm	B in.	B mm	C in.	C mm
90° Vertical Inside Bend Dimensions										
12	305	3	76	**(Pre)-03-90VI12**	16 1/4	413	16 1/4	413	16 1/4	413
		4	101	**(Pre)-04-90VI12**	16 3/4	425	16 3/4	425	16 3/4	425
		6	152	**(Pre)-06-90VI12**	16 3/4	425	16 3/4	425	16 3/4	425
24	609	3	76	**(Pre)-03-90VI24**	28 1/4	718	28 1/4	718	28 1/4	718
		4	101	**(Pre)-04-90VI24**	28 3/4	730	28 3/4	730	28 3/4	730
		6	152	**(Pre)-06-90VI24**	28 3/4	730	28 3/4	730	28 3/4	730
36	915	3	76	**(Pre)-03-90VI36**	40 1/4	1024	40 1/4	1024	40 1/4	1024
		4	101	**(Pre)-04-90VI36**	40 3/4	1035	40 3/4	1035	40 3/4	1035
		6	152	**(Pre)-06-90VI36**	40 3/4	1035	40 3/4	1035	40 3/4	1035
48	1218	3	76	**(Pre)-03-90VI48**	52 1/4	1327	52 1/4	1327	52 1/4	1327
		4	101	**(Pre)-04-90VI48**	52 3/4	1340	52 3/4	1340	52 3/4	1340
		6	152	**(Pre)-06-90VI48**	52 3/4	1340	52 3/4	1340	52 3/4	1340
60° Vertical Inside Bend										
12	305	3	76	**(Pre)-03-60VI12**	16	406	9 1/4	235	10 5/8	270
		4	101	**(Pre)-04-60VI12**	16 1/2	419	9 1/2	241	11	280
		6	152	**(Pre)-06-60VI12**	16 1/2	419	9 1/2	241	11	280
24	609	3	76	**(Pre)-03-60VI24**	26 1/2	673	15 1/4	387	17 5/8	448
		4	101	**(Pre)-04-60VI24**	26 7/8	683	15 1/2	394	17 7/8	454
		6	152	**(Pre)-06-60VI24**	26 7/8	683	15 1/2	394	17 7/8	454
36	915	3	76	**(Pre)-03-60VI36**	36 3/4	933	21 1/4	540	24 1/2	622
		4	101	**(Pre)-04-60VI36**	37 1/8	943	21 3/8	543	24 3/4	629
		6	152	**(Pre)-06-60VI36**	37 1/8	943	21 3/8	543	24 3/4	629
48	1218	3	76	**(Pre)-03-60VI48**	47 1/8	1197	27 1/8	689	31 3/8	797
		4	101	**(Pre)-04-60VI48**	47 5/8	1210	27 1/2	699	31 3/4	806
		6	152	**(Pre)-06-60VI48**	47 5/8	1210	27 1/2	699	31 3/4	806

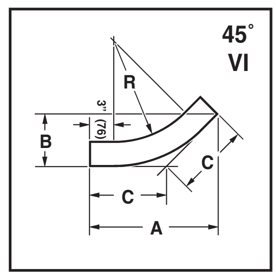
All dimensions in shaded areas are millimeters unless otherwise specified.
(Pre) See page CCT-8 for catalog number prefix.

Vertical Inside Bends 45°, 30° (VI)

1 splice plate with hardware included.

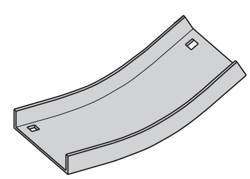


45° Vertical Inside Bend
Ventilated Vertical Inside Bend

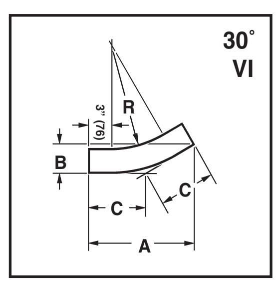


Bend Radius R in.	Bend Radius R mm	Tray Width in.	Tray Width mm	45° Vertical Inside Bend Dimensions: Catalog No.	A in.	A mm	B in.	B mm	C in.	C mm
12	305	3	76	**(Pre)-03-45VI12**	14 1/2	368	6	152	8 1/2	216
		4	101	**(Pre)-04-45VI12**	14 7/8	373	6 1/8	156	8 3/4	222
		6	152	**(Pre)-06-45VI12**	14 7/8	378	6 1/8	156	8 3/4	222
24	609	3	76	**(Pre)-03-45VI24**	23	584	9 1/2	241	13 1/2	343
		4	101	**(Pre)-04-45VI24**	23 1/4	591	9 5/8	245	13 5/8	346
		6	152	**(Pre)-06-45VI24**	23 1/4	591	9 5/8	245	13 5/8	346
36	915	3	76	**(Pre)-03-45VI36**	31 3/8	797	13	330	18 3/8	467
		4	101	**(Pre)-04-45VI36**	31 3/4	806	13 1/8	330	18 5/8	467
		6	152	**(Pre)-06-45VI36**	31 3/4	806	13 1/8	334	18 5/8	473
48	1218	3	76	**(Pre)-03-45VI48**	39 7/8	1013	16 1/2	419	23 3/8	594
		4	101	**(Pre)-04-45VI48**	40 3/8	1026	16 3/4	425	23 5/8	600
		6	152	**(Pre)-06-45VI48**	40 3/8	1026	16 3/4	425	23 5/8	600
30° Vertical Inside Bend										
12	305	3	76	**(Pre)-03-30VI12**	12 1/8	308	3 1/8	83	6 1/2	165
		4	101	**(Pre)-04-30VI12**	12 3/8	314	3 3/8	86	6 5/8	163
		6	152	**(Pre)-06-30VI12**	12 3/8	314	3 3/8	86	6 5/8	163
24	609	3	76	**(Pre)-03-30VI24**	18 1/8	461	4 3/4	121	9 3/4	248
		4	101	**(Pre)-04-30VI24**	18 3/8	467	4 7/8	86	9 7/8	163
		6	152	**(Pre)-06-30VI24**	18 3/8	314	4 7/8	86	9 7/8	163
36	415	3	76	**(Pre)-03-30VI36**	24 1/4	616	6 1/2	165	13	330
		4	101	**(Pre)-04-30VI36**	24 1/2	622	6 5/8	168	13 1/8	334
		6	152	**(Pre)-06-30VI36**	24 1/2	622	6 5/8	168	13 1/8	334
48	1218	3	76	**(Pre)-03-30VI48**	30 3/8	772	8 1/8	207	16 1/4	413
		4	101	**(Pre)-04-30VI48**	30 5/8	778	8 1/4	210	16 3/8	416
		6	152	**(Pre)-06-30VI48**	30 5/8	778	8 1/4	210	16 3/8	416

All dimensions in shaded areas are millimeters unless otherwise specified.
(Pre) See page CCT-8 for catalog number prefix.



30° Vertical Inside Bend
Non-Ventilated Vertical Inside Bend



Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, channel cable tray systems shall be as manufactured by Cooper B-Line, Inc.

Section 2- Selection and Components

2.01 General: Except as otherwise indicated, provide ventilated metal channel cable trays, of types, classes and sizes indicated with splice connectors, fittings and all other necessary accessories for a complete system. Provide channel cable tray with rounded edges and smooth surfaces in compliance with applicable standards, and with the following additional requirements.

2.02 Materials and finishes: Material and finishes specifications for each channel cable tray are as follows:

1. Aluminum: Extruded components shall be made from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052.
2. Pre-Galvanized Steel: Straight sections and fittings shall be made from structural quality mill galvanized 14 gauge steel meeting the properties of ASTM A653SS, coating designation G90.
3. Hot Dip Galvanized Steel: Straight sections and fittings shall be made from 14 gauge structural quality steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 and shall be hot-dip galvanized after fabrication in accordance with ASTM A123.
   All hot dip galvanized after fabrication cable trays must be returned to point of man facture after coating for inspection, conditioning and labeling.
4. Stainless Steel: Straight sections and fittings shall be AISI Type [304] [316].

2.03 Channel cable tray straight sections shall be constructed with ventilated flat bottom. Ventilated bottom shall be perforated with 2.25" diameter holes and have slots to facilitate the use of cable ties to secure the cables.

2.04 Straight sections shall be supplied in standard [12 foot] [10 foot (3 m)] lengths, except where shorter lengths are permitted to facilitate tray assembly as shown on drawings.

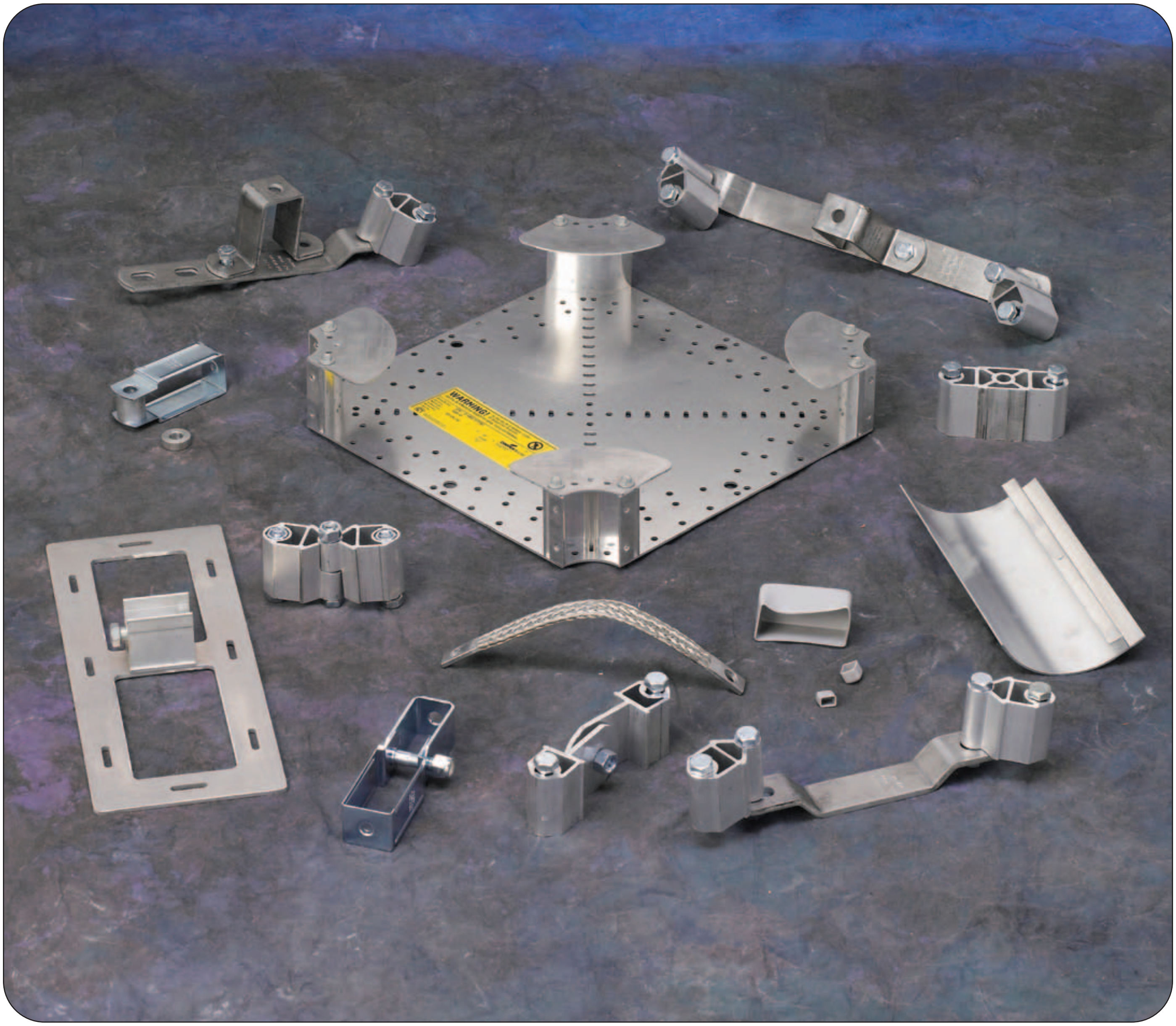
2.05 Ventilated straight sections shall have splice holes every 12 inches to simplify field modifications.

2.06 Channel cable tray width shall be [3] [4] [6] inches with a minimum loading depth of $1^1/_4$".

2.07 Fittings will have a minimum radius of [12] [24] [36] [48] inches.

2.08 Splice plates and hardware shall be included with each straight section and fitting.

Cent-R-Rail®



How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

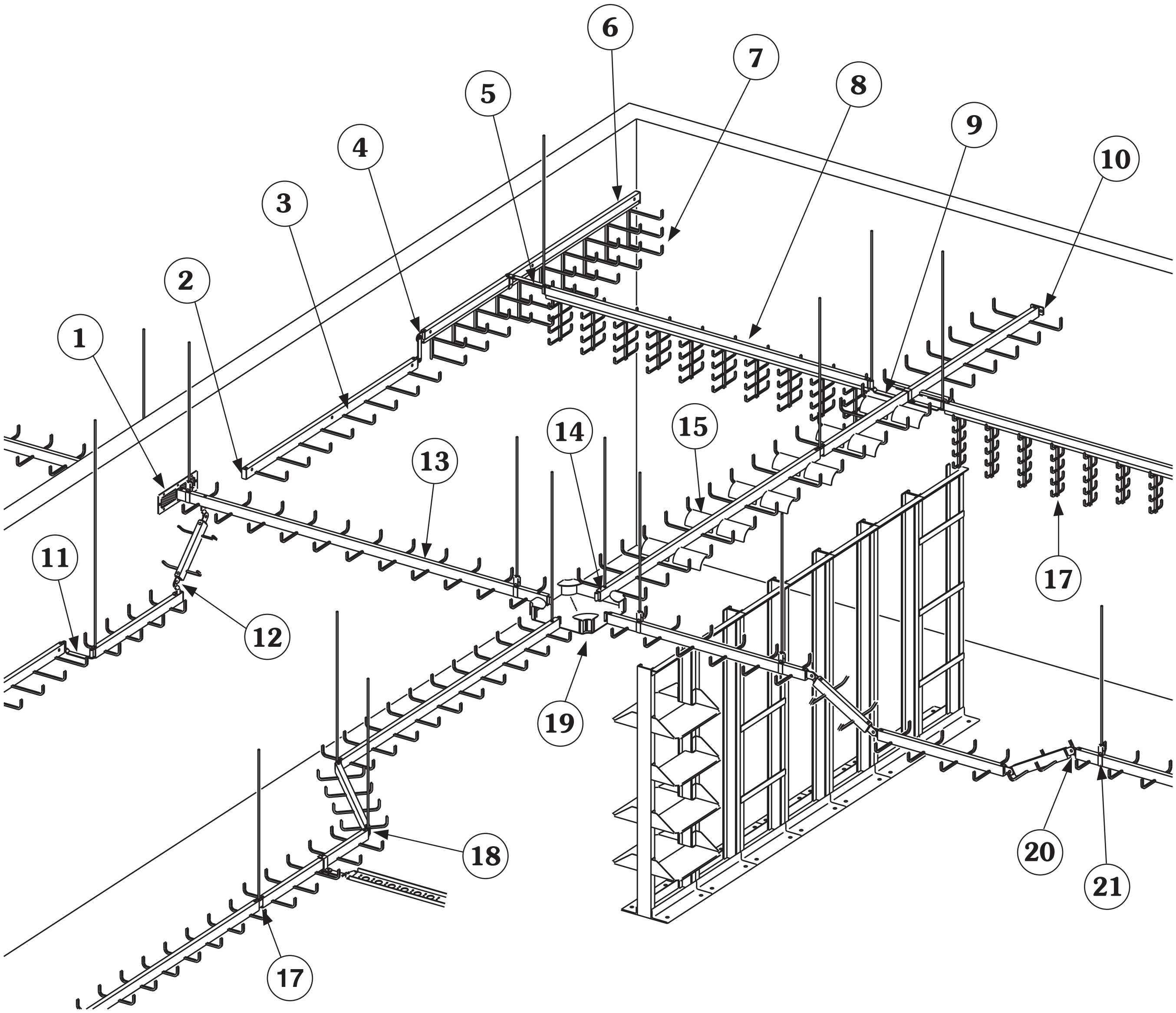
Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Example: (from page CRR-11)	**CO** ●	**A** ●	**DB** ●	**09 -** ●	**12** ●	**- 144** ●
Lead time(days)	5-10	3-5	3-5	3-5	3-5	3-5

Part will typically ship in 5-10 working days, because of the CO Series.

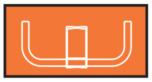
Cent-R-Rail® System



1. Tray-To-Box Connector (pg. CRR-41)
2. Center Rail End Cap (pg. CRR-37)
3. HALF-RACK® Straight Section (pg. CRR-15)
4. Vertical Offset Coupling (pg. CRR-21)
5. Horizontal Tee Coupling (pg. CRR-22 & 23)
6. MULTI-TIER HALF-RACK® Straight Section (pg. CRR-17)
7. MULTI-TIER HALF-RACK® Add-A-Rung® (pg. CRR-17)
8. VERTI-RACK® Straight Section (pg. CRR-13)
9. Horizontal Cross Coupling (pg. CRR-23)
10. Tray-To-Wall Connector (pg. CRR-40)
11. Horizontal Offset Coupling (pg. CRR-20)
12. Vertical Coupling (pg. CRR-24)
13. DATA-TRACK® Straight Section (pg. CRR-11)
14. Horizontal Pivot Connector (pg. CRR-26)
15. Cable Drop-Out (pg. CRR-35)
16. VERTI-RACK® Add-A-Rung® (pg. CRR-13)
17. Qwik-Bolt® Splice Hanger (pg. CRR-19)
18. Horizontal Adjustable Splice (pg. CRR-21)
19. Universal Hub Fitting (pg. CRR-25)
20. Vertical Adjustable Splice (pg. CRR-24)
21. Clevis Hanger (pg. CRR-27)

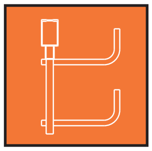
WARNING: Do NOT use as a walkway, ladder or support for personnel.

Data-Track®

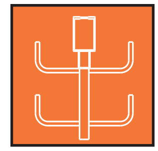


Half-Rack®

Verti-Rack®



Multi-Tier Half-Rack®



Features Common to B-Line Cent-R-Rail® Systems:

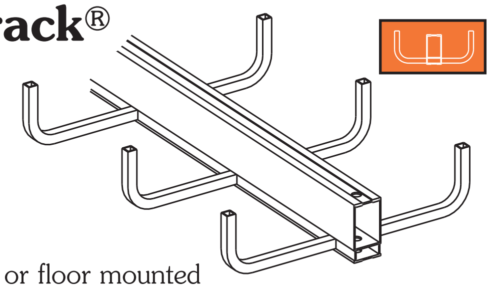
- The fastest cable tray systems to install
- Sides and bottom are open for easy loading and inspection of cables
- Light-weight, high-strength, corrosion-resistant aluminum construction
- Provide the most freedom for cables to enter or exit - perfect for future change
- Cable fill area is free of sharp edges and connection hardware
- The splice can also be used to support the tray
- Qwik-Bolt® splice maximizes installation speed and minimizes hardware
- Clevis hangers are available for random support locations without drilling center rail
- Systems are designed to install with 1/2" ATR
- Cent-R-Rail® engineered to simplify the in-field drilling process and to provide post modification integrity
- All Cent-R-Rail® Systems use the same internal connectors
- All Cent-R-Rail® Systems are interactive with each other
- Designed to interact with B-Line's Strut System and Strut Raceway System
- Comprehensive accessory options allow for complete installations without traditional cable tray fittings
- Colored rung end caps are available for system labeling
- UL Classified (cross sectional area 0.60 in^2/1000 amps)
- Patent Information

  The indicated patented products in this catalog are protected by one or more of the following patents.

  U.S. Patents 5,618,014; 5,628,481; 5,628,580; 5,634,614; 5,651,518; 5,564,658; 5,720,567; 5,730,400; 5,782,439; 5,816,542; 5,868,361; 6,547,192
  U.K. Patents 2,285,344; 2,317,508; 2,317,509
  Germany Patent 4,447,144
  Canada Patent 2,139,201
  Mexico-Pending

Cent-R-Rail® Systems

Data-Track®

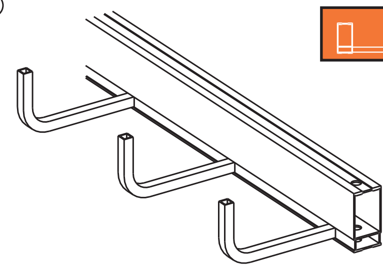


- Ceiling hung or floor mounted
- Low profile
- Built-in barrier
- NEMA 12C load classification
- Seismic restraint systems available (see appendix page CRR-59)
- CSA classified
- Technical information on pages CRR-11 & CRR-12

Sizes Available

Loading depth: 3" (75), 4" (100), 6" (150) and straight rung
Width: 6" (150), 9" (225), 12" (225), 18" (450), 24" (600)
Length: 120" (3m), 144" (4m)
Rung Spacing: 6" (150), 9" (225), 12" (300)

Half-Rack®

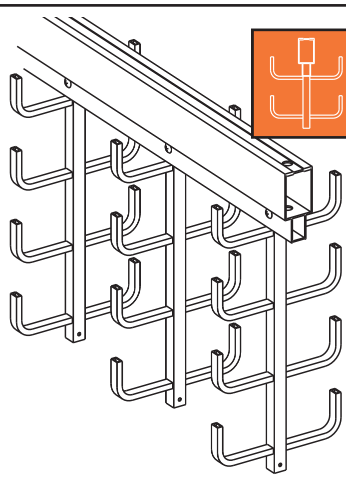


- Supported on wall or other structure
- Low profile
- Flush mounted without spacers or brackets
- Seismic restraint systems available (see appendix page CRR-59)
- CSA classified
- Technical information on pages CRR-15 & CRR-16

Sizes Available

Loading depth: 3" (75), 4" (100), 6" (150) and straight rung
Width: 3" (75), 6" (150), 9" (225), 12" (300)
Length: 120" (3m), 144" (4m)
Rung Spacing: 6" (150), 9" (225), 12" (300)

Verti-Rack®

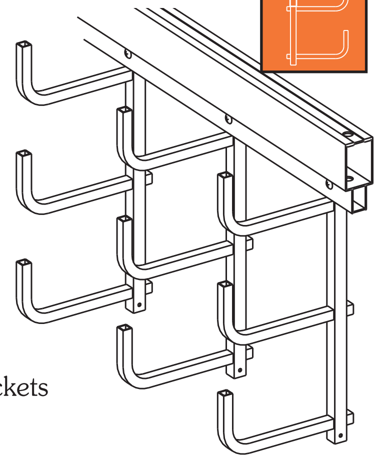


- Ceiling hung
- Multiple tray runs with one center rail
- Installs in narrow spaces
- Provides cable system segregation
- NEMA 12C load classification
- Expandable with ADD-A-RUNG®
- Expanded sizes available (page CRR-60)
- Variable widths available (page CRR-61)
- Inverted design available (page CRR-62)
- Technical information on pages CRR-13 & CRR-14

Sizes Available

Loading depth: Each tier 2" (50) and straight rung
Width: 3" (75), 6" (150), 9" (225), 12" (300)
Number of tiers: 2, 3, 4, 5 & 6
Length: 120" (3m), 144" (4m)
Rung Spacing: 6" (150), 9" (225), 12" (300), specials available

Multi-Tier Half-Rack®



- Supported on wall or other structure
- Multiple tray runs with one center rail
- Installs in narrow spaces
- Provides cable system segregation
- Flush mounted without spacers or brackets
- Expandable with ADD-A-RUNG®
- Seismic restraint systems available (see appendix page CRR-59)
- Variable widths available (page CRR-61)
- Technical information on pages CRR-17 & CRR-18

Sizes Available

Loading depth: 3" (75), 4" (100) and straight rung
Width: 3" (75), 6" (150), 9" (225), 12" (300)
Number of tiers: 2, 3 & 4
Length: 120" (3m), 144" (4m)
Rung Spacing: 6" (150), 9" (225), 12" (300), specials available

Dimensions shown in parentheses are in millimeters, unless otherwise specified.

The following guidelines are based on the 1999 National Electrical Code, Article 318.

I) Number of Multiconductor Cables, Rated 2000 Volts or Less, in Data-Track® and Half-Rack® (Excluding Straight Rung)

(1) Multiconductor Control and/or Signal Cables Only

A ladder cable tray containing only control and/or signal cables, may have 50% of its total fill area filled with cable. When using continuous bottom pans, the allowable fill is reduced from 50% to 40%.

Example: Cable tray width is obtained as follows:

2/C - #16 AWG instrumentation cable cross sectional area = 0.04 sq. in.
Total Cross Sectional Area for 300 Cables = 12.00 sq. in.
Minimum tray fill area needed = 12.00 x 2 = 24.00 sq. in.; therefore, the tray width required for 4" loading depth tray = 24.00/4 = 6 inches.

(2) 4/0 or Larger Cables

The ladder cable tray must have an inside usable width equal to or greater than the sum of the diameters (Sd) of the cables, which must be installed in a single layer. When using continuous bottom pans, the sum of the cable diameters can not exceed 90% of the usable tray width.

Example: Cable tray width is obtained as follows:

List Cable Sizes	(D) List Cable Outside Diameter	(N) List Number of Cables	Multiply (D) x (N) = Subtotal of the Sum of the Cable Diameters
3/C - #500 kcmil	2.26 inches	1	2.26 inches
3/C - #250 kcmil	1.76 inches	2	3.52 inches
3/C - #4/0 AWG	1.55 inches	4	6.20 inches

The sum of the diameters (Sd) of all cables = 2.26 + 3.52 + 6.20 = 11.98 inches; therefore, a cable tray with a usable width of at least 12 inches is required.

(3) Cables Smaller Than 4/0

The total sum of the cross-sectional areas of all the cables to be installed in the cable tray must be equal to or less than the allowable cable area for the tray width, as indicated in Table 1. When using continuous bottom pans, the allowable cable area is reduced by 22%.

Table 1

Inside Width of Cable Tray inches	Allowable Cable Area square inches
6	7.0
9	10.5
12	14.0
18	21.0
24	28.0

Example: Cable tray width is obtained as follows:

List Cable Sizes	(A) List Cable Cross Sectional Areas	(N) List Number of Cables	Multiply (A) x (N) = Total of the Cross-Sectional Area for Each Size
3/C - #12 AWG	0.167 sq. in.	10	1.67 sq. in.
4/C - #12 AWG	0.190 sq. in.	8	1.52 sq. in.
3/C - # 6 AWG	0.430 sq. in.	6	2.58 sq. in.
3/C - # 2 AWG	0.800 sq. in.	9	7.20 sq. in.

The sum of the totals of the cross-sectional areas = 1.67 + 1.52 + 2.58 + 7.20 = 12.97 inches. Using Table 1, a 12 inch wide tray with an allowable cable area of 14 sq. inches should be used.

Note: Increasing the cable tray loading depth does not permit an increase in cable fill area for power and lighting cables. The maximum allowable fill area for all cable tray with a 3 inch or greater loading depth is limited to the fill area for a 3 inch loading depth.

Cent-R-Rail® Sizing Guide

(4) 4/0 or Larger Cables Installed with Cables Smaller than 4/0

The ladder cable tray needs to be divided into two zones (a barrier or divider is not required, but one can be used if desired) so that the No. 4/0 and larger cables have a dedicated zone, as they must be placed in a single layer.

A direct method for determining the cable tray width is by figuring the cable tray widths that are required for each of the cable combinations, per steps (2) & (3); and then adding these widths together to select the proper cable tray width.

Example: Cable tray width is obtained as follows:

Part A- Width required for #4/0 AWG and larger multiconductor cables

List Cable Sizes	(D) List Cable Outside Diameter	(N) List Number of Cables	Multiply (D) x (N) = Subtotal of the Sum of the Cable Diameters (Sd)
3/C - #500kcmil	2.26 inches	1	2.26 inches
3/C - #4/0 AGW	1.55 inches	2	3.10 inches

Cable tray width required for large cables = 2.26 + 3.10 = 5.36 inches.

Part B- Width required for multiconductor cables smaller than #4/0 AWG

List Cable Sizes	(A) List Cable Cross Sectional Areas	(N) List Number of Cables	Multiply (A) x (N) = Total of the Cross-Sectional Area for Each Size
3/C - #12 AWG	0.167 sq. in.	10	1.67 sq. in.
3/C - #6 AWG	0.430 sq. in.	8	3.44 sq. in.
3/C - #2 AWG	0.800 sq. in.	2	1.60 sq. in.

The sum of the total areas = 1.67 + 3.44 + 1.60 = 6.71 sq. inches.
From Table 1, the cable tray width required for small cables is 6 inches.

The total cable tray width = 5.36 + 6.00 = 11.36 inches; therefore a 12 inch wide cable tray is required.

II) Number of Single Conductor Cables, Rated 2000 Volts or Less, in DATA-TRACK® and HALF-RACK® (Excluding Straight Rung)

Single conductor cables installed in cable tray must be 1/0 or larger, and they can not be installed with continuous bottom pans.

(1) 1000 KCMIL or Larger Cables

The sum of the diameters (Sd) of all single conductor cables shall not exceed the cable tray width. See Table 3, page CRR-8.

(2) 250 KCMIL to 1000 KCMIL Cables

The total sum of the cross-sectional areas of all the cables to be installed in the cable tray must be equal to or less than the allowable cable area for the tray width, as indicated in Table 2.

Table 2

Inside Width of Cable Tray inches	Allowable Cable Area square inches
6	6.5
9	9.5
12	13.0
18	19.5
24	26.0

(3) Cables 1/0 through 4/0

These conductors must be installed in a single layer. See Table 3.

Note: It is the opinion of some that this practice may cause problems with unbalanced voltages. To avoid these potential problems, the cables for this type of cable tray wiring system should be bundled with ties. The bundle should contain the circuit's three phase conductors plus the neutral, if one is used. The single conductor cables should be firmly tied to the cable trays at intervals not greater than 6 feet.

Table 3
Number of 600 Volt Single Conductor Cables that may be Installed in Ladder Cable Tray

Single Conductor Size	Outside Diameter in.	Area sq. in.	Cable Tray Width 6 in.	9 in.	12 in.	18 in.	24 in.
1/0	0.58	-	10	15	20	31	41
2/0	0.62	-	9	14	19	29	38
3/0	0.68	-	8	13	17	26	35
4/0	0.73	-	8	12	16	24	32
250 Kcmil	0.84	.55	11	18	24	35	47
350 Kcmil	0.94	.69	9	14	19	28	38
500 Kcmil	1.07	.90	7	11	14	22	29
750 Kcmil	1.28	1.29	5	8	10	15	20
1000 Kcmil	1.45	-	4	6	8	12	16

Cable diameters used are those for Oknite-Okolon 600 volt single conductor power cables.

III) Sizing VertI-Rack® and Multi-Tier Half-Rack®

Due to the unique nature of multiple-tier cable trays, there are no existing guidelines for sizing these types of cable trays. However, the following tables are provided to assist you in comparing the usable widths and fill areas for the different Cent-R-Rail® trays available.

This cable tray label is attached to each straight section and fitting that is U.L. classified.
U.L. assigned cross-sectional area is also stated in the loading charts in this catalog for each system.

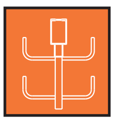
Cent-R-Rail® Sizing Guide

Usable Tray Width & Overall Outside Width:

Data-Track®

Tray Width		Usable Width				Overall Outside Width			
		Bottom Rung		Top Rung		Bottom Rung		Top Rung	
in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
6	(150)	6	(150)	6	(150)	8.7	(220)	7.1	(180)
9	(225)	9	(225)	9	(225)	11.7	(295)	10.1	(250)
12	(300)	12	(300)	12	(300)	14.7	(375)	13.1	(335)
18	(450)	16	(400)	18	(450)	19.1	(485)	19.1	(485)
24	(600)	22	(550)	24	(600)	25.1	(630)	25.1	(630)

Verti-Rack®

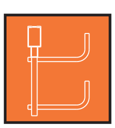


Tray Width		Total Usable Width										Overall Outside Width	
		2 tier		3 tier		4 tier		5 tier		6 tier			
in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
3	(75)	6	(150)	9	(225)	12	(300)	15	(381)	18	(450)	4.4	(110)
6	(150)	12	(300)	18	(450)	24	(600)	30	(750)	36	(900)	7.4	(190)
9	(225)	18	(450)	27	(675)	36	(900)	45	(1125)	54	(1350)	10.4	(265)
12	(300)	24	(600)	36	(900)	48	(1200)	60	(1500)	72	(1800)	13.4	(340)

Half-Rack®

Tray Width		Usable Width		Overall Outside Width	
in.	(mm)	in.	(mm)	in.	(mm)
3	(75)	3	(75)	5.2	(130)
6	(150)	6	(150)	8.2	(210)
9	(225)	9	(225)	11.2	(285)
12	(300)	12	(300)	14.2	(360)

Multi-Tier Half-Rack®



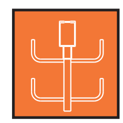
Tray Width		Total Usable Width						Overall Outside Width	
		2 tier		3 tier		4 tier			
in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
3	(75)	6	(150)	9	(225)	12	(300)	4.7	(120)
6	(150)	12	(300)	18	(450)	24	(600)	7.7	(195)
9	(225)	18	(450)	27	(675)	36	(900)	10.7	(270)
12	(300)	24	(600)	36	(900)	48	(1200)	13.7	(350)

Tray Fill Area & Overall Outside Height:

Data-Track®

Loading Depth in.	(mm)	Tray Width in.	(mm)	Fill Area Bottom Rung in.²	(cm²)	Fill Area Top Rung in.²	(cm²)	Overall Outside Height Bottom Rung in.	(mm)	Overall Outside Height Top Rung in.	(mm)
3	(75)	6	(150)	18	(120)	18	(120)	3.7	(95)	6.1	(155)
		9	(225)	27	(180)	27	(180)				
		12	(300)	36	(240)	36	(240)				
		18	(450)	49	(325)	54	(360)				
		24	(600)	67	(450)	72	(480)				
4	(100)	6	(150)	24	(160)	24	(160)	4.7	(120)	7.1	(180)
		9	(225)	36	(240)	36	(240)				
		12	(300)	48	(320)	48	(320)				
		18	(450)	65	(420)	72	(480)				
		24	(600)	89	(575)	96	(640)				
6	(150)	6	(150)	36	(240)	36	(240)	6.7	(170)	9.1	(230)
		9	(225)	54	(360)	54	(360)				
		12	(300)	72	(480)	72	(480)				
		18	(450)	98	((630)	108	(700)				
		24	(600)	134	(865)	144	(930)				

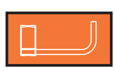
Verti-Rack®



Loading Depth in.	(mm)	Tray Width in.	(mm)	Fill Area 2 tier in.²	(cm²)	3 tier in.²	(cm²)	4 tier in.²	(cm²)	5 tier in.²	(cm²)	6 tier in.²	(cm²)
2	(50)	3	(75)	12	(80)	18	(120)	24	(160)	30	(200)	36	(240)
		6	(150)	24	(160)	36	(240)	48	(320)	60	(400)	72	(480)
		9	(225)	36	(240)	54	(360)	72	(480)	90	(600)	108	(700)
		12	(300)	48	(320)	72	(480)	96	(640)	120	(800)	144	(930)

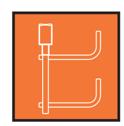
Overall Outside Height 2 tier in.	(mm)	3 tier in.	(mm)	4 tier in.	(mm)	5 tier in.	(mm)	6 tier in.	(mm)
9.3	(235)	13.3	(340)	17.3	(440)	21.3	(540)	25.3	(645)

Half-Rack®



Loading Depth in.	(mm)	Tray Width in.	(mm)	Fill Area in.2	(cm2)	Overall Outside Height in.	(mm)
3	(75)	3	(75)	9	(60)	3.7	(95)
		6	(150)	18	(120)		
		9	(225)	27	(180)		
		12	(300)	36	(240)		
4	(100)	3	(75)	12	(80)	4.7	(120)
		6	(150)	24	(160)		
		9	(225)	36	(240)		
		12	(300)	48	(320)		
6	(150)	3	(75)	18	(120)	6.7	(170)
		6	(150)	36	(240)		
		9	(225)	54	(360)		
		12	(300)	72	(480)		

Multi-Tier Half-Rack®

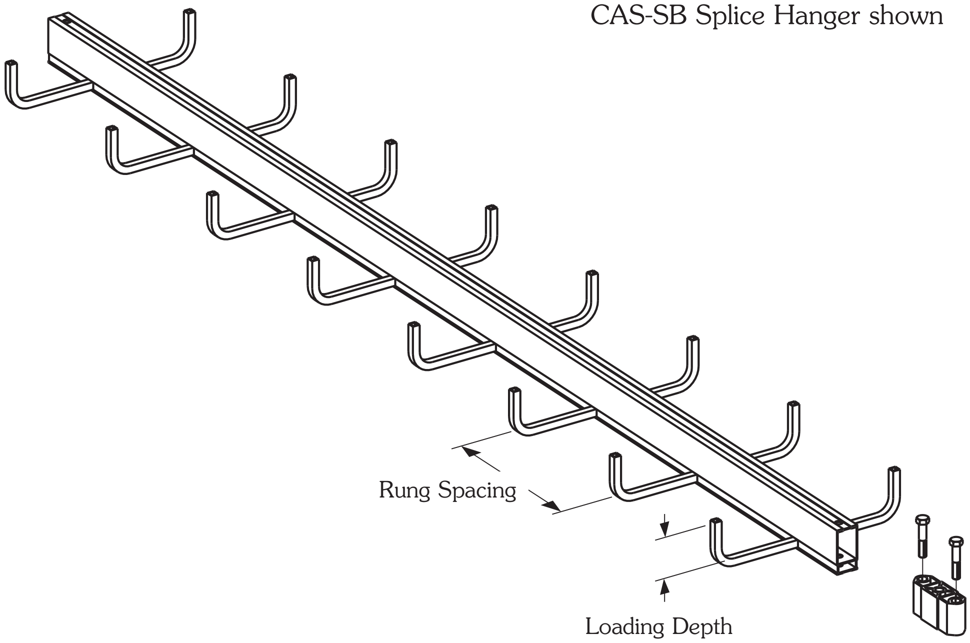


Loading Depth in.	(mm)	Tray Width in.	(mm)	Fill Area 2 tier in.²	(cm²)	3 tier in.²	(cm²)	4 tier in.²	(cm²)
3	(75)	3	(75)	18	(120)	27	(180)	36	(240)
		6	(150)	36	(240)	54	(360)	72	(480)
		9	(225)	54	(360)	81	(525)	108	(700)
		12	(300)	72	(480)	108	(700)	144	(930)
4	(100)	3	(75)	24	(160)	36	(240)	48	(320)
		6	(150)	48	(320)	72	(480)	96	(640)
		9	(225)	72	(480)	108	(700)	144	(930)
		12	(300)	96	(640)	144	(930)	192	(1240)

Overall Outside Height 2 tier in.	(mm)	3 tier in.	(mm)	4 tier in.	(mm)
11.3	(285)	17.3	(440)	23.3	(590)

Data-Track®

Data-Track® Straight Section with
CAS-SB Splice Hanger shown



- One CAS-SB Splice Hanger provided with each straight section
- For overall height and width dimension see pages CRR-9 & CRR-10

Patented (see page CRR-4)

Data-Track® Straight Section Part Numbering

C3 A DB 09 - 12 - 144

Series	Material	Type	Rung Spacing	Width	Length*
● C0 = Straight Rung	● A = Aluminum	● DB = Bottom Rung	● 06 = 6"	● 06 = 6"	● 144 = 144"
● C3 = 3" Loading Depth		● DT = Top Rung	● 09 = 9"	● 09 = 9"	● 120 = 120"
● C4 = 4" Loading Depth			● 12 = 12"	● 12 = 12"	
● C6 = 6" Loading Depth				● 18 = 18"	
				● 24 = 24"	

* Actual tray lengths are 142" and 118" to allow for splice hangers

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Data-Track®

Data-Track® Load Capacities

Tray Width		Rung Spacing		Support Span ft. (m)										Rung * Deflection Multiplier	Avg. Empty Tray Weight	
				5	(1.5)	6	(1.8)	8	(2.4)	10	(3.0)	12	(3.7)			
in.	(mm)	in.	(mm)	lbs/ft	(kg/m)	lbs/ft	(kg/m)	lbs/ft	(kg/m)	lbs/ft	(kg/m)	lbs/ft	(kg/m)		lbs/ft	(kg/m)
6	(150)	6	(150)	646	(961)	448	(667)	252	(375)	161	(240)	112	(167)	0.00002	1.38	(2.05)
		9	(225)	532	(793)	448	(667)	252	(375)	161	(240)	112	(167)	0.00003	1.25	(1.86)
		12	(300)	400	(595)	400	(595)	252	(375)	161	(240)	112	(167)	0.00004	1.20	(1.79)
9	(225)	6	(150)	532	(793)	448	(667)	252	(375)	161	(240)	112	(167)	0.00005	1.45	(2.16)
		9	(225)	354	(527)	354	(527)	252	(375)	161	(240)	112	(167)	0.00008	1.30	(1.93)
		12	(300)	266	(396)	266	(396)	252	(375)	161	(240)	112	(167)	0.00010	1.24	(1.85)
12	(300)	6	(150)	400	(595)	400	(595)	252	(375)	161	(240)	112	(167)	0.00020	1.53	(2.28)
		9	(225)	266	(396)	266	(396)	252	(375)	161	(240)	112	(167)	0.00020	1.35	(2.01)
		12	(300)	200	(298)	200	(298)	200	(298)	161	(240)	112	(167)	0.00030	1.28	(1.90)
18	(450)	6	(150)	266	(396)	266	(396)	252	(375)	161	(240)	112	(167)	0.00050	1.69	(2.51)
		9	(225)	178	(265)	178	(265)	178	(265)	161	(240)	112	(167)	0.00070	1.46	(2.17)
		12	(300)	134	(199)	134	(199)	134	(199)	134	(199)	112	(167)	0.00090	1.35	(2.01)
24	(600)	6	(150)	200	(298)	200	(298)	200	(298)	161	(240)	112	(167)	0.00110	1.85	(2.75)
		9	(225)	134	(199)	134	(199)	134	(199)	134	(199)	112	(167)	0.00170	1.56	(2.32)
		12	(300)	100	(149)	100	(149)	100	(149)	100	(149)	100	(149)	0.00220	1.43	(2.13)

Safety Factor = 1.5 for load capacities

For unbalanced load information see appendix page CRR-58
For Seismic Restraint Systems see appendix page CRR-59

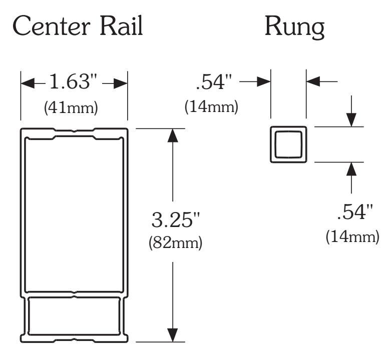
	Support Span (feet)				
	5	6	8	10	12
Center Rail Deflection Multiplier*	0.0012	0.0025	0.0079	0.0192	0.0397

* Deflection multipliers are given for English units. To determine deflection in millimeters, first calculate deflection in inches and then multiply by 25.4.

To calculate the center rail simple beam deflection at mid span in inches for a specific support span (ft), multiply the "center rail deflection multiplier" for that span by the load in lbs/ft that will be installed in the cable tray.
Example: The center rail deflection for 50 lbs/ft supported every 12 ft = 50 x .0397 = 2.0 inches.
Note: When trays are used in continuous spans, the deflection is reduced by as much as 50%.

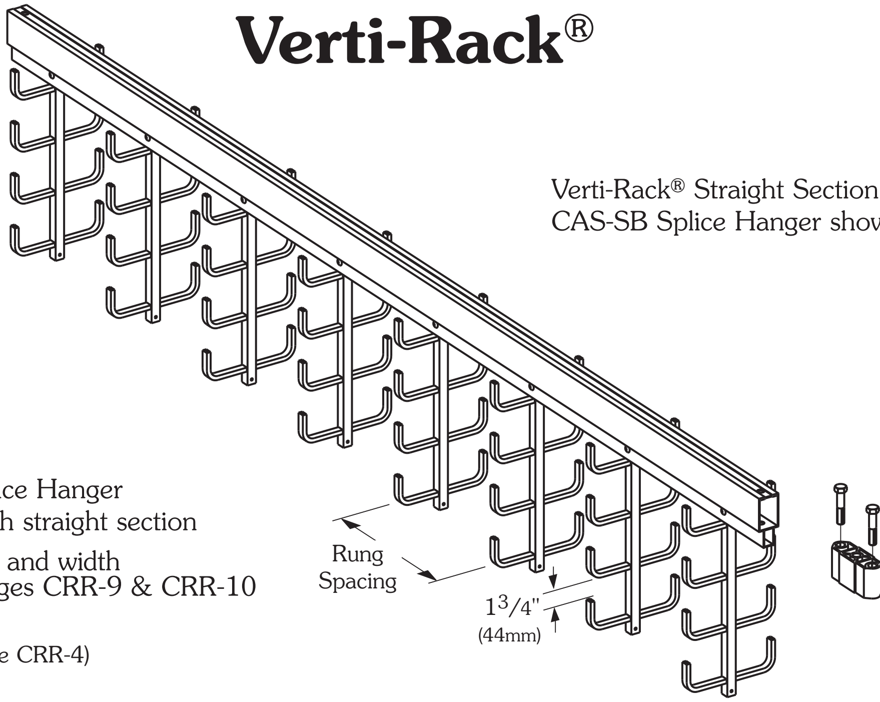
To calculate the rung deflection in inches for a specific tray width (in.) and rung spacing (in.), multiply the rung deflection multiplier for that width and rung spacing by the load in lbs/ft that will be installed in the cable tray.
Example: The rung deflection for 50 lbs/ft in a 12" wide tray with 9" rung spacing = 50 x .0002 = .01 inches.
Note: The rung deflection multiplier is based on a uniformly distributed load.

Section Property		Center Rail	Rungs
Area	in^2	0.88	0.13
	(cm^2)	(5.68)	(0.84)
Sx	in^3	0.70	0.02
	(cm^3)	(11.49)	(0.31)
Ix	in^4	1.17	0.005
	(cm^4)	(48.87)	(0.21)



Cent-R-Rail® - Straight Sections

Verti-Rack®



Verti-Rack® Straight Section with CAS-SB Splice Hanger shown

- One CAS-SB Splice Hanger provided with each straight section
- For overall height and width dimension see pages CRR-9 & CRR-10

Patented (see page CRR-4)

Verti-Rack® Straight Section Part Numbering

C2 A 4V 12 - 09 - 144

Series	Material	Type†	Rung Spacing	Width†	Length*
● C0 = Straight Rung	● A = Aluminum	● 2V = 2 tier	● 06 = 6"	● 03 = 3"	● 144 = 144"
● C2 = 2" Loading Depth		● 3V = 3 tier	● 09 = 9"	● 06 = 6"	● 120 = 120"
		● 4V = 4 tier	● 12 = 12"	● 09 = 9"	
		● 5V = 5 tier	● (Specials available)	● 12 = 12"	
		● 6V = 6 tier			

* Actual tray lengths are 142" and 118" to allow for splice hangers

† For inverted, multiple or special sizes and widths see appendix pages CRR-60, CRR-61, CRR-62

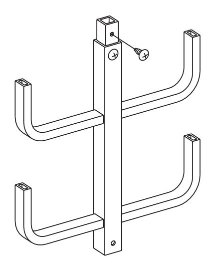
Expand your Verti-Rack® system with ADD-A-Rung®

- Attaches to bottom of existing tray
- Shipped with required hardware

ADD-A-Rung® Part Numbering

CAR-2 V 2 12

No. of Tiers	Loading Depth	Width
● 1 = 1 tier	● 0 = Straight Rung	● 03 = 3"
● 2 = 2 tier	● 2 = 2" Loading Depth	● 06 = 6"
		● 09 = 9"
		● 12 = 12"



Note: Not to exceed 100 lbs/ft on 12 ft span, 225 lbs/ft on 8 ft span.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Verti-Rack®

Support Span ft	(m)	Total System Load Capacities lbs/ft	(kg/m)	Center Rail* Deflection Multiplier
5	(1.5)	300	(450)	0.0010
6	(1.8)	300	(450)	0.0020
8	(2.4)	225	(335)	0.0063
10	(3.0)	144	(214)	0.0155
12	(3.7)	100	(149)	0.0321

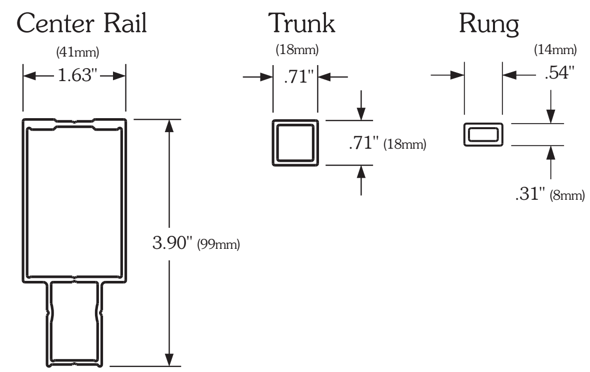
Tray Width in.	(mm)	Rung Spacing in.	(mm)	Per Tier Load Capacity lbs/ft	(kg/m)	Rung* Deflection Multiplier	Avg. Empty Tray Weight lbs/ft	(kg/m)
3	(75)	6	(150)	608	(905)	0.00001	2.09	(3.11)
		9	(225)	408	(607)	0.00002	1.72	(2.56)
		12	(300)	304	(452)	0.00002	1.55	(2.31)
6	(150)	6	(150)	304	(452)	0.00010	2.31	(3.44)
		9	(225)	204	(304)	0.00020	1.86	(2.77)
		12	(300)	152	(226)	0.00020	1.66	(2.47)
9	(225)	6	(150)	203	(302)	0.00030	2.53	(3.76)
		9	(225)	136	(202)	0.00040	2.00	(2.98)
		12	(300)	102	(152)	0.00050	1.77	(2.63)
12	(300)	6	(150)	152	(226)	0.00060	2.75	(4.09)
		9	(225)	102	(152)	0.00090	2.14	(3.18)
		12	(300)	76	(113)	0.00120	1.88	(2.80)

Safety Factor = 1.5 for load capacities

* Deflection multipliers are given for English units. To determine deflection in millimeters, first calculate deflection in inches and then multiply by 25.4.

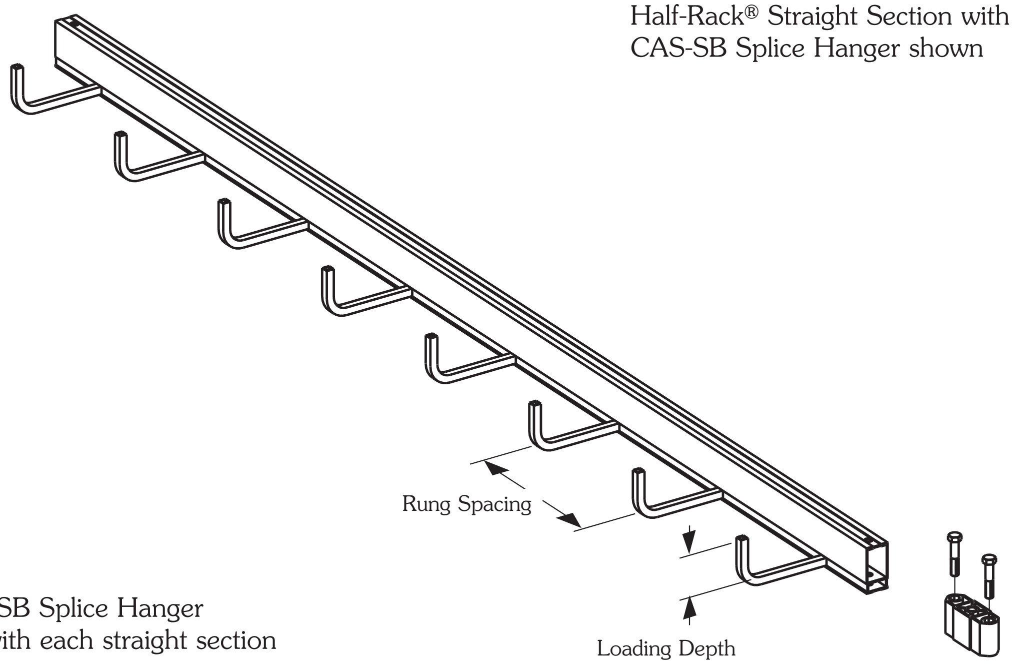
Example: The center rail deflection for 50 lbs/ft supported every 12 ft = 50 x .0321 = 1.6 inches.
Example: The rung deflection for 50 lbs/ft in a 12" wide tray with 9" rung spacing = 50 x .0009 = .05 inches.

Section Property		Center Rail	Rungs	Trunk
Area	in^2	0.88	0.09	0.18
	(cm^2)	(5.68)	(0.61)	(1.16)
Sx	in^3	0.56	0.01	N/A
	(cm^3)	(9.15)	(0.12)	(N/A)
Ix	in^4	1.27	0.001	N/A
	(cm^4)	(52.99)	(0.04)	(N/A)



Half-Rack®

Half-Rack® Straight Section with CAS-SB Splice Hanger shown



- One CAS-SB Splice Hanger provided with each straight section
- For overall height and width dimension see pages CRR-9 & CRR-10

Patented (see page CRR-4)

Half-Rack® Straight Section Part Numbering

C3 A 1H 09 - 12 - 144

Series	Material	Type	Rung Spacing	Width	Length*
● C0 = Straight Rung	● A = Aluminum	● 1H = 1 tier	● 06 = 6"	● 03 = 3"	● 144 = 144"
● C3 = 3" Loading Depth			● 09 = 9"	● 06 = 6"	● 120 = 120"
● C4 = 4" Loading Depth			● 12 = 12"	● 09 = 9"	
● C6 = 6" Loading Depth				● 12 = 12"	

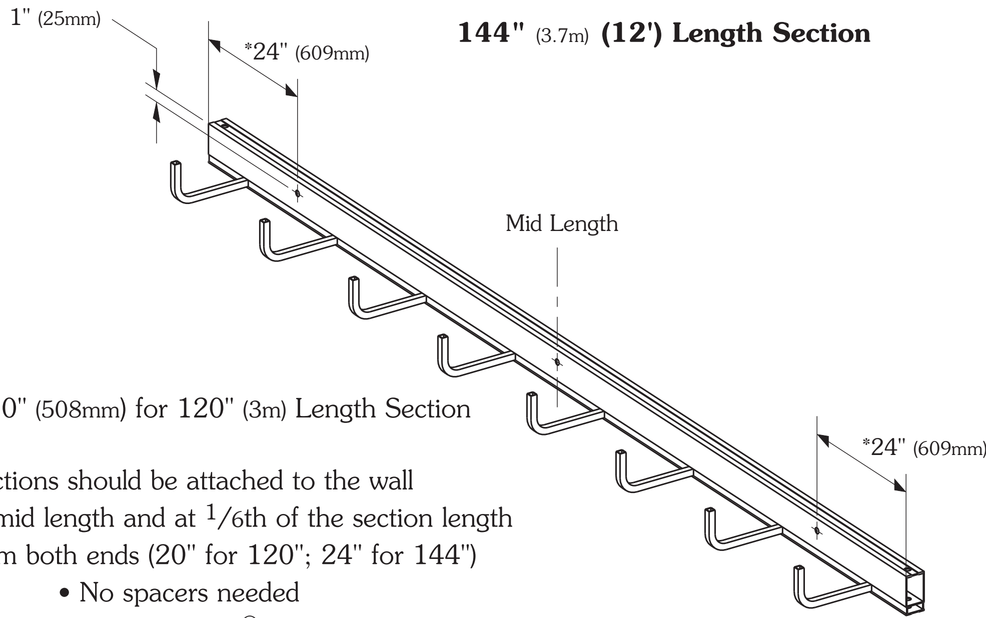
* Actual tray lengths are 142" and 118" to allow for splice hangers

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Half-Rack®

Half-Rack® Loading Guidelines

• Support Locations



* = 20" (508mm) for 120" (3m) Length Section

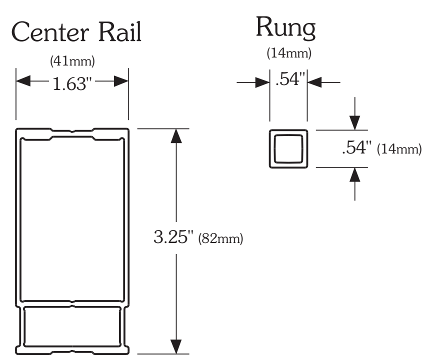
Sections should be attached to the wall at mid length and at 1/6th of the section length from both ends (20" for 120"; 24" for 144")

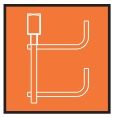
- No spacers needed
- For Half-Rack® wall attachment options see page CRR-51

• Loading Recommendations

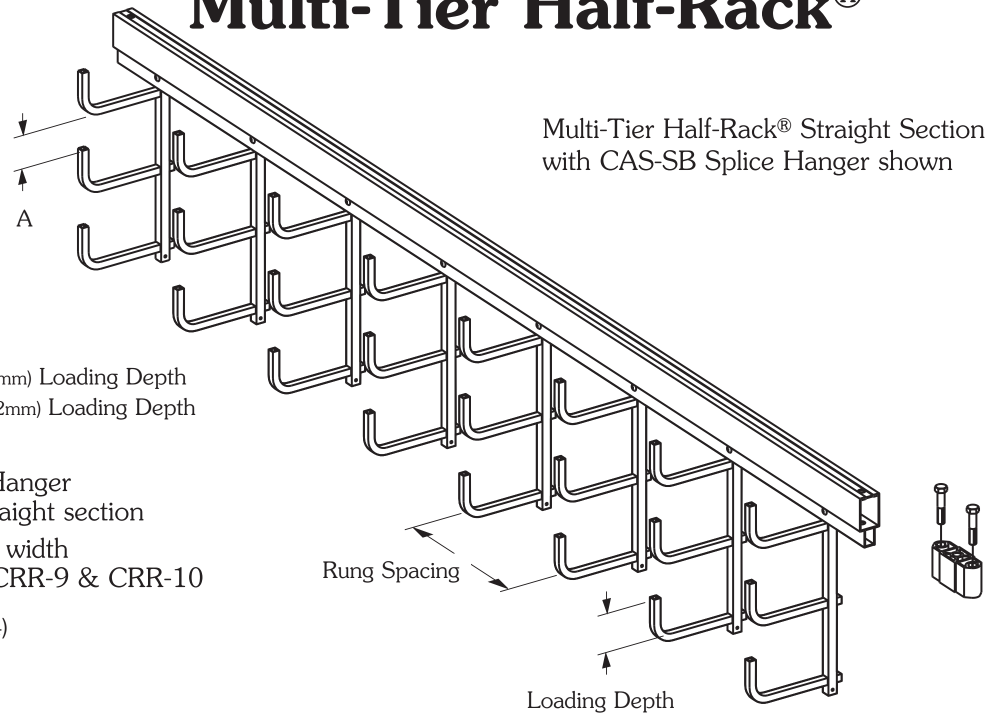
- CSA classified A-3M
- 50 lbs/ft (74kg/m) maximum based on 3/4" (19mm) rung deflection

Section Property		Center Rail	Rungs
Area	in^2	0.88	0.13
	(cm^2)	(5.68)	(0.84)
Sx	in^3	0.70	0.02
	(cm^3)	(11.49)	(0.31)
Ix	in^4	1.27	0.005
	(cm^4)	(52.99)	(0.21)





Multi-Tier Half-Rack®



Multi-Tier Half-Rack® Straight Section
with CAS-SB Splice Hanger shown

A = 2 5/8" (67mm) for 3" (76mm) Loading Depth
= 1 3/4" (44mm) for 4" (102mm) Loading Depth

- One CAS-SB Splice Hanger provided with each straight section
- For overall height and width dimension see pages CRR-9 & CRR-10

Patented (see page CRR-4)

Multi-Tier Half-Rack® Straight Section Part Numbering

C3 A 2M 09 - 12 - 144

Series
- ● C0 = Straight Rung
- ● C3 = 3" Loading Depth
- ● C4 = 4" Loading Depth

Material
- ● A = Aluminum

Type
- ● 2M = 2 tier
- ● 3M = 3 tier
- ● 4M = 4 tier

Rung Spacing
- ● 06 = 6"
- ● 09 = 9"
- ● 12 = 12"

(Specials available)

Width†
- ● 03 = 3"
- ● 06 = 6"
- ● 09 = 9"
- ● 12 = 12"

Length*
- ● 144 = 144"
- ● 120 = 120"

* Actual tray lengths are 142" and 118" to allow for splice hangers
† For multiple widths see appendix pages CRR-60 & CRR-61

Expand your Multi-Tier Half-Rack® system with ADD-A-Rung®

- Attaches to bottom of existing tray
- Shipped with required hardware

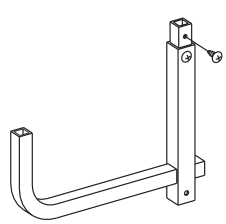
ADD-A-Rung® Part Numbering

CAR-2 M 3 12

No. of Tiers
- ● 1 = 1 tier
- ● 2 = 2 tier

Loading Depth
- ● 0 = Straight Rung
- ● 3 = 3" Loading Depth
- ● 4 = 4" Loading Depth

Width
- ● 03 = 3"
- ● 06 = 6"
- ● 09 = 9"
- ● 12 = 12"

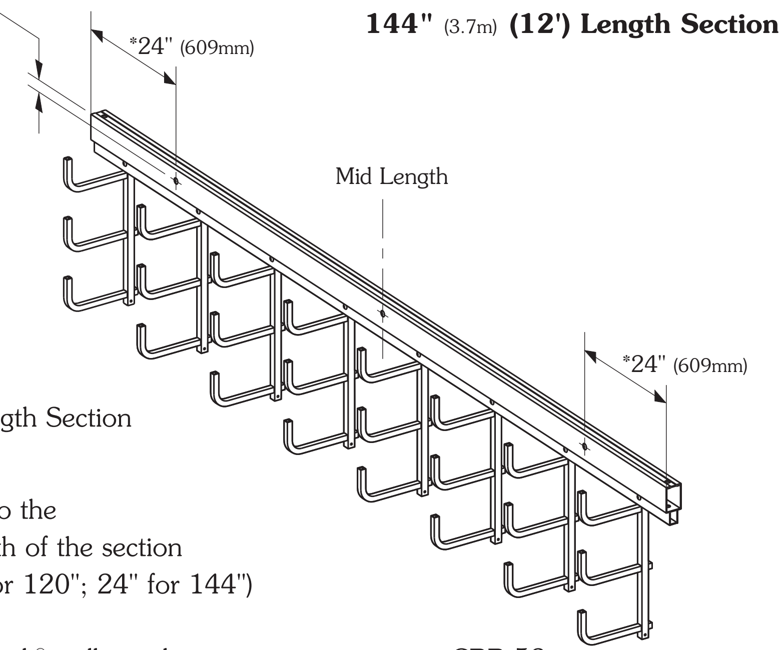


● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Multi-Tier Half-Rack®

Multi-Tier Half-Rack® Loading Guidelines

• Support Locations



* = 20" (508mm) for 120" (3m) Length Section

Sections should be attached to the wall at mid length and at 1/6th of the section length from both ends (20" for 120"; 24" for 144")

- No spacers needed
- For Multi-Tier Half-Rack® wall attachment options see page CRR-52

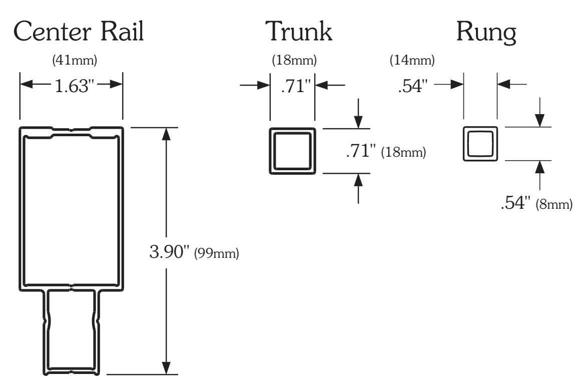
• Loading Recommendations

- 50 lbs/ft (74kg/m) maximum based on 3/4" (19mm) rung deflection

Half-Rack® shown

For Seismic Restraint Systems see appendix page CRR-59

Section Property		Center Rail	Rungs	Trunk
Area	in^2	0.88	0.13	0.18
	(cm^2)	(5.68)	(0.84)	(1.16)
Sx	in^3	0.56	0.02	N/A
	(cm^3)	(9.15)	(0.31)	(N/A)
Ix	in^4	1.27	0.005	N/A
	(cm^4)	(52.99)	(0.21)	(N/A)



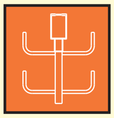
Cent-R-Rail

Cent-R-Rail® - Connectors

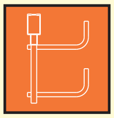
Application System Icons

The parts in the following catalog sections can be used with one or more of the Cent-R-Rail® systems. We have provided the following application icons to indicate the systems each item is compatible with.

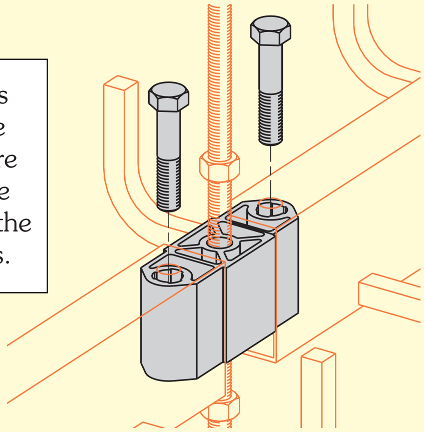

Compatibility with Data-Track®

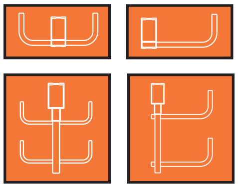

Compatibility with VertI-Rack®


Compatibility with Half-Rack®


Compatibility with Multi-Tier Half-Rack®

Shaded items shown in the illustrations are items that are provided with the part numbers.

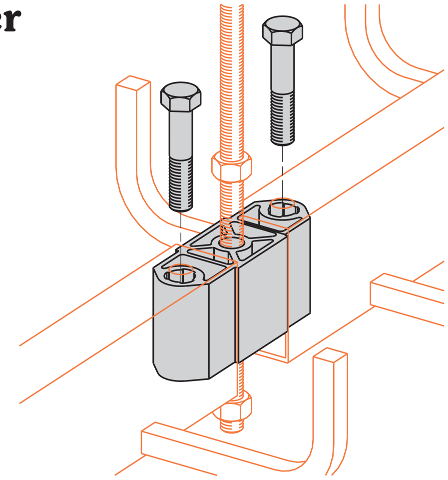




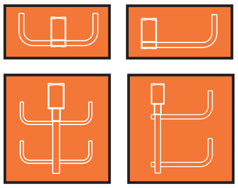
Qwik-Bolt® Splice Hanger

Cat. No.
● CAS-SB

Patented (see page CRR-4)



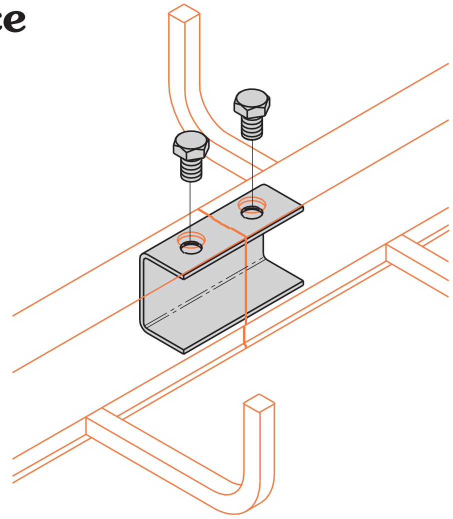
- One splice included with each straight section
- Bolts screw directly into splice, minimizing hardware
- Splice protects cables from center rail edges
- Vertical hardware removes hardware from cable fill area
- Shipped assembled with required hardware
- Designed to install with 1/2" ATR
- UL classified for grounding - 1000 amps



Qwik-Bolt® No Gap Splice

Cat. No.
● CAS-NG

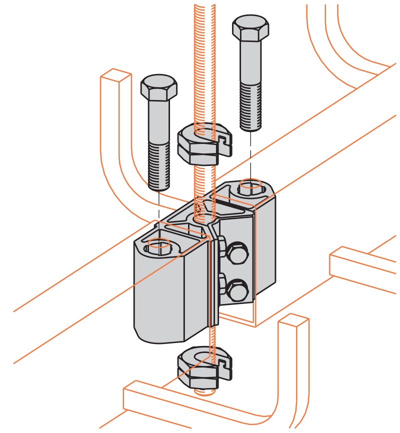
Patented (see page CRR-4)



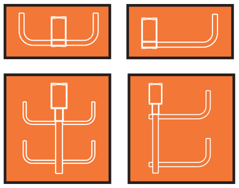
- A straight splice option
- Bolts screw directly into splice, minimizing hardware
- Vertical hardware removes hardware from cable fill area
- Shipped assembled with required hardware
- UL classified for grounding - 1000 amps
- Straight section length (using this splice) is 142 or 118 inches
- For use where ATR is not required through the splice hanger

Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)



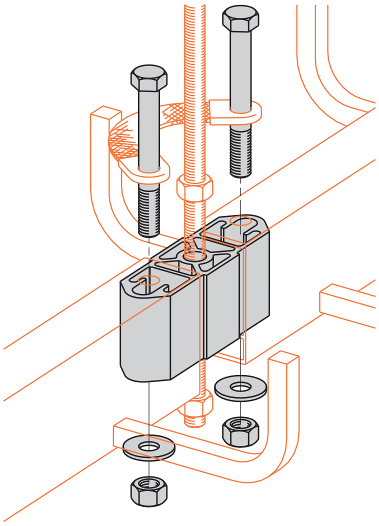
Qwik-Bolt® Splice Hanger



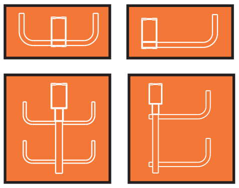
Cat. No.
● CAS-CB

Patented (see page CRR-4)

- Side mounts to existing 1/2" ATR
- Qwik-Bolt® design
- Shipped with required hardware
- UL classified for grounding - 1000 amps



Expansion Splice Hanger



Cat. No.	Tray Type
● CAS-EB1	Data-Track® & Half-Rack®
● CAS-EB2	Verti-Rack® & Multi-Tier Half-Rack®

Patented (see page CRR-4)

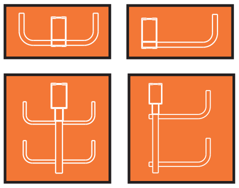
- Allows for 1" (25mm) of tray expansion and contraction
- Shipped with required hardware
- Order grounding jumper CAM-GJ separately (see page CRR-35)

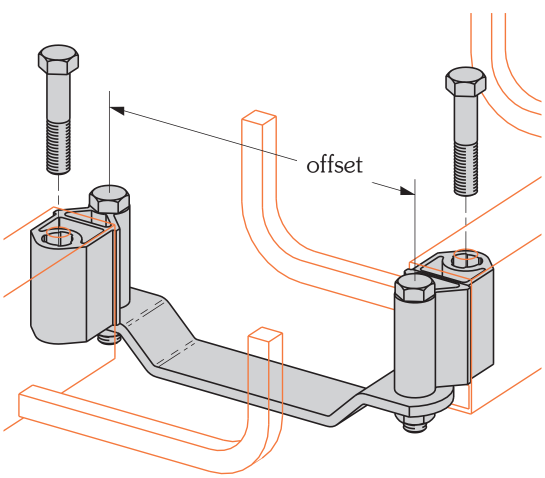
It is important that thermal contraction and expansion be considered when installing cable tray systems. The length of the straight cable tray runs and the temperature differential govern the number of expansion splice plates required (See Table 1).

Table 1
Maximum Spacing Between Expansion Joints that Provide for 1" (25mm) Movement

Temperature Differential °F	(°C)	Aluminum ft	(m)
25	(14)	260	(79)
50	(28)	130	(40)
75	(42)	87	(27)
100	(56)	65	(20)
125	(69)	52	(16)
150	(83)	43	(13)
175	(97)	37	(11)

Horizontal Offset Coupling





Cat. No.	Offset in.	(mm)
● CAC-OH050B	5.0	(125)
● CAC-OH065B	6.5	(165)
● CAC-OH080B	8.0	(200)
● CAC-OH100B	10.0	(250)
● CAC-OH130B	13.0	(330)

Patented (see page CRR-4)

Refer to tray widths on pg. CRR-9 to determine offset needed

- Designed to provide horizontal offset
- Ideal for connecting Data-Track® to Half-Rack®
- Pivoting connections
- Qwik-Bolt® design
- Shipped assembled with required hardware
- UL classified for grounding - 1000 amps
- 7/8" (22mm) adjustment on offset

Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

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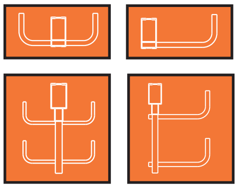
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

COOPER B-Line

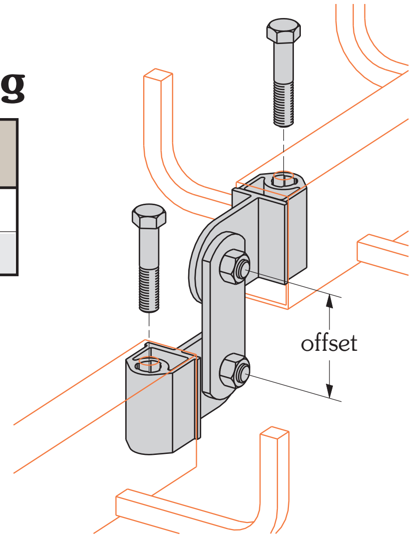
Cent-R-Rail® - Connectors



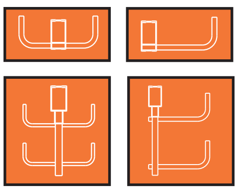
Vertical Offset Coupling

Cat. No.	Offset in.	Offset (mm)
● CAC-OV030B	3.0	(75)
● CAC-OV060B	6.0	(150)

Patented (see page CRR-4)



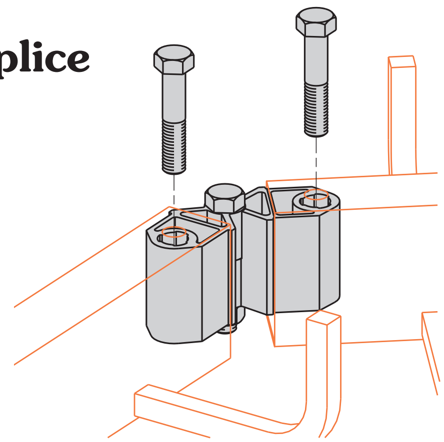
- Designed to provide vertical offset
- Pivoting connections
- Qwik-Bolt® design
- Shipped assembled with required hardware
- UL classified for grounding - 1000 amps



Horizontal Adjustable Splice

Cat. No.
● CAS-HB

Patented (see page CRR-4)



- Allows random angle horizontal bend
- Also can be used to connect straight sections at mid-run locations
- Qwik-Bolt® design
- Shipped assembled with required hardware
- UL classified for grounding - 1000 amps

Horizontal Bend Rung Support

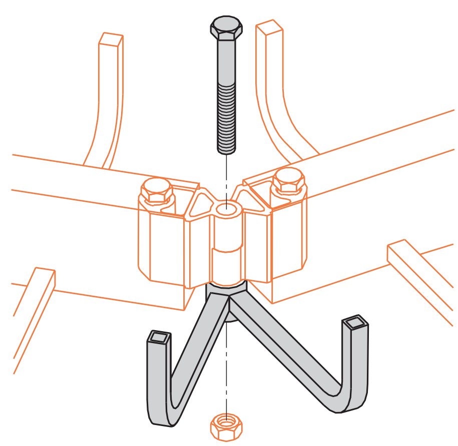
Cat. No.
● CAR-H3-06
● CAR-H3-09
● CAR-H3-12
● CAR-H3-18
● CAR-H3-24
● CAR-H4-06
● CAR-H4-09
● CAR-H4-12
● CAR-H4-18
● CAR-H4-24
● CAR-H6-06
● CAR-H6-09
● CAR-H6-12
● CAR-H6-18
● CAR-H6-24

Cat. No.

CAR-H3-06

Loading Depth	Tray Width
3 = 3"	06 = 6"
4 = 4"	09 = 9"
6 = 6"	12 = 12"
	18 = 18"
	24 = 24"

Patented (see page CRR-4)

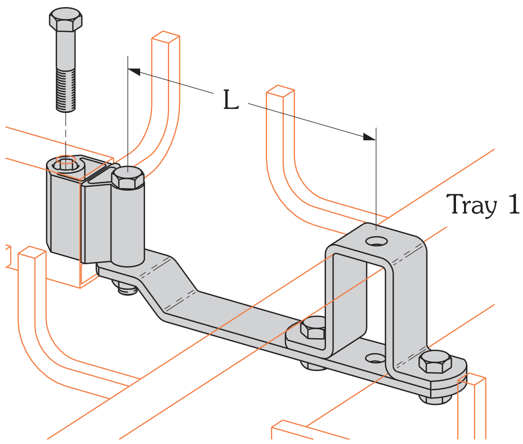


- Use with CAS-HB
- For additional cable support on the outside of bends
- Select fill depth and width required
- Shipped with required hardware (1 pc. HHCS - 1/2" x 4" znplt)
- Rungs set at 45° angle

Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Data-Track® Horizontal Tee Coupling

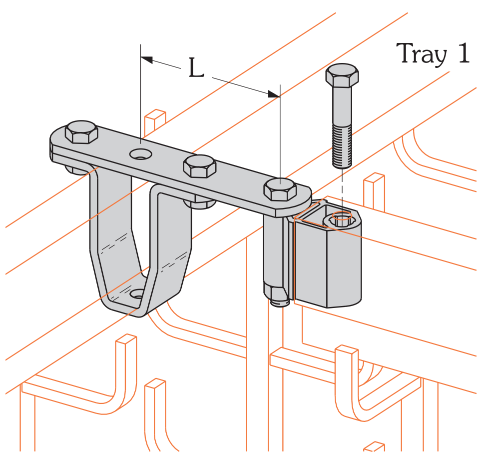


Patented (see page CRR-4)

Tray 1 Width in.	(mm)	Cat. No.	L in.	(mm)
6	(150)	● CAC-HTD06B	5	(125)
9	(225)	● CAC-HTD09B	$6\frac{1}{2}$	(165)
12	(300)	● CAC-HTD12B	8	(200)
18	(450)	● CAC-HTD18B	10	(250)
24	(600)	● CAC-HTD24B	13	(330)

- Used to make tee, elbow or wye
- Allows random attachment to center rail without drilling
- Pivoting connection
- Qwik-Bolt® Design
- Shipped assembled with required hardware
- 9/16" (14mm) hole provided for optional support ATR
- 7/16" (11mm) adjustment slot
- UL classified for grounding - 1000 amps

Verti-Rack® Horizontal Tee Coupling

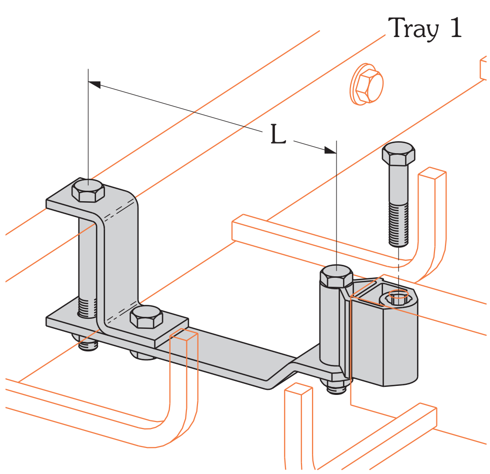


Patented (see page CRR-4)

Tray 1 Width in.	(mm)	Cat. No.	L in.	(mm)
3	(75)	● CAC-HTV03B	3	(75)
6	(150)	● CAC-HTV06B	$4\frac{1}{2}$	(115)
9	(225)	● CAC-HTV09B	6	(150)
12	(300)	● CAC-HTV12B	$7\frac{1}{2}$	(190)

- Used to make tee, elbow or wye
- Allows random attachment to center rail without drilling
- Pivoting connection
- Qwik-Bolt® design
- Shipped assembled with required hardware
- 7/16" (11mm) adjustment slot
- UL classified for grounding - 1000 amps

Half-Rack® Horizontal Tee Coupling



Patented (see page CRR-4)

Tray 1 Width in.	(mm)	Cat. No.	L in.	(mm)
3	(75)	● CAC-HTH03B	5	(125)
6	(150)	● CAC-HTH06B	8	(200)
9	(225)	● CAC-HTH09B	11	(275)
12	(300)	● CAC-HTH12B	14	(355)

- Used to make tee, elbow or wye
- Allows random attachment to center rail
- Pivoting connection
- Qwik-Bolt® design
- Shipped assembled with required hardware
- UL classified for grounding - 1000 amps

Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

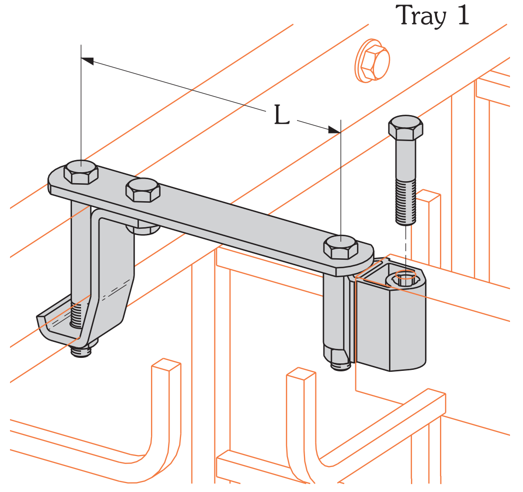
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cent-R-Rail® - Connectors

Multi-Tier Half-Rack® Horizontal Tee Coupling

Tray 1 Width in.	(mm)	Cat. No.	L in.	(mm)
3	(75)	● CAC-HTM03B	5	(125)
6	(150)	● CAC-HTM06B	8	(200)
9	(225)	● CAC-HTM09B	11	(275)
12	(300)	● CAC-HTM12B	14	(355)

- Used to make tee, elbow or wye
- Allows random attachment to center rail
- Pivoting connection
- Qwik-Bolt® design
- Shipped assembled with required hardware
- UL classified for grounding - 1000 amps

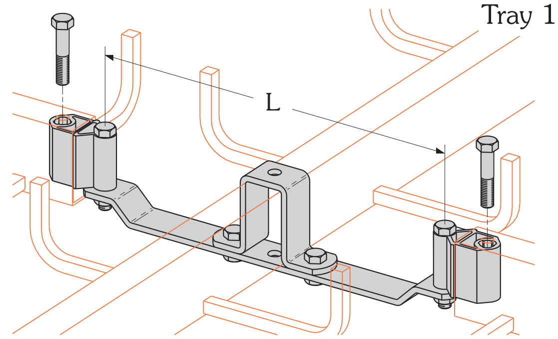


Patented (see page CRR-4)

Data-Track® Horizontal Cross Coupling

Tray 1 Width in.	(mm)	Cat. No.	L in.	(mm)
6	(150)	● CAC-HXD06B	10	(250)
9	(225)	● CAC-HXD09B	13	(330)
12	(300)	● CAC-HXD12B	16	(400)
18	(450)	● CAC-HXD18B	20	(500)
24	(600)	● CAC-HXD24B	26	(650)

- Allows random attachment to center rail without drilling
- Pivoting connections
- Qwik-Bolt® design
- Shipped assembled with required hardware
- 9/16" (14mm) hole provided for optional support ATR
- UL classified for grounding - 1000 amps

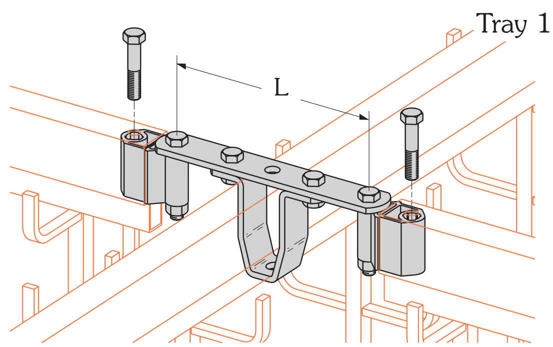


Patented (see page CRR-4)

Verti-Rack® Horizontal Cross Coupling

Tray 1 Width in.	(mm)	Cat. No.	L in.	(mm)
3	(75)	● CAC-HXV03B	3	(75)
6	(150)	● CAC-HXV06B	9	(225)
9	(225)	● CAC-HXV09B	12	(300)
12	(300)	● CAC-HXV12B	15	(375)

- Allows random attachment to center rail without drilling
- Pivoting connections
- Qwik-Bolt® design
- Shipped assembled with required hardware
- 9/16" (14mm) hole provided for optional support ATR
- UL classified for grounding - 1000 amps



Patented (see page CRR-4)

Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
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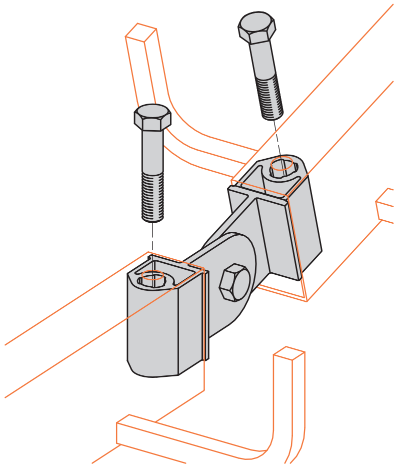
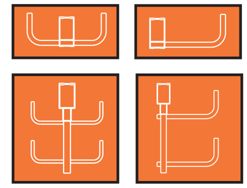
● Red = Normally long lead-time items (15 working days minimum)



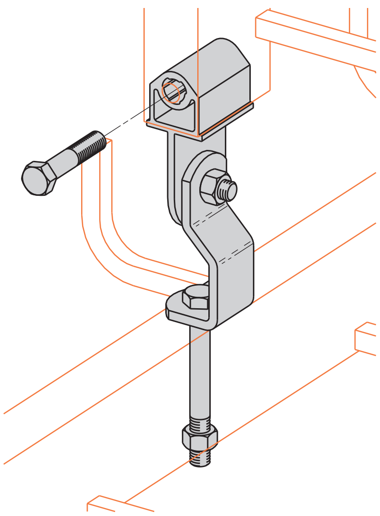
Vertical Adjustable Splice

Cat. No.
● CAS-VB

Patented (see page CRR-4)



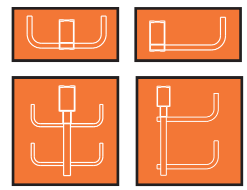
- Ideal for random angle vertical bends
- Qwik-Bolt® design
- Shipped assembled with required hardware
- UL classified for grounding - 1000 amps



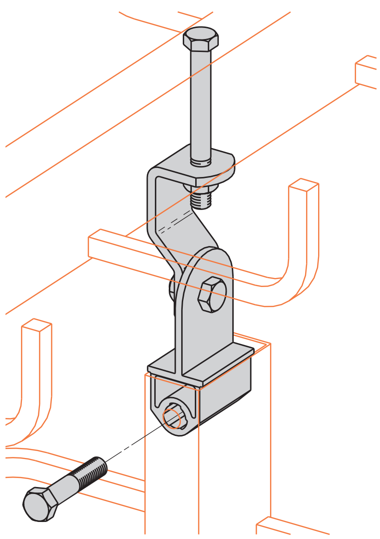
Vertical Coupling

Cat. No.
● CAC-VB

Patented (see page CRR-4)

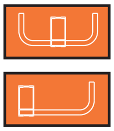


- Use one piece to create vertical tees.
- Use two pieces to create vertical crosses.
- Pivoting connections
- Qwik-Bolt® design
- Shipped assembled with required hardware
- UL classified for grounding - 1000 amps



Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)



Universal Hub Fittings

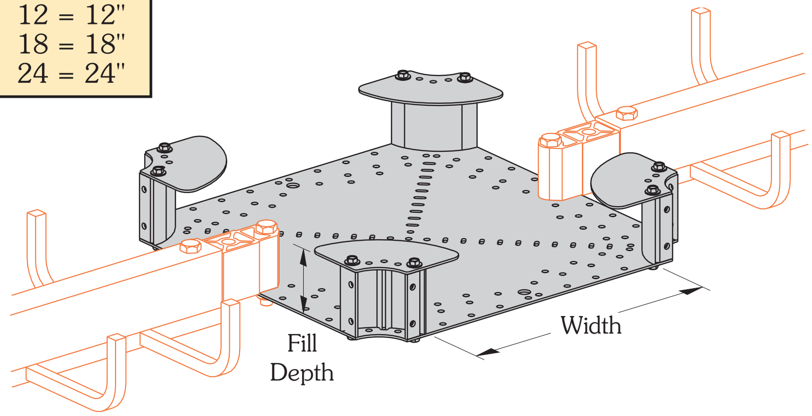
Cat. No.
● U2A-06
● U2A-09
● U2A-12
● U2A-18
● U2A-24
● U3A-06
● U3A-09
● U3A-12
● U3A-18
● U3A-24
● U4A-06
● U4A-09
● U4A-12
● U4A-18
● U4A-24
● U6A-06
● U6A-09
● U6A-12
● U6A-18
● U6A-24

Cat. No.

U4A-12

Fill Depth	Width
2 = 2"	06 = 6"
3 = 3"	09 = 9"
4 = 4"	12 = 12"
6 = 6"	18 = 18"
	24 = 24"

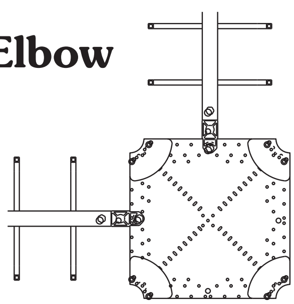
Patented (see page CRR-4)



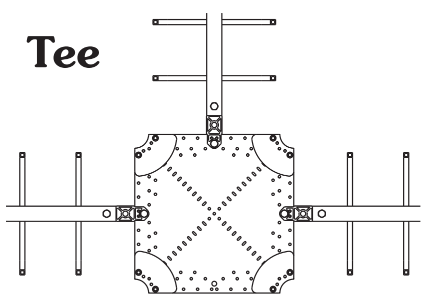
- Connects up to 4 trays in random directions
- Provides an area free of center rails for cable transitions
- Ideal for easy system expansion
- Slots provided for cable tie down
- Order one CAC-UFB pivot connector per tray connection (see page CRR-26)
- Positive cable retention for cables routed around corner post
- UL classified for grounding - 1000 amps

Typical applications for universal hub fittings:

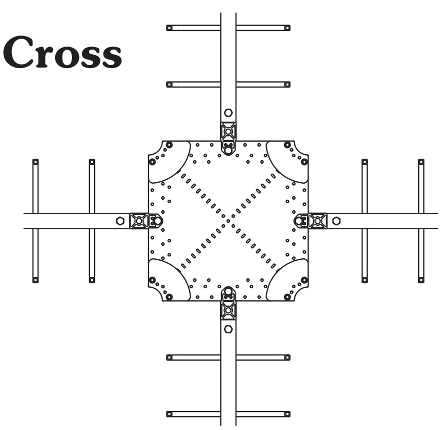
Elbow



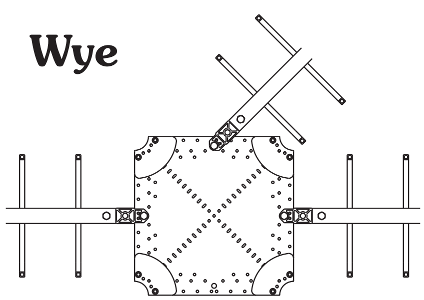
Tee



Cross

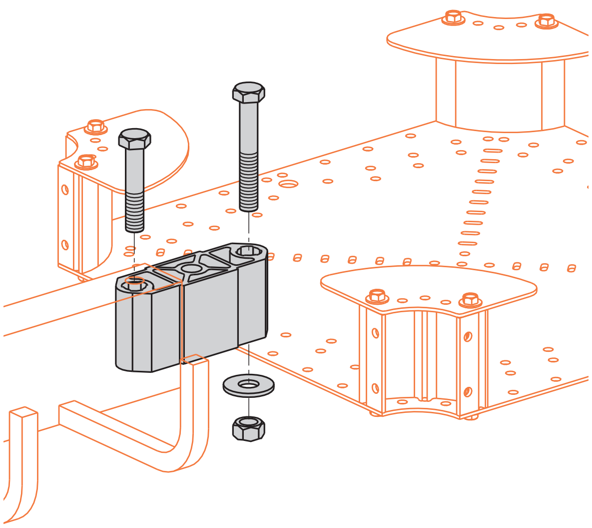


Wye

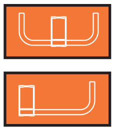


Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)



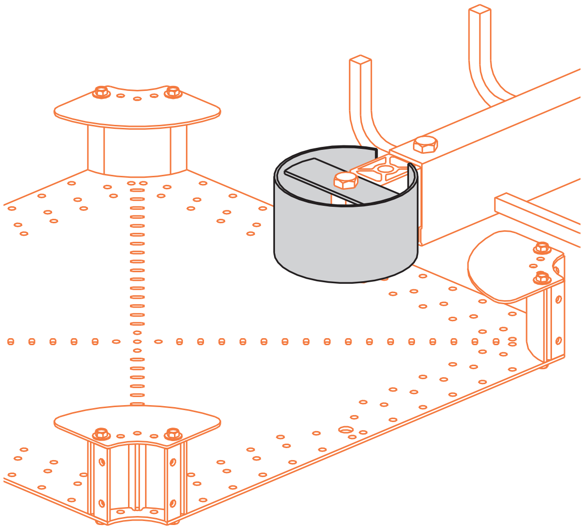
Pivot Connector For Universal Hub
Horizontal Application



Cat. No.
● CAC-UFB

Patented (see page CRR-4)

- Qwik-Bolt® design
- Shipped with required hardware
- UL classified for grounding - 1000 amps



Category 5 Cable Radius Protector

Cat. No.	Tray Depth
● CAM-PR253	3
● CAM-PR254	4
● CAM-PR256	6

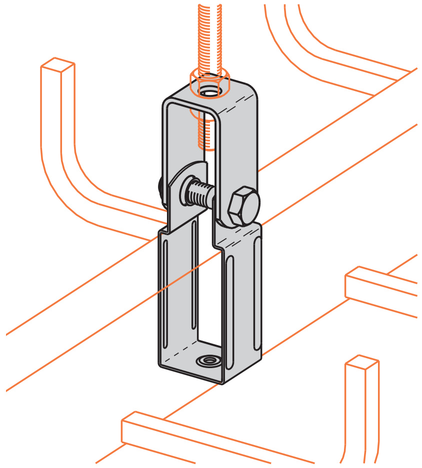
- Designed to provide a 2 1/2" cable bend radius
- Mounts directly over the horizontal pivot connector using the existing hardware
- Made from aluminum

Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Data-Track® Standard Clevis Hanger

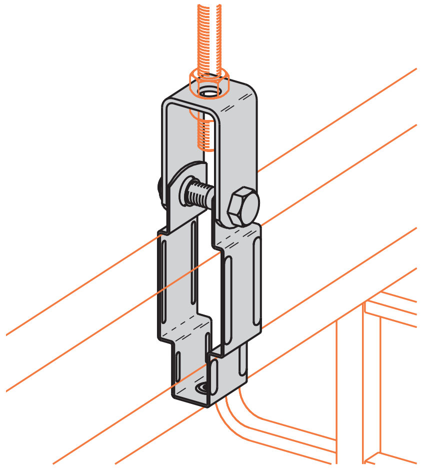
Cat. No.	Rod Size
● CZNH-CD	1/2"
● CZNH-CD-5/8	5/8"



- Allows random support without drilling
- Zinc plated steel construction
- If seismic restraints required, see Seismic Restraints Cent-R-Rail® Supplement brochure (SRSCR1)

Verti-Rack® Standard Clevis Hanger

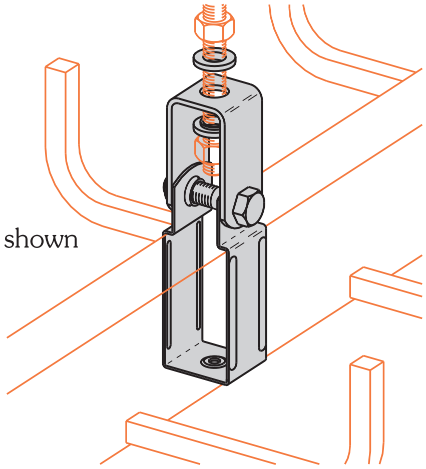
Cat. No.	Rod Size
● CZNH-CV	1/2"
● CZNH-CV-5/8	5/8"



- Allows random support without drilling
- Zinc plated steel construction

Isolation Clevis Hanger

Cat. No.	Tray Type
● CZNH-CD-I	Data-Track®
● CZNH-CV-I	Verti-Rack®



Data-Track® shown

- Isolates tray from ATR to reduce low voltage interference
- Nylon bushing
- Allows random support without drilling
- Zinc plated steel construction
- Used with 1/2" ATR

Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

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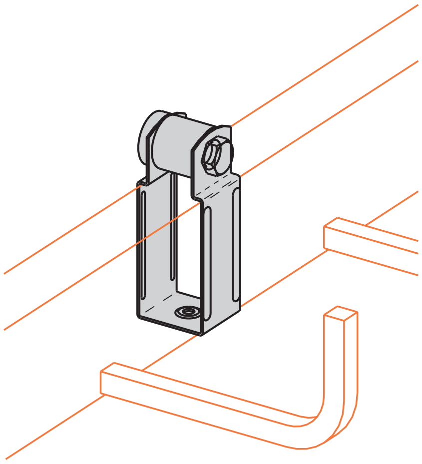
● Red = Normally long lead-time items (15 working days minimum)

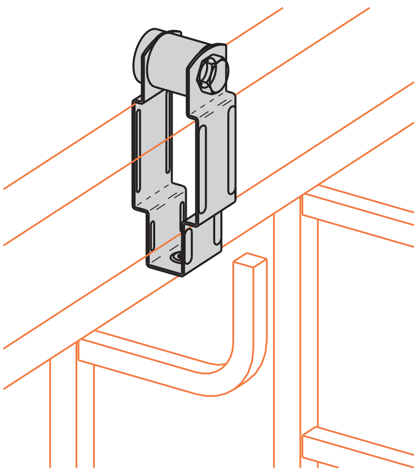
Wall Hanger Half Rack®



Cat. No.
● CZNH-WH

- Simplifies bolt to anchor alignment.
- Center rail drilling eliminated.
- Hanger bottom snaps over center rail.
- Smooth edge design in wire fill areas.
- Zinc plated steel construction
- Sized for up to a 1/2" bolt.

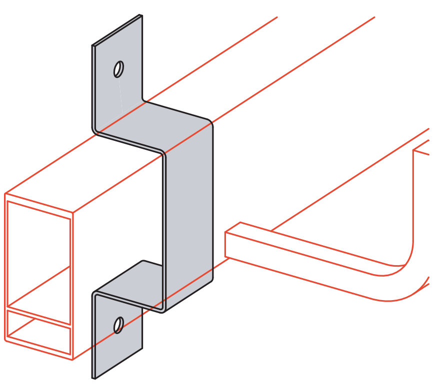
Wall Hanger Multi-Tier Half Rack®



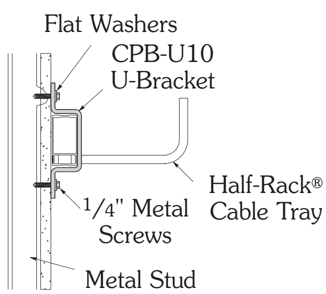
Cat. No.
● CZNH-WM

- Simplifies bolt to anchor alignment.
- Center rail drilling eliminated.
- Hanger bottom snaps over center rail.
- Smooth edge design in wire fill areas.
- Zinc plated steel construction
- Sized for up to a 1/2" bolt.

U-Bracket: In Drywall & Metal Stud Wall



Cat. No.	Tray Type
● CPB-U10	Half-Rack®
● CPB-CV1	Multi-Tier Half-Rack®

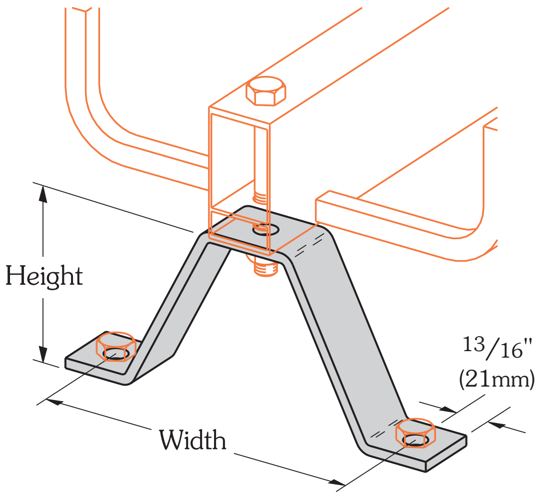


Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Floor Stands

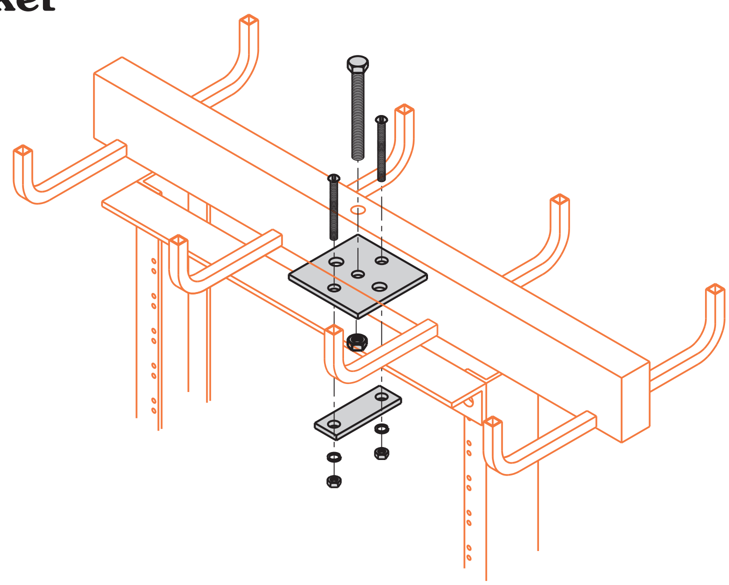
Cat. No.	Height in.	Height (mm)	Width in.	Width (mm)
● B381	2 3/8	(60.3)	6	(152.4)
● B382	4 3/8	(111.1)	8	(203.2)
● B383	6 3/8	(161.9)	10	(254.0)
● B384	8 3/8	(212.7)	12	(304.8)
● B385	10 3/8	(263.5)	14	(355.6)



- Zinc plated steel construction
- 9/16" (14mm) holes

Relay Rack Mounting Bracket

Cat. No.
● SB-2133-CR

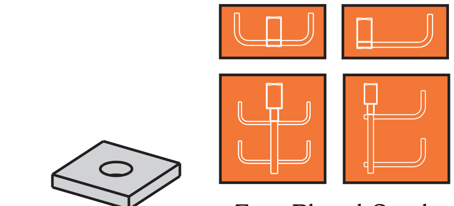


- ASTM A36 Steel
- Yellow zinc dichromate
- Includes: Mounting plates
  1 - 1/2" x 4 1/2" HHCS
  1- 1/2" hex nut
  2 - 5/16" x 3" SRHMS
  2 - 5/16" hex nuts
  2 - 5/16" lockwashers

Note: All connectors are aluminum material and sized for 1/2" zinc plated steel hardware, unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

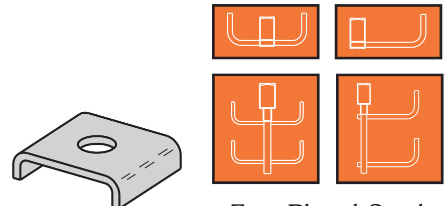
Cent-R-Rail® - Support Accessories



Zinc Plated Steel

Square Washer

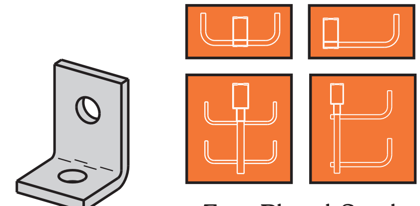
Cat. No.
● B202



Zinc Plated Steel

"U" Washer

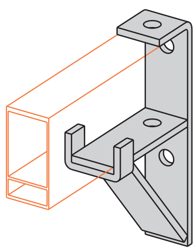
Cat. No.
● B450

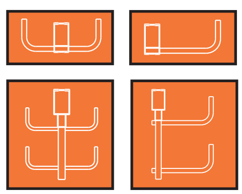


Zinc Plated Steel

90° Angle Fitting

Cat. No.
● B101

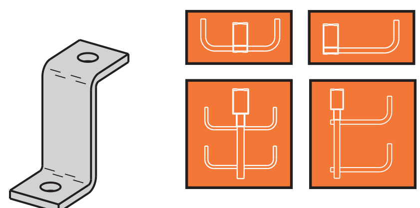




Zinc Plated Steel

Wall Bracket

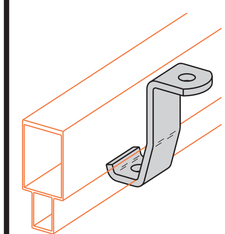
Cat. No.
● B370

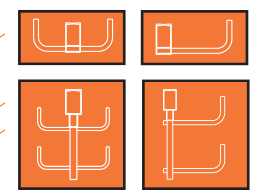


Aluminum

"Z" Bracket

Cat. No.
● B110AL

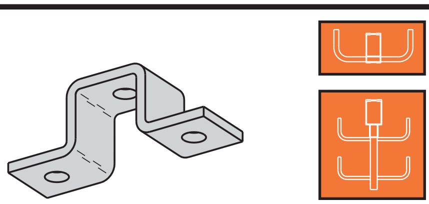




Aluminum

"Z" Bracket

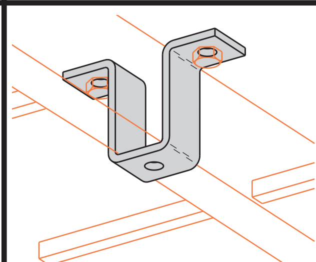
Cat. No.
● CAB-U25



Zinc Plated Steel

"U" Bracket

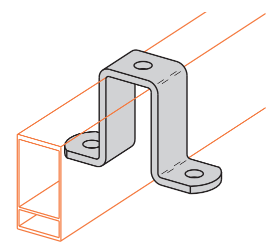
Cat. No.
● B107



Zinc Plated Steel

"U" Bracket

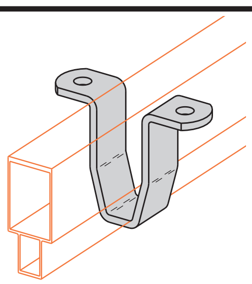
Cat. No.
● B107-22A

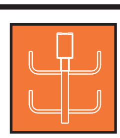


Aluminum

"U" Bracket

Cat. No.
● CAB-U10

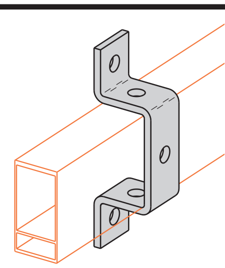


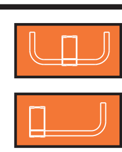


Aluminum

"U" Bracket

Cat. No.
● CAB-U20

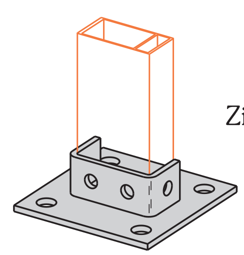




Zinc Plated Steel

"U" Bracket

Cat. No.
● B594



Zinc Plated Steel

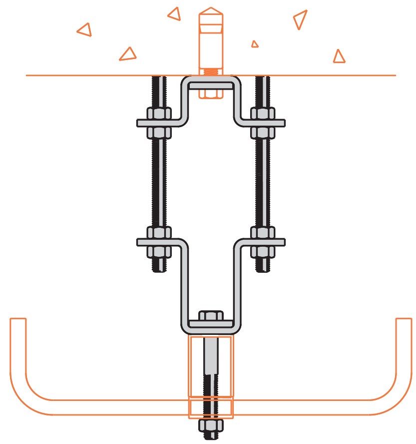
Post Base

Cat. No.
● B281ASQ

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Non-Uniform Loading Bracket

Cat. No.	ATR Length
● CZN-DRS-36	36
● CZN-DRS-60	60
● CZN-DRS-72	72



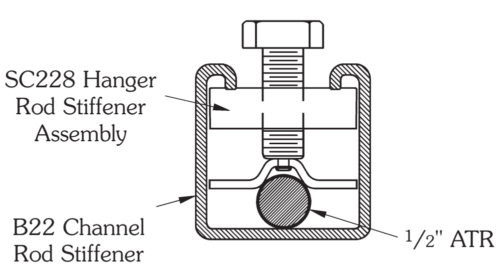
- Hardware included
- ATR included
- Zinc plated
- See Seismic Restraints Cent-R-Rail® Supplement brochure (SRSCR1)
- Note: Refer to unbalance section in the appendix (pg. CRR-58)

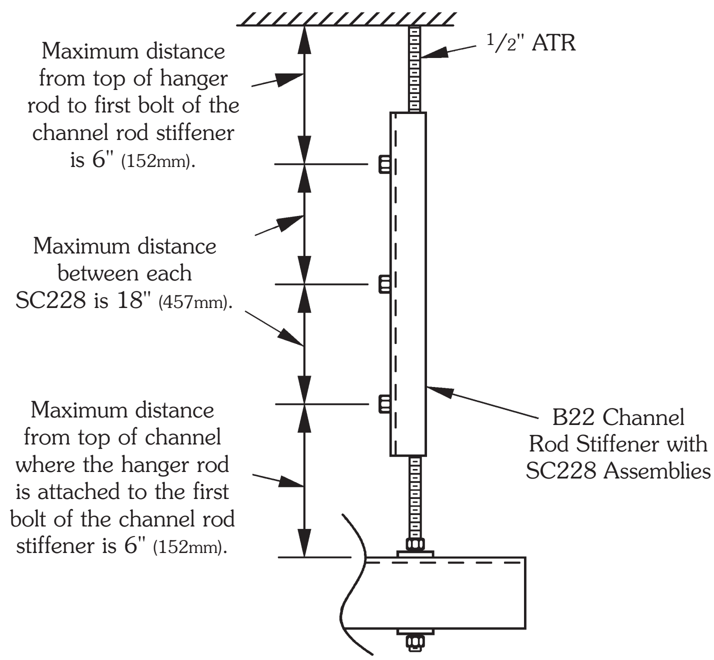
Includes:
- 1 - B107 Znplt U Support
- 1 - B107-22A Znplt U Support
- 9 - 1/2" Hex Nuts, Znplt
- 2 - ATR 1/2" x Length, Znplt
- 1 - HHC Screw 1/2" x 4 1/2", Znplt
- 2 - B202 Znplt sq washers

All Threaded Rod Stiffener

- See Seismic Restraints Cent-R-Rail® Supplement brochure (SRSCR1)
- Note: Minimum of (2) - SC228 or SC-UB are required per rod.

SC228 Hanger Rod Stiffener Assembly
For 3/8" thru 5/8" ATR
(Order B22 Channel Separately)





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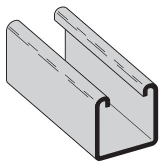
● Red = Normally long lead-time items (15 working days minimum)

Cent-R-Rail® - *Support Accessories*

Channel Sizes and Hole Patterns Selections Chart

Channel Type	Channel Dimensions				Material & Thickness				Channel Hole Patterns			
	Height		Width		1	2	3	4	SH	S	H1 7/8	TH
	in.	(mm)	in.	(mm)	Steel	Alum.	304 S.S.	316 S.S.				
● B11	3 1/4	(82.5)	1 5/8	(41.3)	12Ga.	--	--	--	1	1	1	--
● B22A	3 1/4	(82.5)	1 5/8	(41.3)	12Ga.	.105	12Ga.	12Ga.	1,2,3,4	1	1,2,3,4	--
● B22	1 5/8	(41.3)	1 5/8	(41.3)	12Ga.	.105	12Ga.	12Ga.	1,2,3,4	1	1,2,3,4	1
● B54	15/16	(20.6)	1 5/8	(41.3)	14Ga.	.080	14Ga.	14Ga.	1,2,3,4	1	1,2,3,4	--

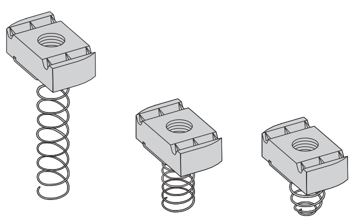
Available Finishes on Steel: Dura-Green Epoxy, Pre-Galvanized and Hot Dip Galvanized are standard.
Material types available for various hole patterns are defined by numbers 1 thru 4 as follows:



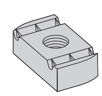
1= Steel
2= Aluminum
3= Type 304 Stainless Steel
4= Type 316 Stainless Steel

Channel Nuts

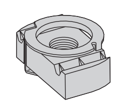
With Spring			Without Spring		Twirl Nut		Thread Size	Thickness
B11 B12	B22 B24 B32	B42 B52 B54	B11, B22 B12, B24 B32	B42 B52 B54	B11, B22 B12, B24 B32	B42 B52 B54		
N725 ●	N225 ●	N525 ●	N225WO ●	N525WO ●	TN225 ●	TN525 ●	1/2"-13	1/2"(12.7 mm) for N725,N225,N225WO,TN225 3/8"(9.5 mm) for N525,N525WO,TN525
N755 ●	N255 ●	N555 ●	N255WO ●	N555WO ●	--	--	5/8"-11	1/2"(12.7 mm) for N755,N255,N255WO 3/8"(9.5 mm) for N555,N555WO



Channel Nut With Spring



Channel Nut Without Spring

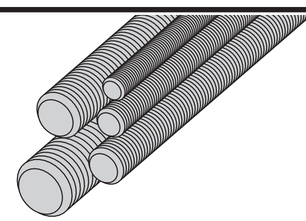


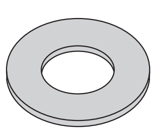
Twirl Nut

All Threaded Rod (ATR)

Cat. No. & Size	Threads Per Inch	*Recommended Load lbs	(kN)
● ATR 1/2"	13	1130	(5.02)
● ATR 5/8"	11	1810	(8.05)

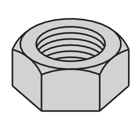
*Safety Factor = 5
• Specify length in inches: 36", 72", 120", 144"





Flat Washers

Cat. No. & Size
● FW 1/2"
● FW 5/8"



Hex Nut

Cat. No. & Size
● HN 1/2"
● HN 5/8"

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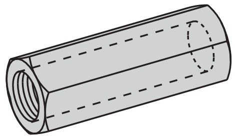
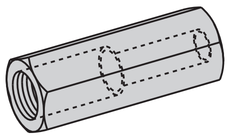
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cent-R-Rail® - Support Accessories



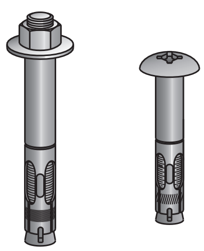
Rod Coupling

Cat. No.	Size	Length in.	Length (mm)	Recommended Load lbs	Recommended Load (kN)
● B655-1/2	1/2"-13	1 3/4	(44.4)	1130	(5.02)
● B655-5/8	5/8"-11	2 1/8	(54.0)	1810	(8.05)



Reducer Rod Coupling

Cat. No.	Size	Length in.	Length (mm)	Recommended Load lbs	Recommended Load (kN)
● B656-1/2 x 3/8	1/2"-13 & 3/8"-16	1 1/4	(31.7)	610	(2.71)
● B656-5/8 x 1/2	5/8"-11 & 1/2"-13	1 1/4	(31.7)	1130	(5.02)
● B656-3/4 x 5/8	3/4"-10 & 5/8"-11	1 1/2	(38.1)	1810	(8.05)



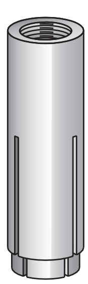
Hex Nut Round Quadrex

Sleeve Anchors

Type	Catalog Number	Size in.	Size (mm)	Bolt Diameter in.	Bolt Diameter (mm)	Hole Diameter in.	Hole Diameter (mm)
Hex Nut	● ASA-50-225HN	1/2 x 2 1/4	(13 x 57)	3/8	(10)	1/2	(13)
	● ASA-50-400HN	1/2 x 4	(13 x 102)	3/8	(10)	1/2	(13)
	● ASA-62-225HN	5/8 x 2 1/4	(16 x 57)	1/2	(13)	5/8	(16)
	● ASA-62-425HN	5/8 x 4 1/4	(16 x 108)	1/2	(13)	5/8	(16)
Round Quadrex	● ASA-37-250RQ	3/8 x 2 1/2	(10 x 64)	5/16	(8)	3/8	(10)
	● ASA-37-375RQ	3/8 x 3 3/4	(10 x 95)	5/16	(8)	3/8	(10)
	● ASA-37-475RQ	3/8 x 4 3/4	(10 x 121)	5/16	(8)	3/8	(10)

Catalog Number	Minimum Embedment in.	Minimum Embedment (mm)	Allowable Pull-Out Load* lbs	Allowable Pull-Out Load* (kN)	Allowable Shear Load* lbs	Allowable Shear Load* (kN)
● ASA-50-225HN	1 1/2	(38)	1100	(4.8)	1100	(4.8)
● ASA-50-400HN	1 1/2	(38)	1100	(4.8)	1100	(4.8)
● ASA-62-225HN	2	(51)	1545	(6.8)	1790	(7.8)
● ASA-62-425HN	2	(51)	1545	(6.8)	1790	(7.8)
● ASA-37-250RQ	1 1/4	(32)	675	(2.9)	570	(2.5)
● ASA-37-375RQ	1 1/4	(32)	675	(2.9)	570	(2.5)
● ASA-37-475RQ	1 1/4	(32)	675	(2.9)	570	(2.5)

*Tested in 3500 PSI (24 MPa) concrete. S.F. = 4.0



Drop-In Anchors

Catalog Number	Anchor Size Diameter in.	Anchor Size Diameter (mm)	Anchor Size Length in.	Anchor Size Length (mm)	Thread Hole Depth in.	Thread Hole Depth (mm)	Thread Hole Diameter in.	Thread Hole Diameter (mm)
● ADI-50	1/2	(13)	2	(51)	12/16	(21)	5/8	(16)
● ADI-62	5/8	(16)	2 1/2	(64)	1 3/16	(30)	7/8	(22)

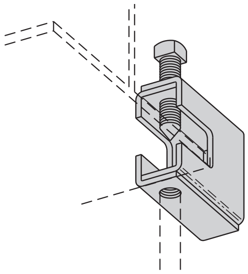
Catalog Number	Anchor Length in.	Anchor Length (mm)	Allowable Pull-out Load* lbs	Allowable Pull-out Load* (kN)	Allowable Shear Load* lbs	Allowable Shear Load* (kN)	Setting Tool Catalog Number
● ADI-50	2	(51)	1883	(8.2)	1903	(8.3)	ADI-50T
● ADI-62	2 1/2	(64)	2473	(10.8)	3403	(14.9)	ADI-62T

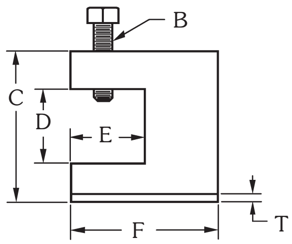
*Tested in 4860 PSI (33.5 MPa) concrete. S.F. = 4.0

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cent-R-Rail® - Support Accessories

Beam Clamps





Cat. No.	Rod Size	B	C in.	C (mm)	D in.	D (mm)
● **B307**	1/2"-13	1/2"-13	2 7/16"	(61.9)	7/8"	(22.2)
● **B308**	1/2"-13	1/2"-13	2 9/16"	(65.1)	7/8"	(22.2)
● **B321-2**	1/2"-13	1/2"-13	3 9/16"	(90.5)	1 11/16"	(42.8)

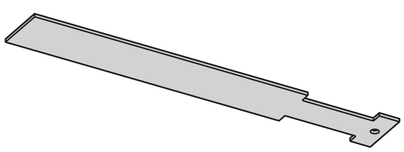
Cat. No.	E in.	E (mm)	F in.	F (mm)	T in.	T (mm)	Design Load lbs.	Design Load (kN)
● **B307**	1 1/8"	(28.6)	2 1/2"	(63.5)	7Ga.	(4.5)	1100	(4.89)
● **B308**	1 1/8"	(28.6)	2 1/2"	(63.5)	1/4"	(6.3)	1500	(7.11)
● **B321-2**	1 5/8"	(41.3)	3 1/4"	(82.5)	1/4"	(6.3)	1400	(6.23)

- Design Load Safety Factor = 5
- Setscrew included

Anchor Strap

Cat. No.	Flange Width in.	Flange Width (mm)
● **B312-6**	Up to 6"	(Up to 152.4)
● **B312-9**	6"-9"	(152.4-228.6)
● **B312-12**	9"-12"	(228.6-304.8)

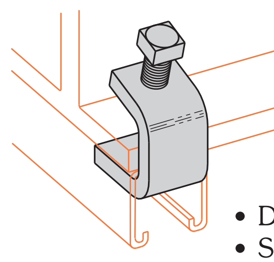
Used with B307, B308 and B321-2 beam clamps



Beam Clamp

Part Number	Design Load* lbs	Design Load* (kN)	Max. Flange Thick in.	Max. Flange Thick (mm)	Mat'l Thickness in.	Mat'l Thickness (mm)
● **B212-3/8**	1000	(4.45)	1 1/8	(28.6)	3/8	(9.5)

*when used in pairs



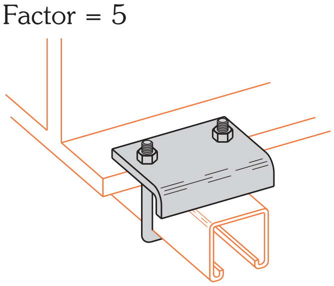
- Design Load Safety Factor = 5
- Sold in pieces
- Setscrew included

Beam Clamp

Cat. No.	Design Load* lbs	Design Load* (kN)	'A' Dimension in.	'A' Dimension (mm)
● **B441-22**	1200	(15.34)	3 3/8	(85.7)
● **B441-22A**	1200	(15.34)	5	(127.0)
● **B441Z-22**	N/A	(N/A)	3 3/8	(85.7)

*when used in pairs

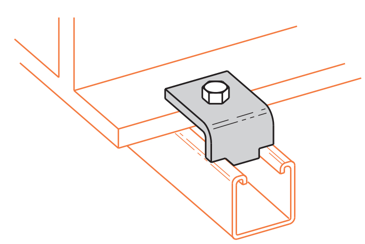
- Design Load Safety Factor = 5
- Sold in pieces



Beam Clamps

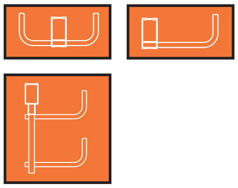
Cat. No.
● **B355**

- Design Load 1200 lbs (5.34kN) when used in pairs
- Design Load Safety Factor = 5
- Sold in pieces
- Order HHCS & channel nuts separately



● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

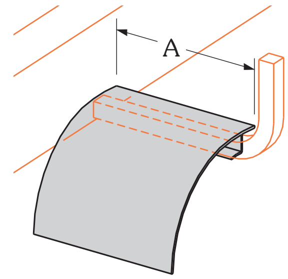
Cent-R-Rail® - Accessories



Cable Drop-Out

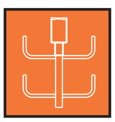
- Provides 3.25" (82mm) bend radius
- Attaches to horizontal section of rung
- Self-drilling screw included
- Part number for one side only

Cat. No.	A in.
● CAM-DO-1	1
● CAM-DO-2	2
● CAM-DO-3	3
● CAM-DO-4	4
● CAM-DO-5	5
● CAM-DO-7	7
● CAM-DO-8	8
● CAM-DO-10	10
● CAM-DO-11	11



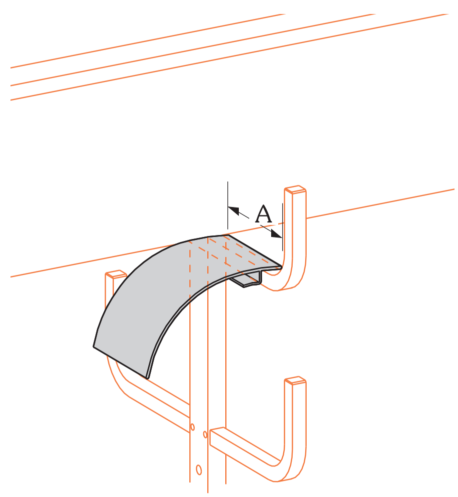
Tray Width in.	Recommended Drop-out Width A*			
	DATA-TRACK® Bottom Rung	DATA-TRACK® Top Rung	Half-Rack®	Multi-Tier Half-Rack®
3	N/A	N/A	2	2
6	2	1	5	5
9	3	2	8	8
12	5	4	11	11
18	7	7	N/A	N/A
24	10	10	N/A	N/A

* Indicates widest Drop-out that will fit in tray

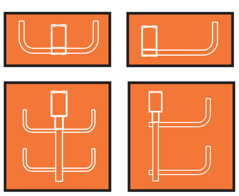


Verti-Rack® Drop-Out

Cat. No.	A in.
● CAM-VDO-1	1.5
● CAM-VDO-2 1/2	3
● CAM-VDO-4	4.5
● CAM-VDO-5 1/2	6

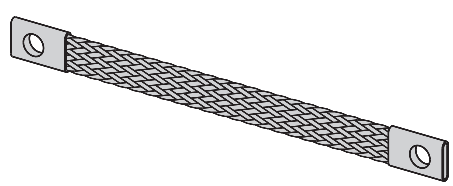


- Provides 3.25" (82mm) bend radius
- Attaches to horizontal section of rung
- Self-drilling screw included
- Part number for one side only



Grounding Jumper

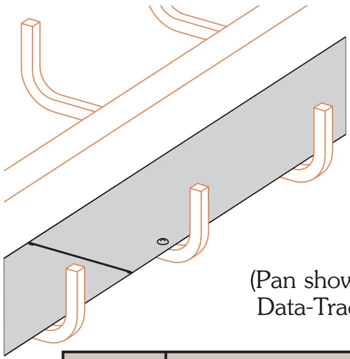
Cat. No.
● CAM-GJ



- Tin plated copper
- 1000 Amps maximum fuse amperage rating
- 12" (305mm) overall length
- Provides electrical continuity between trays
- Required with expansion splice hangers and when trays are discontinuous
- For up to 1/2" hardware - not provided

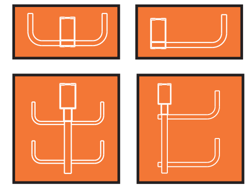
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cent-R-Rail® - Accessories



(Pan shown in Data-Track®)

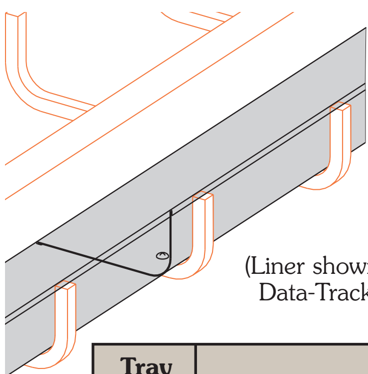
Pan



- Solid floor system with the flexibility of a center rail system
- Side remains open for cable exit/entry
- Available in aluminum or pre-galvanized steel
- Hemmed edges to provide smooth cable fill area
- Shipped with self-drilling screws for easy field installation

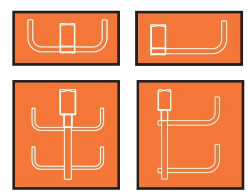
Tray Width in.	Pan Catalog Number				
	Data-Track® ● Bottom Rung (one side only)	Data-Track® ● Top Rung (one side only)	Verti-Rack® ● (one side - one tier only)	Half-Rack® ●	Multi-Tier Half-Rack® ● (one tier only)
3	N/A	N/A	C(*)P-008-(†)	C(*)P-020-(†)	C(*)P-020-(†)
6	C(*)P-020-(†)	C(*)P-012-(†)	C(*)P-023-(†)	C(*)P-050-(†)	C(*)P-050-(†)
9	C(*)P-035-(†)	C(*)P-027-(†)	C(*)P-038-(†)	C(*)P-080-(†)	C(*)P-080-(†)
12	C(*)P-050-(†)	C(*)P-042-(†)	C(*)P-053-(†)	C(*)P-110-(†)	C(*)P-110-(†)
18	C(*)P-072-(†)	C(*)P-072-(†)	N/A	N/A	N/A
24	C(*)P-102-(†)	C(*)P-102-(†)	N/A	N/A	N/A

(*) Material- Insert "A" for .040 aluminum or "P" for 20 Ga. pre-galvanized steel.
(†) Length- Insert 060 for 60", 072 for 72", 120 for 120", or 144 for 144".
Ordering information - Example: CAP-035-144
Aluminum pan for 9" wide bottom rung Data-Track in a 12 foot section.



(Liner shown in Data-Track®)

Liner



- Used to enclose a center rail system when desired
- Available in aluminum or pre-galvanized steel
- Hemmed edges to provide smooth cable fill area
- Shipped with self-drilling screws for easy field installations

Tray Width in.	Liner Catalog Number				
	Data-Track® ● Bottom Rung (one side only)	Data-Track® ● Top Rung (one side only)	Verti-Rack® ● (one side - one tier only)	Half-Rack® ●	Multi-Tier Half-Rack® ● (one tier only)
3	N/A	N/A	C(*)L-V2-014-(†)	C(*)L-D(x)-028-(†)	C(*)L-D(x)-028-(†)
6	C(*)L-D(x)-028-(†)	C(*)L-D(x)-021-(†)	C(*)L-V2-029-(†)	C(*)L-D(x)-059-(†)	C(*)L-D(x)-059-(†)
9	C(*)L-D(x)-044-(†)	C(*)L-D(x)-036-(†)	C(*)L-V2-044-(†)	C(*)L-D(x)-089-(†)	C(*)L-D(x)-089-(†)
12	C(*)L-D(x)-059-(†)	C(*)L-D(x)-051-(†)	C(*)L-V2-059-(†)	C(*)L-D(x)-119-(†)	C(*)L-D(x)-119-(†)
18	C(*)L-D(x)-081-(†)	C(*)L-D(x)-081-(†)	N/A	N/A	N/A
24	C(*)L-D(x)-111-(†)	C(*)L-D(x)-111-(†)	N/A	N/A	N/A

(*) Material- Insert "A" for .040 aluminum or "P" for 20 Ga. pre-galvanized steel.
(†) Length- Insert 060 for 60", 072 for 72", 120 for 120", or 144 for 144".
(x) Loading Depth- Insert 3, 4 or 6 for applicable depth.
Ordering information Example: CAL-D4-059-120
Aluminum liner for 12" wide bottom rung Data-Track with 4" loading in a ten foot section.

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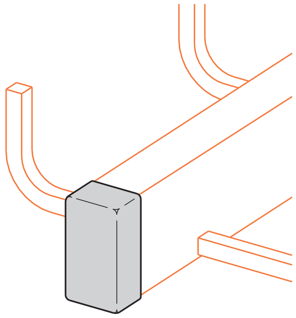
● Red = Normally long lead-time items (15 working days minimum)

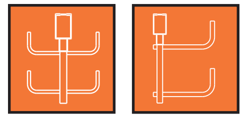
Cent-R-Rail® - Accessories

Plastic Center Rail End Cap

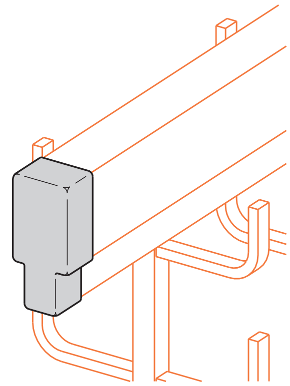


Cat. No.
● CPLM-EC10-Gray

- Fits over end of center rail
- Gray PVC material
- Field installation

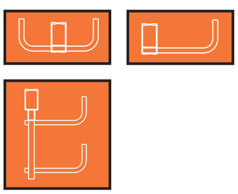


Plastic Center Rail End Cap

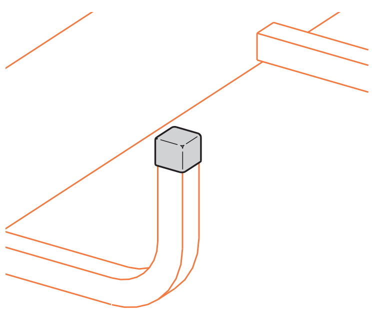


Cat. No.
● CPLM-EC20-Gray

- Fits over end of center rail
- Gray PVC material
- Field installation



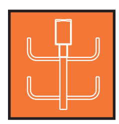
Plastic Rung End Cap



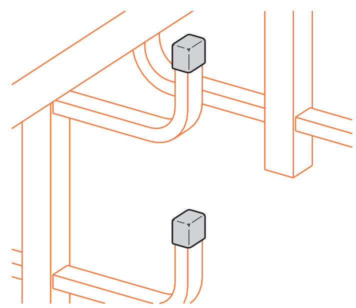
Cat. No.
● CPLM-EC30-*

* Insert color:
Gray is standard
Optional- red, white, purple, blue, yellow, orange, black

- Fits over end of rungs
- Used for cable identification
- PVC material
- Field installation



Plastic Rung End Cap



Cat. No.
● CPLM-EC40-*

* Insert color:
Gray is standard
Optional- red, white, purple, blue, yellow, orange, black

- Fits over end of rungs
- Used for cable identification
- PVC material
- Field installation

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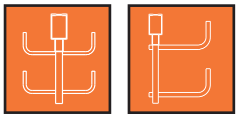
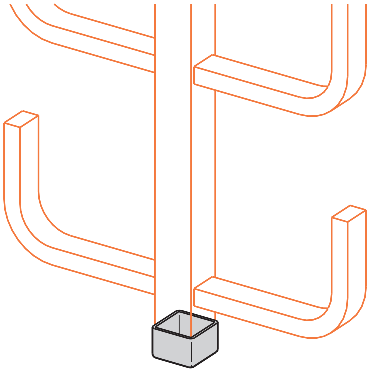
● Red = Normally long lead-time items (15 working days minimum)



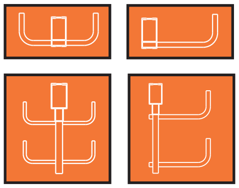
Plastic Trunk End Cap

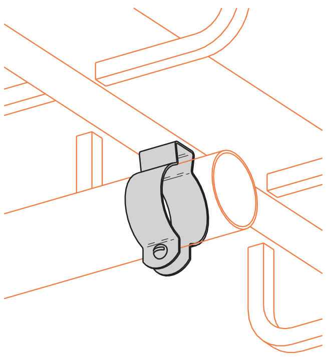


Cat. No.
● CPLM-EC50-Gray

- Fits over end of vertical trunk
- Gray PVC Material
- Field installation

Conduit Adapter

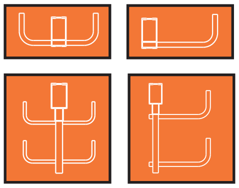


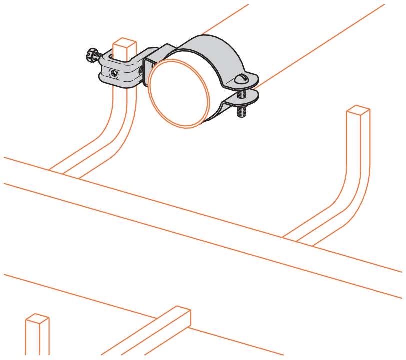


Cat. No.	Conduit Size in.	Conduit Size (mm)	Mounting Hardware Size in.	Mounting Hardware Size (mm)
● BL1400	1/2	(15)	1/4	(6)
● BL1410	3/4	(20)	1/4	(6)
● BL1420	1	(25)	1/4	(6)
● BL1430	1 1/4	(32)	1/4	(6)
● BL1440	1 1/2	(40)	5/16	(8)
● BL1450	2	(50)	5/16	(8)
● BL1460	2 1/2	(65)	5/16	(8)
● BL1470	3	(80)	5/16	(8)
● BL1480	3 1/2	(90)	5/16	(8)
● BL1490	4	(100)	5/16	(8)

- Designed to support or suspend light-duty stationary conduit runs
- Zinc plated steel
- Attaches to tray center rail (mounting hardware not included)

Conduit Adapter



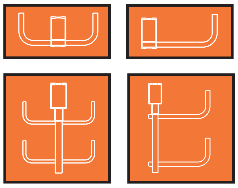


Cat. No.	Conduit Size in.	Conduit Size (mm)
● BL1400-C442	1/2	(15)
● BL1410-C442	3/4	(20)
● BL1420-C442	1	(25)
● BL1430-C442	1 1/4	(32)
● BL1440-C442	1 1/2	(40)
● BL1450-C442	2	(50)

- Connects conduit to Cent-R-Rail®
- Easy one rung installation
- Positions conduit between rungs
- Shipped assembled with hardware

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cent-R-Rail® - Accessories



Conduit Adapter

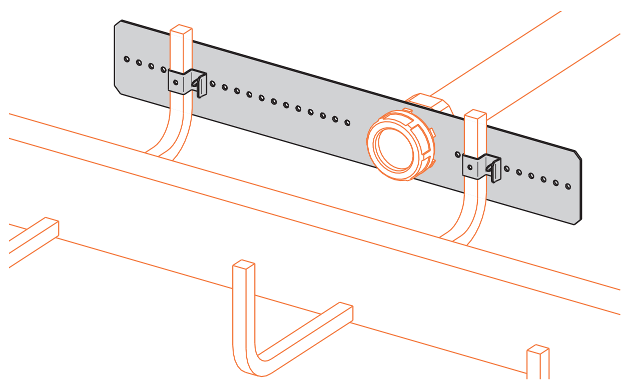
6" (152mm) thru 12" (305mm) rung spacing		
Cat. No.	Conduit Size Punched in.	(mm)
● CZNM-CA1S-1/2	1/2	(15)
● CZNM-CA1S-3/4	3/4	(20)
● CZNM-CA1S-1	1	(25)
● CZNM-CA1S-1 1/4	1 1/4	(32)
● CZNM-CA2S-1 1/2	1 1/2	(40)
● CZNM-CA2S-2	2	(50)
● CZNM-CA2S-2 1/2	2 1/2	(65)
● CZNM-CA3S-3	3	(80)
● CZNM-CA3S-3 1/2	3 1/2	(90)
● CZNM-CA3S-4	4	(100)

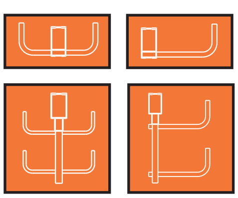
18" (457mm) thru 24" (609mm) rung spacing		
Cat. No.	Conduit Size Punched in.	(mm)
● CZNM-CA1L-1/2	1/2	(15)
● CZNM-CA1L-3/4	3/4	(20)
● CZNM-CA1L-1	1	(25)
● CZNM-CA1L-1 1/4	1 1/4	(32)
● CZNM-CA2L-1 1/2	1 1/2	(40)
● CZNM-CA2L-2	2	(50)
● CZNM-CA2L-2 1/2	2 1/2	(65)
● CZNM-CA3L-3	3	(80)
● CZNM-CA3L-3 1/2	3 1/2	(90)
● CZNM-CA3L-4	4	(100)

6" (152mm) thru 12" (305mm) rung spacing		
Cat. No.	Conduit Size Unpunched in.	(mm)
● CZNM-CA1S	1/2 thru 1 1/4	(15) thru (32)
● CZNM-CA2S	1 1/2 thru 2 1/2	(40) thru (65)
● CZNM-CA3S	3 thru 4	(80) thru (100)

18" (457mm) thru 24" (609mm) rung spacing		
Cat. No.	Conduit Size Unpunched in.	(mm)
● CZNM-CA1L	1/2 thru 1 1/4	(15) thru (32)
● CZNM-CA2L	1 1/2 thru 2 1/2	(40) thru (65)
● CZNM-CA3L	3 thru 4	(80) thru (100)

- Connects conduit to Cent-R-Rail®
- Supported by two rungs for stability
- Allows variable positioning between rungs
- Items included:
  - -mounting body
  - -2 rung attachment clips with #10 self-drilling screws

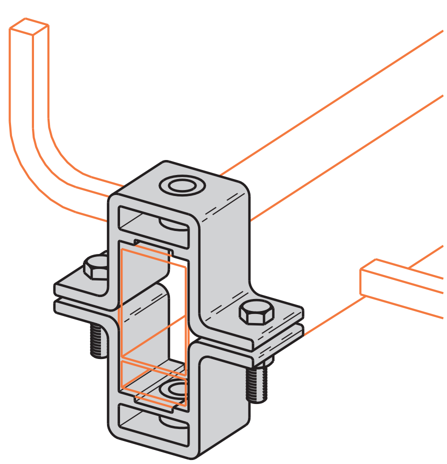




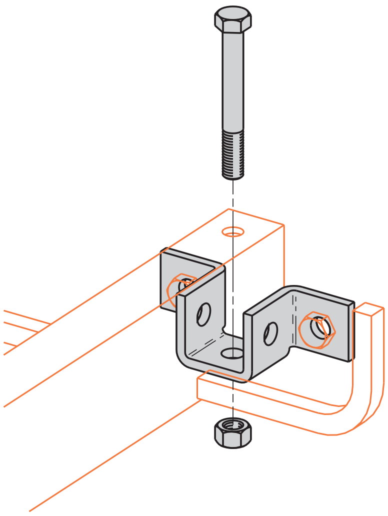
Drill Fixture

Cat. No.
● CAM-DF

- Locates splice holes to be drilled in field cut trays
- Used to mark cut lines square
- Requires 9/16" diameter drill bit (not included)



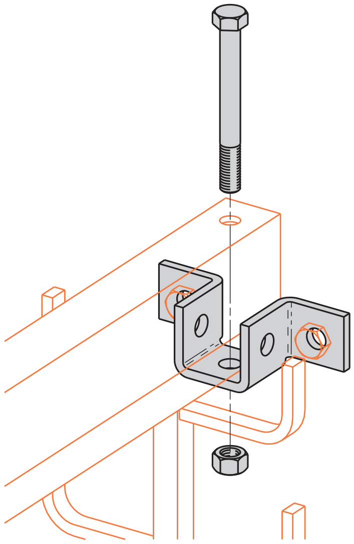
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)



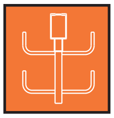
Data-Track® Tray-to-Wall Connector

Cat. No.
● CZNT-WB1

- Easy to install
- Strong - 1/4" (6mm) steel
- Zinc plated - ASTM B633
- Designed for up to 1/2" diameter wall attachment hardware (not included)
- Cent-R-Rail® nut and bolt connector provided

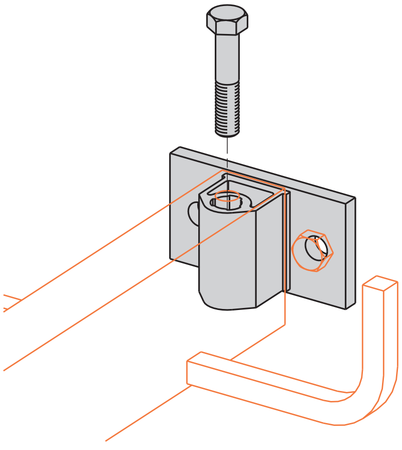


Verti-rack® Tray-to-Wall Connector

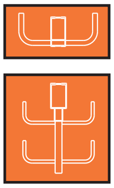


Cat. No.
● CZNT-WB2

- Easy to install
- Strong - 1/4" (6mm) steel
- Zinc plated - ASTM B633
- Designed for up to 1/2" diameter wall attachment hardware (not included)
- Cent-R-Rail® nut and bolt connector provided



Tray-to-Wall Connector



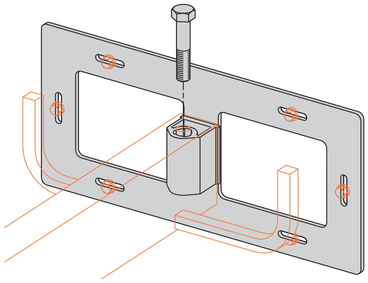
Cat. No.
● CAT-WB

Patented (see page CRR-4)

- Connects tray end to wall for termination and support
- Qwik-Bolt® design
- Shipped with one bolt for tray connection (order 1/2" diameter wall mounting hardware separately)

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cent-R-Rail® - Accessories



Data-Track® Tray-To-Box Connector

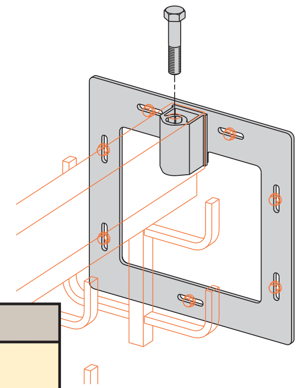
Cat. No.

CAT-BD B 3 12 B

Rung Type	Loading Depth	Tray Width
● B=Bottom rung	● 3=3"	● 06= 6"
● T=Top rung (red)	● 4=4"	● 09= 9"
	● 6=6"	● 12=12"
		● 18=18"
		● 24=24"

Patented (see page CRR-4)

- Connects tray to opening in enclosures
- Qwik-Bolt® design
- Shipped with one bolt for tray connection (order 1/4" diameter wall mounting hardware separately)



Verti-Rack® Tray-To-Box Connector

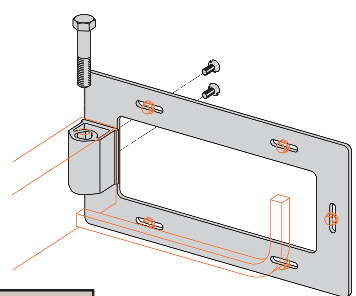
Cat. No.

CAT-B 4 V 06 B

Number of Tiers	Tray Width
● 2 = 2 tiers	● 03 = 3"
● 3 = 3 tiers	● 06 = 6"
● 4 = 4 tiers	● 09 = 9"
● 5 = 5 tiers	● 12 = 12"
● 6 = 6 tiers	

Patented (see page CRR-4)

- Connects tray to opening in enclosures
- Qwik-Bolt® design
- Shipped with one bolt for tray connection (order 1/4" diameter wall mounting hardware separately)



Half-Rack® Tray-To-Box Connector

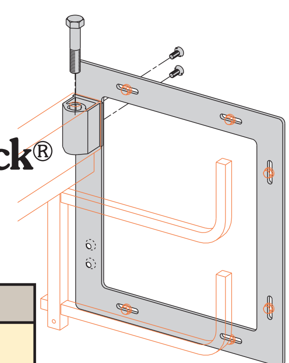
Cat. No.

CAT-B1H 3 03 B

Loading Depth	Tray Width
● 3 = 3”	● 03 = 3"
● 4 = 4”	● 06 = 6"
● 6 = 6”	● 09 = 9"
	● 12 = 12"

Patented (see page CRR-4)

- Connects tray to opening in enclosures
- Qwik-Bolt® design
- Shipped with one bolt for tray connection (order 1/4" diameter wall mounting hardware separately)



Multi-Tier Half-Rack® Tray-To-Box Connector

Cat. No.

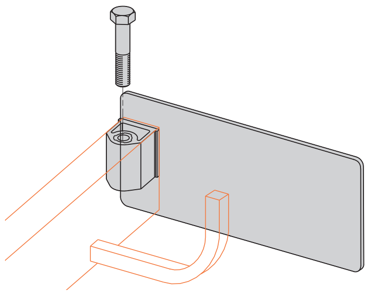
CAT-B 2 M 03 B

Number of Tiers	Tray Width
● 2 = 2 tiers	● 03 = 3"
● 3 = 3 tiers	● 06 = 6"
● 4 = 4 tiers	● 09 = 9"
	● 12 = 12"

Patented (see page CRR-4)

- Connects tray to opening in enclosures
- Qwik-Bolt® design
- Shipped with one bolt for tray connection (order 1/4" diameter wall mounting hardware separately)
- Designed for 3” and 4” fill

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)



Half-Rack® Blind End

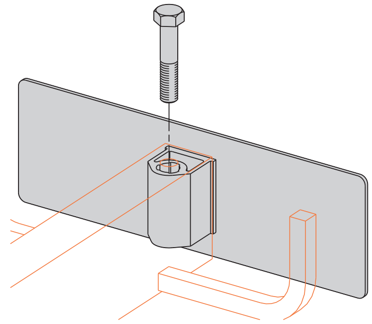
Cat. No.

CAM-BE1 B 3 12 B

Rung Type	Loading Depth	Tray Width
● B = Bottom rung	● 3 = 3"	● 06 = 6"
● T = Top rung	● 4 = 4"	● 09 = 9"
	● 6 = 6"	● 12 = 12"
		● 18 = 18"
		● 24 = 24"

Patented (see page CRR-4)

- Terminates cable tray run
- Qwik-Bolt® design
- Shipped with one bolt for tray connections



Data-Track® Blind End

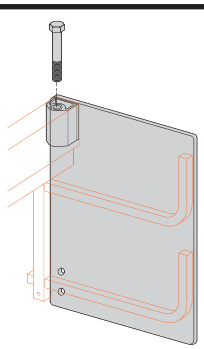
Cat. No.

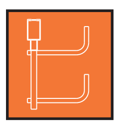
CAM-BED B 3 12 B

Rung Type	Loading Depth	Tray Width
● B = Bottom rung	● 3 = 3"	● 06 = 6"
● T = Top rung	● 4 = 4"	● 09 = 9"
	● 6 = 6"	● 12 = 12"
		● 18 = 18"
		● 24 = 24"

Patented (see page CRR-4)

- Terminates cable tray run
- Qwik-Bolt® design
- Shipped with one bolt for tray connections





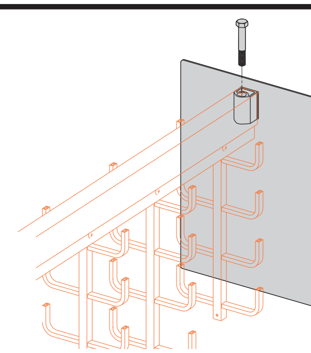
Cat. No.

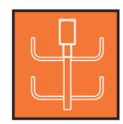
CAM-BE 2 M 12 B

Tier	Rung Type	Tray Width
● 2 = 2 Tier	● M = Multi-Tier Half Rack®	● 03 = 3"
● 3 = 3 Tier		● 06 = 6"
● 4 = 4 Tier		● 09 = 9"
		● 12 = 12"

Patented (see page CRR-4)

- Terminates cable tray run
- Qwik-Bolt® design
- Shipped with one bolt for tray connections
- Designed for 3” and 4” fill





Cat. No.

CAM-BE 2 V 09 B

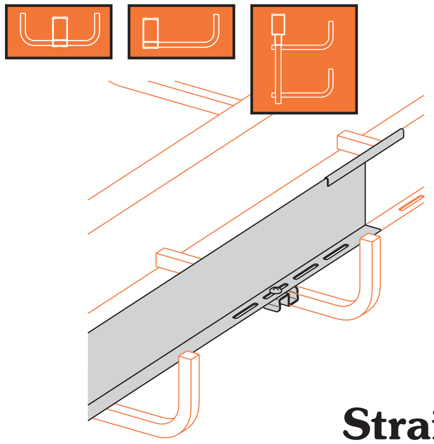
Tier	Rung Type	Tray Width
● 2 = 2 Tier	● V = Verti-Rack®	● 03 = 3"
● 3 = 3 Tier		● 06 = 6"
● 4 = 4 Tier		● 09 = 9"
		● 12 = 12"

Patented (see page CRR-4)

- Terminates cable tray run
- Qwik-Bolt® design
- Shipped with one bolt for tray connections
- Designed for straight rung and 2” fill

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

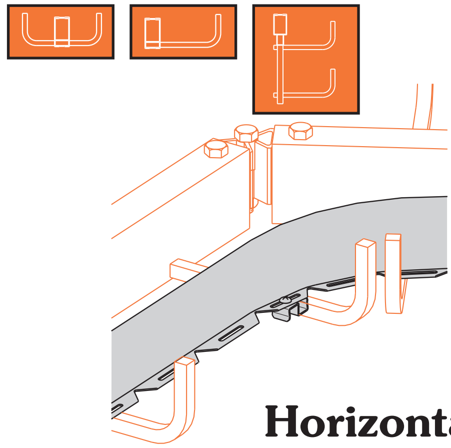
Cent-R-Rail® - *Accessories*



Straight Section Barriers

Cat. No.	Tray Loading Depth	Length
● **C73A-144**	3" (76.2mm)	144" (3.66m)
● **C74A-144**	4" (101.6mm)	144" (3.66m)
● **C76A-144**	6" (152.4mm)	144" (3.66m)
● **C73A-120**	3" (76.2mm)	120" (3.05m)
● **C74A-120**	4" (101.6mm)	120" (3.05m)
● **C76A-120**	6" (152.4mm)	120" (3.05m)

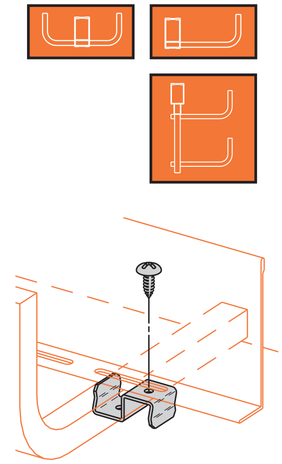
- Separates cable randomly in straight tray
- Furnished with 4 rung attachment clips, hardware and one splice



Horizontal Bend Barriers

Cat. No.	Tray Loading Depth
● **C73A-90HBFL**	3" (76.2mm)
● **C74A-90HBFL**	4" (101.6mm)
● **C76A-90HBFL**	6" (152.4mm)

- Separates cable randomly
- Standard Length: 72" (6 ft.) (1.8m)
- Horizontal bend barriers are flexible in order to conform to any horizontal bend
- Furnished with 3 rung attachment clips, hardware and one splice



Rung Attachment

Cat. No.
● **CZNM-RC**

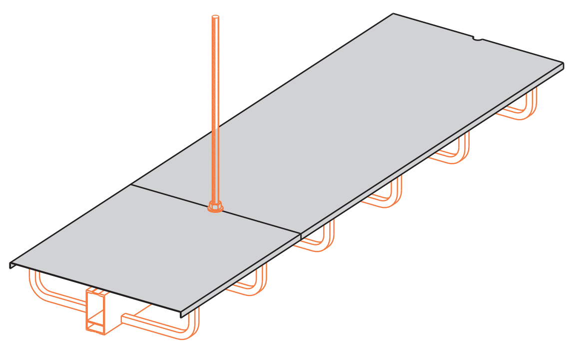
- Used to attach barrier strips without screwing into rungs
- One #10 x 1/2" self-drilling screw included

K1 Cover

Bottom Rung Data-Track®		
Cat. No.	**Overall Width in.**	**(mm)**
● **C(*)K1F-DB-06-(length)**	9.000	(228.6)
● **C(*)K1F-DB-09-(length)**	12.000	(304.8)
● **C(*)K1F-DB-12-(length)**	15.000	(381.0)
● **C(*)K1F-DB-18-(length)**	19.375	(492.1)
● **C(*)K1F-DB-24-(length)**	25.375	(644.5)

Top Rung Data-Track®		
Cat. No.	**Overall Width in.**	**(mm)**
● **C(*)K1F-DT-06-(length)**	7.375	(187.3)
● **C(*)K1F-DT-09-(length)**	10.375	(263.5)
● **C(*)K1F-DT-12-(length)**	13.375	(339.7)
● **C(*)K1F-DT-18-(length)**	19.375	(492.1)
● **C(*)K1F-DT-24-(length)**	25.375	(644.5)

(*) Insert "A" for .040" aluminum or "P" for 20 Ga. pre-galvanized steel.



- Available in .040 (1mm) aluminum
- Available in 20 (.9mm) gauge pre-galvanized steel.
- Notched for 1/2" ATR (hardware not included).
- Full 1/2" flange.
- Available in 10 ft. (120") (3.0m) and 12 ft. (144") (3.7m) sections.

Length Suffix	Cover Length
● -120	120" (10 ft.) (3.05m)
● -144	144" (12 ft.) (3.66m)

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, cable tray system shall be as manufactured by B-Line® Systems, Inc.

Section 2- Cable Tray Sections and Components

2.01 General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated with splice hangers and all other necessary accessories. Provide cable trays with rounded edges and smooth surfaces in compliance with applicable standards, and with the following additional construction features.

2.02 Materials and Finish: Aluminum: Center rails and rungs shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052 and all cast parts from Aluminum Association Alloy 319. All hardware and fasteners shall be zinc plated steel in accordance with ASTM B633.

2.03 Cable trays shall be constructed of a center rail 1.625" x 3.250" with minimum section properties of Sx = 0.701 in^3 and Ix = 1.174 in^4. Rungs shall be a single continuous square tube 0.54" x 0.54" with radiused corners and minimum section properties of Sx = 0.019 in^3 and Ix = 0.005 in^4. Rungs shall be mechanically connected to the center rail in at least two places, symmetrical about the center rail, with ends finished to protect installers and cables.

2.04 Rungs shall be spaced every [6] [9] [12] inches.

2.05 Straight sections shall be supplied in [10] [12] foot lengths.

2.06 Cable tray width shall be [6] [9] [12] [18] [24] inches.

2.07 Splice hangers must also be capable of acting as the support points for all thread rod.

2.08 Cable tray loading depth shall be [3] [4] [6] inches.

2.09 All splices and connectors must protect cables from the edges of the center rail and act as a barrier to prevent the center rail from transmitting hazardous gases or smoke; hardware must be installed vertically, so as not to interfere with the cables in the cable fill area.

2.10 Where required, expansion splices shall allow for 1" of thermal expansion and contraction.

2.11 When required, and to provide an area free of center rails for cable transitions, contractor shall install a universal hub fitting. The universal hub fitting must be a cast aluminum structural member, B-Line CAU Series (flat sheets of steel or aluminum are not acceptable), which can be used with cable ties and allows the center rails to be connected so they may be pivoted at connection points.

Section 3- Loading Capacities and Testing

3.01 Cable tray shall meet the loading requirements of NEMA 12C.

3.02 Upon request, manufacturer shall provide test reports in accordance with the latest revision of NEMA VE-1 or CSA C22.2 No. 126-M91.

3.03 UL Compliance: Provide products which are UL classified and labeled.

Cent-R-Rail® - Sample Specification Verti-Rack®

Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, cable tray systems shall be as manufactured by B-Line® Systems, Inc.

Section 2- Cable Tray Sections and Components

2.01 General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated with splice hangers and all other necessary accessories. Provide cable trays with rounded edges and smooth surfaces in compliance with applicable standards, and with the following additional construction features.

2.02 Materials and Finish: Aluminum: Center rails and rungs shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052 and all cast parts from Aluminum Association Alloy 319. All hardware and fasteners shall be zinc plated steel in accordance with ASTM B633.

2.03 Cable trays shall be constructed of a center rail 1.625" x 3.900" with minimum section properties of Sx = 0.558 in^3 and Ix = 1.272 in^4. Rungs shall be a single continuous rectangular tube 0.54" x 0.31" with radiused corners and minimum section properties of Sx = 0.007 in^3 and Ix = 0.001 in^4. Rungs shall be mechanically connected to square trunks 0.71" x 0.71", symmetrical about the trunk, with ends finished to protect installers and cables. Trunks shall be mechanically connected to the center rail.

2.04 Rungs shall be spaced every [6] [9] [12] inches.

2.05 Straight sections shall be supplied in [10] [12] foot lengths.

2.06 Cable tray width shall be [3] [6] [9] [12] inches.

2.07 Splice hangers must also be capable of acting as the support points for all thread rod.

2.08 Cable tray loading depth shall be 2 inches.

2.09 Cable tray shall have [2] [3] [4] [5] [6] tiers.

2.10 All splices and connectors must protect cables from the edges of the center rail and act as a barrier to prevent the center rail from transmitting hazardous gases or smoke; hardware must be installed vertically, so as not to interfere with the cables in the cable fill area.

2.11 Where required, expansion splices shall allow for 1" of thermal expansion and contraction.

2.12 When required, cable tray system shall be expandable after installation, up to two additional tiers.

Section 3- Loading Capacities and Testing

3.01 Cable tray shall meet the loading requirements of NEMA 12C.

3.02 Upon request, manufacturer shall provide test reports in accordance with the latest revision of NEMA VE-1 or CSA C22.2 No. 126-M91.

3.03 UL Compliance: Provide products which are UL classified and labeled.

Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, cable tray systems shall be as manufactured by B-Line® Systems, Inc.

Section 2- Cable Tray Sections and Components

2.01 General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated with splice hangers and all other necessary accessories. Provide cable tray with rounded edges and smooth surfaces in compliance with applicable standards, and with the following additional construction features.

2.02 Materials and Finish: Aluminum: Center rails and rungs shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052 and all cast parts from Aluminum Association Alloy 319. All hardware and fasteners shall be zinc plated steel in accordance with ASTM B633.

2.03 Cable trays shall be constructed of a center rail 1.625" x 3.250" with minimum section properties of Sx = 0.701 in^3 and Ix = 1.174 in^4. Rungs shall be a single continuous square tube 0.54" x 0.54" with radiused corners and minimum section properties of Sx = 0.019 in^3 and Ix = 0.005 in^4. Rungs shall be mechanically connected to the center rail in at least two places, with ends finished to protect installers and cables.

2.04 Rungs shall be spaced every [6] [9] [12] inches.

2.05 Straight sections shall be supplied in [10] [12] foot lengths.

2.06 Cable tray width shall be [3] [6] [9] [12] inches.

2.07 Splice hangers must also be capable of acting as the support points for all thread rod.

2.08 Cable tray loading depth shall be [3] [4] [6] inches.

2.09 All splices and connectors must protect cables from the edges of the center rail and act as a barrier to prevent the center rail from transmitting hazardous gases or smoke; hardware must be installed vertically, so as not to interfere with the cables in the cable fill area.

2.10 Cable tray shall be capable of being installed flush against a flat surface without the use of spacers or brackets.

2.11 Where required, expansion splices shall allow for 1" of thermal expansion and contraction.

Section 3- Loading Capacities and Testing

3.01 Upon request, manufacturer shall provide test reports in accordance with the latest revision of NEMA VE-1 / CSA C22.2 No. 126.1-98.

3.02 UL Classified: Provide products which are UL classified and labeled.

Cent-R-Rail® - Sample Specification Multi-Tier Half-Rack®

Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, cable tray systems shall be as manufactured by B-Line® Systems, Inc.

Section 2- Cable Tray Sections and Components

2.01 General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated with splice hangers and all other necessary accessories. Provide cable tray with rounded edges and smooth surfaces in compliance with applicable standards, and with the following additional construction features.

2.02 Materials and Finish: Aluminum: Center rails and rungs shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052 and all cast parts from Aluminum Association Alloy 319. All hardware and fastener shall be zinc plated steel in accordance with ASTM B633.

2.03 Cable trays shall be constructed of a center rail 1.625" x 3.900" with minimum section properties of $Sx = 0.558 \text{ in}^3$ and $Ix = 1.272 \text{ in}^4$. Rungs shall be a single continuous square tube 0.54" x 0.54" with radiused corners and minimum section properties of $Sx = 0.019 \text{ in}^3$ and $Ix = 0.005 \text{ in}^4$. Rungs shall be mechanically connected to square trunks 0.71" x 0.71", with ends finished to protect installers and cables. Trunks shall be mechanically connected to the center rail.

2.04 Rungs shall be spaced every [6] [9] [12] inches.

2.05 Straight sections shall be supplied in [10] [12] foot lengths.

2.06 Cable tray width shall be [3] [6] [9] [12] inches.

2.07 Splice hangers must also be capable of acting as the support points for all thread rod.

2.08 Cable tray loading depth shall be [3] [4] inches.

2.09 Cable tray shall have [2] [3] [4] tiers.

2.10 All splices and connectors must protect cables from the edges of the center rail and act as a barrier to prevent the center rail from transmitting hazardous gases or smoke; hardware must be installed vertically, so as not to interfere with the cables in the cable fill area.

2.11 Cable tray shall be capable of being installed flush against a flat surface without the use of spacers or brackets.

2.12 Where required, expansion splices shall allow for 1" of thermal expansion and contraction.

2.13 When required, cable tray system shall be expandable after installation, up to two additional tiers.

Section 3- Loading Capacities and Testing

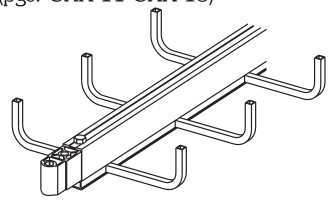
3.01 Upon request, manufacturer shall provide test reports in accordance with the latest revision of NEMA VE-1 / CSA C22.2 No. 126.1-98.

3.02 UL Compliance: Provide products which are UL classified and labeled.

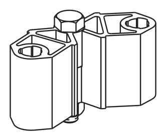
Cent-R-Rail® - Installation Suggestions

Common Items Required:

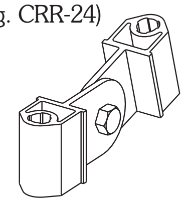
- 10 ft (3.0m) or 12 ft (3.7m) Straight Sections with Standard Splice Hangers. (pgs. CRR-11-CRR-18)



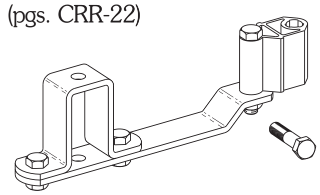
- Horizontal Adjustable Splices (pg. CRR-21)



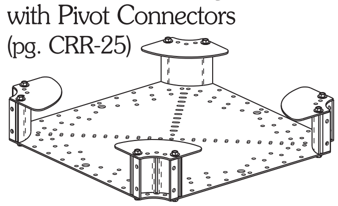
- Vertical Adjustable Splices (pg. CRR-24)



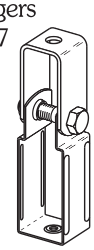
- Horizontal Elbow & Tee Coupling (pgs. CRR-22)



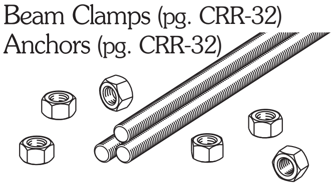
- Universal Hub Fittings with Pivot Connectors (pg. CRR-25)



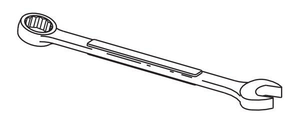
- Clevis Hangers (pgs. CRR-27 & CRR-28)



- 1/2" ATR & Hex Nuts (pg. CRR-32)
- Beam Clamps (pg. CRR-32)
- Anchors (pg. CRR-32)



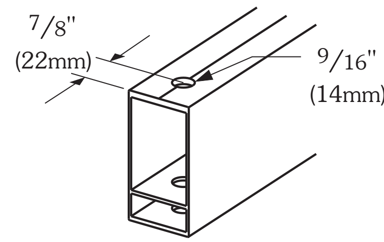
- Two 3/4" Combination Wrenches



Guidelines for Common Items:

- When field cutting is required, use drill fixture (pg. 38) to cut ends square and locate new splice holes, or drill one 9/16" (14mm) hole 7/8" (22mm) on center from end of the tray through center rail.

  IMPORTANT: Tube end must be cut square when field cutting.

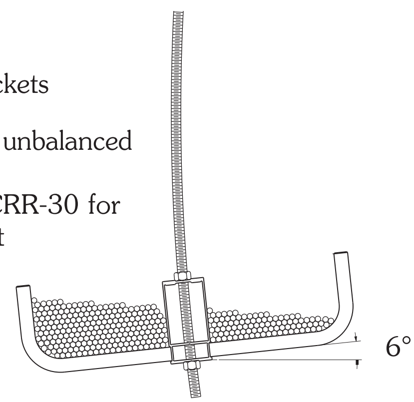


- When hanging ATR, leave slightly loose until after tray is installed to ease alignment with splice hanger holes.

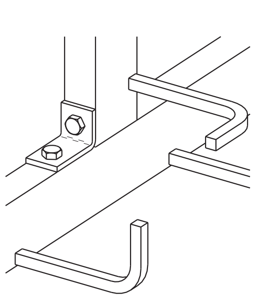
- When attaching the tray system to the ATR, extend the ATR approximately 1" past the hex nut to allow for the use of B655 rod couplings (pg. CRR-33) for future expansion.

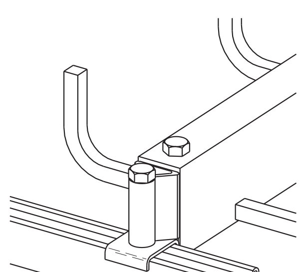
- **To address unbalanced loading.** When tray stabilization is required for non-uniform loading, use brackets with ATR as shown: (pg. CRR-31)

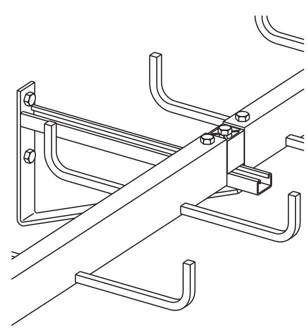
- Page CRR-58 - unbalanced loading study.
- Refer to page CRR-30 for auxiliary support



- CENT-R-RAIL® tray was designed to be interactive with Cooper B-Line's strut systems, allowing multiple options for miscellaneous supports. Refer to Cooper B-Line's Strut Systems catalog and seismic brochure for a complete listing of items available. A few examples are shown below:





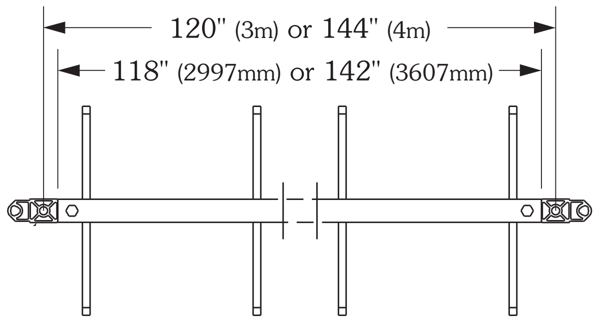


Cent-R-Rail® - *Installation Suggestions*

Guidelines for Common Items:

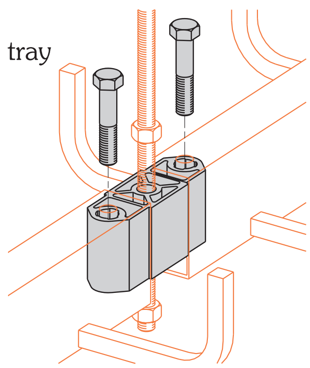
• When installing straight sections:

- Hang 1/2" ATR on 10 ft or 12 ft centers (depending on tray lengths) with one hex nut threaded approximately 4 inches onto ATR.
- Attach splice hanger and tray onto ATR through center hole of splice hanger.
- Install one hex nut on ATR under tray and thread up to set elevation of tray.
- Tighten upper hex nut against top of splice hanger.
- For wall attachment options see Seismic Restraints Cent-R-Rail® Supplement.



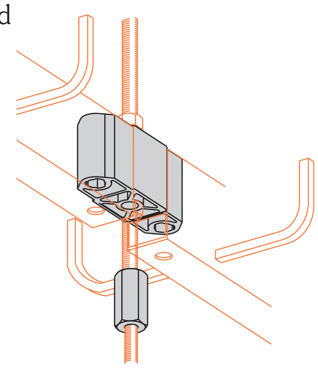
• When using Qwik-Bolt® Splice Hangers:

- Insert splice into ends of tray with non-threaded side toward bolt head.
- Insert bolts and tighten securely.



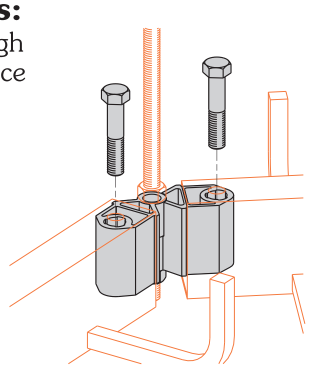
• Allow for future expansion

- When possible, extend ATR 1" past bottom hex nut to provide for later expansion by using an ATR coupling (pg. CRR-33).



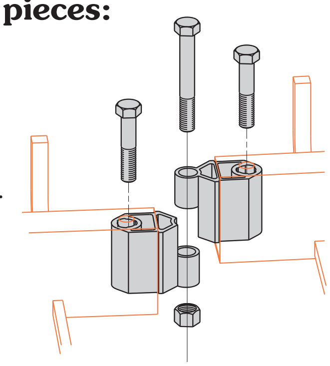
• When using Horizontal Adjustable Splices:

- Install with ATR through center hole, adjust splice to required angle and tighten ATR nuts. (May also install with the included 3" bolt and nut and support tray using a clevis hanger within 2 ft of splice.)
- For optional outside bend cable support, horizontal bend rung support (pg. CRR-21).



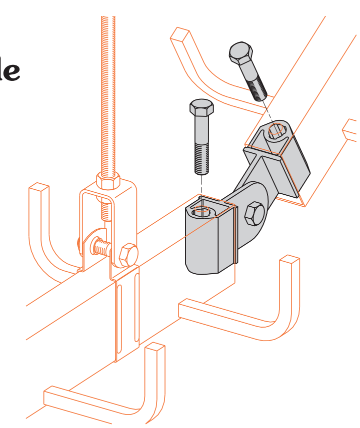
• For connecting two mid-run straight pieces:

- Use Horizontal Adjustable Splices to join two straight sections at mid-run, where short of space for connection.

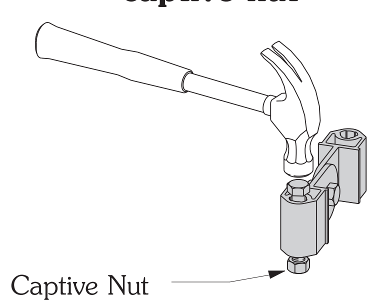


• When using Vertical Adjustable Splices:

- Attach splice to trays and install a clevis hanger within 2 ft of splice to support tray. (May also install using ATR as support by first removing captive nut.)
- Tighten pivot bolt & nut.

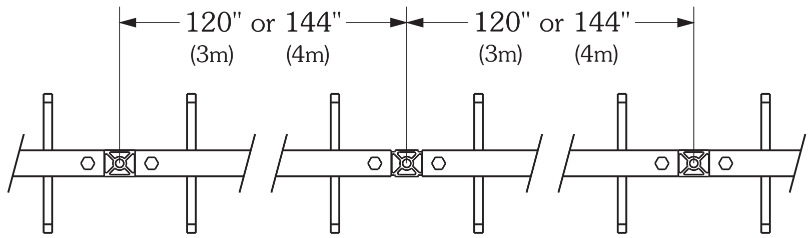


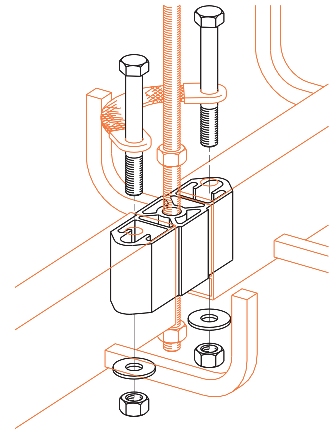
• Removing the captive nut



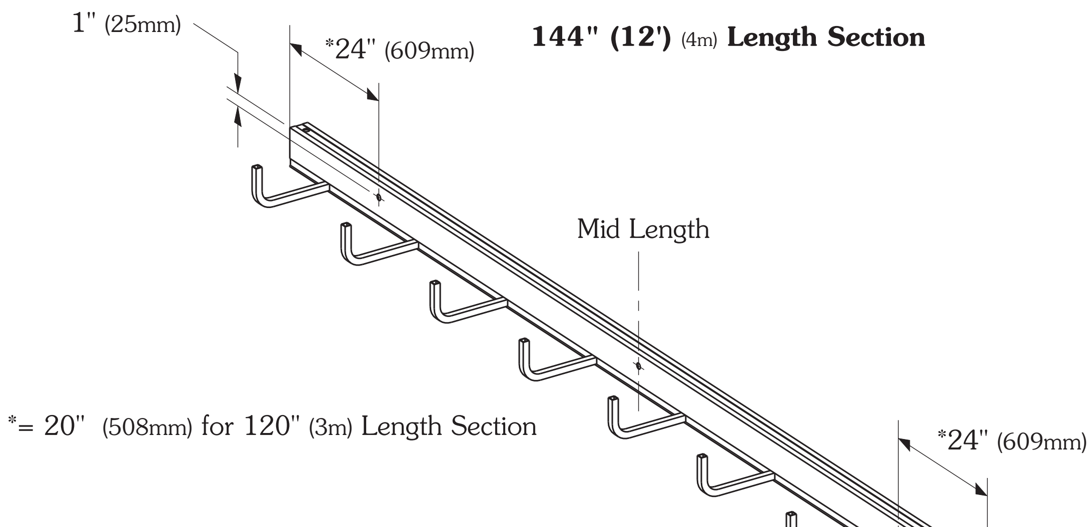
Guidelines for Common Items:

- **When using Expansion Splice Hangers:**
  - Both splices adjacent to expansion splice hangers must be installed 120" or 144" (depending on the tray length) on centers from expansion splice to allow full expansion and contraction.
  - Grounding jumper must be installed with expansion splice.





Half-Rack® and Multi-Tier Half-Rack® Support Locations



Sections should be attached to the wall
at mid length and at 1/6th of the section length
from both ends (20" for 120"; 24" for 144")

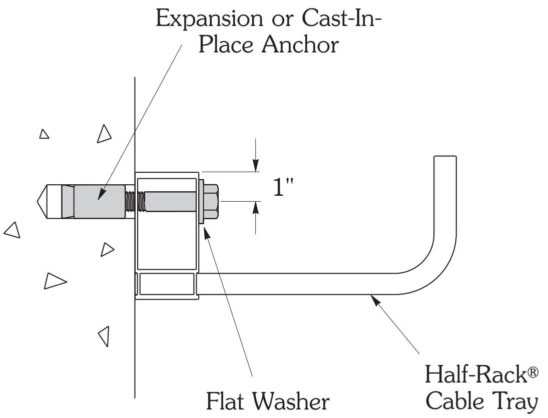
- **When wall-mounting tray:**
  - Attach tray and splice to wall by bolting through center rail to wall. (May also be installed using other methods, such as brackets.)

Cent-R-Rail® - *Installation Suggestions*

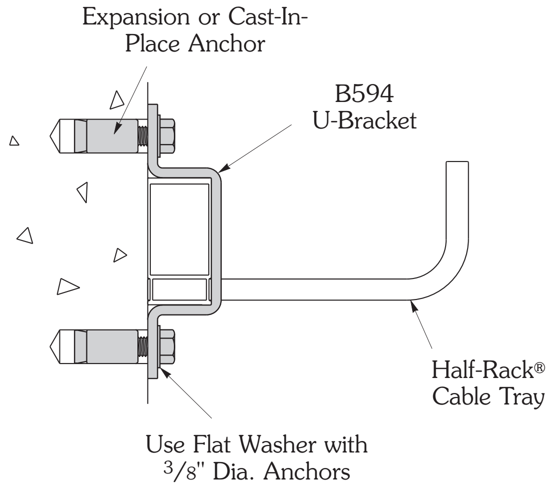
Guidelines for Common Items:

Half-Rack® Mounting Details:

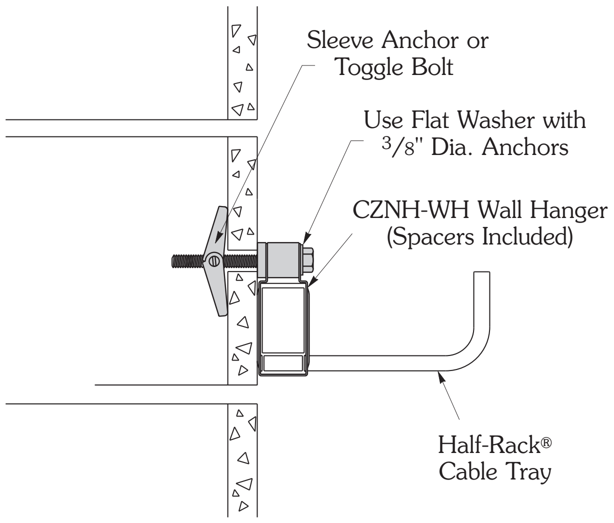
**• Drill Through Method:
In Concrete Slab**



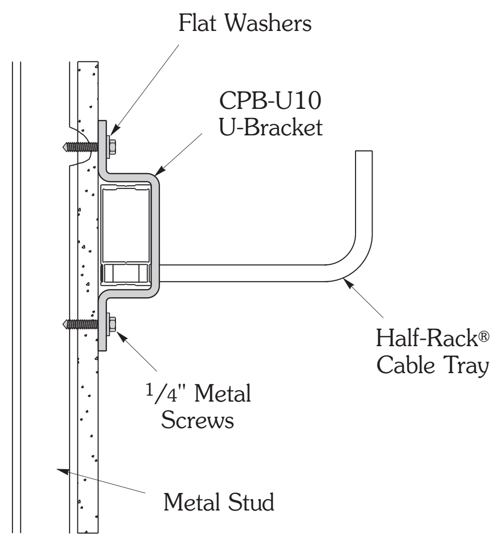
**• B594 Clevis U-Bracket:
In Concrete Slab**



**• CZNH-WH Wall Hanger:
In Hollow CMU Wall**



**• CPB-U10 U-Bracket:
In Drywall & Metal Stud Wall**
• CPB-CV1 For Multi-Tier Half-Rack

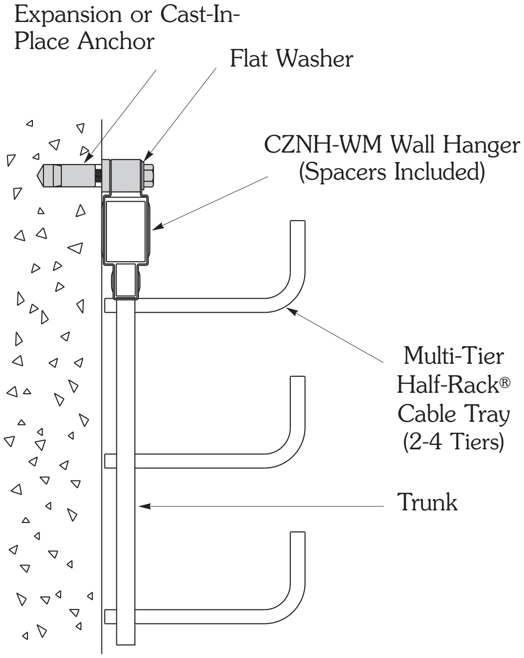


Note: These mounting details serve as a vertical support, and can serve as seismic bracing. See the Cent-R-Rail Seismic Restraints brochure for details.

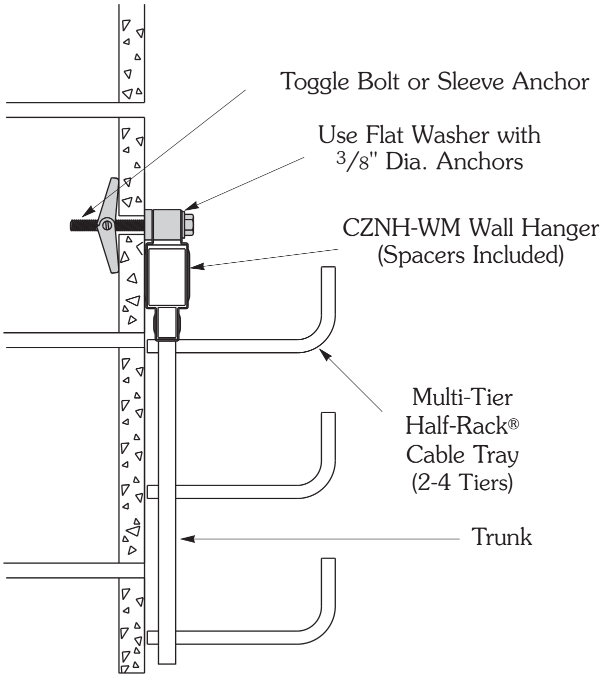
Guidelines for Common Items:

Multi-Tier Half-Rack® Mounting Details:

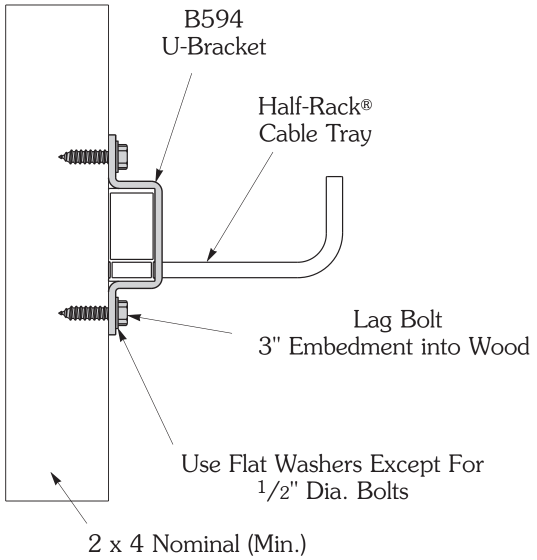
• CZNH-WM Wall Hanger: In Concrete Slab



• CZNH-WM Wall Hanger: In Hollow CMU Wall



• B594 Clevis U-Bracket: In Wood Stud Wall



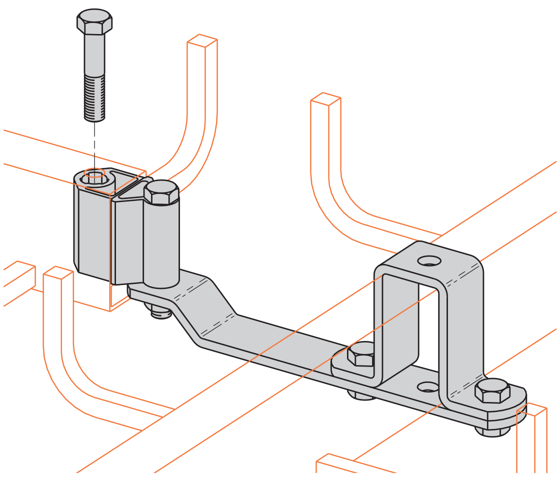
Guidelines (cont.):

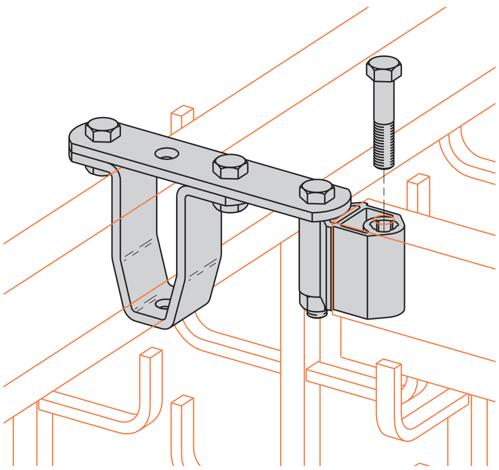
- **When using Horizontal Elbow and Tee Couplings:**

  - Bolt "U" bracket around tray center rail with coupling bar on bottom of center rail for Data-Track® & Half-Rack®, and top of center rail for Verti-Rack® & Multi-Tier Half-Rack®.

  - Attach pivot connector to branch tray using included bolt, and support tray with clevis hanger within 2 ft of coupling. (May also attach to ATR by first removing captive nut.)

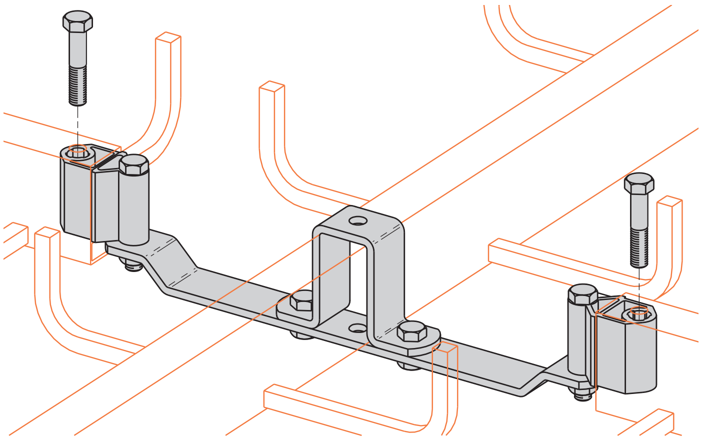
  - Adjust pivot connector to desired position and tighten all hardware.

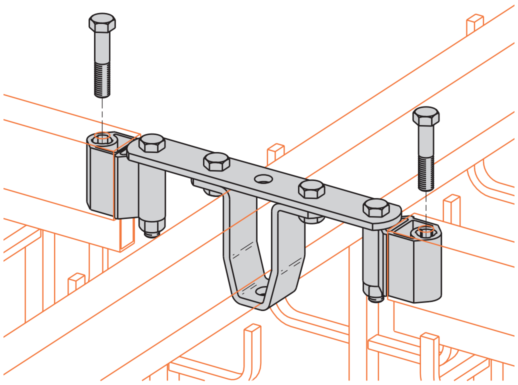




- **When using Horizontal Cross Couplings:**

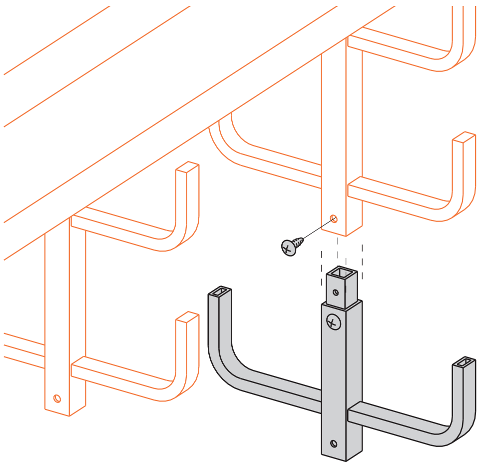
  - Installation is similar to elbow and tee coupling, except with two branch trays instead of one.
  - Support ATR may be located through existing "U" bracket holes, by using clevis hangers within 2 ft of coupling. (May also attach to ATR by first removing captive nut.)



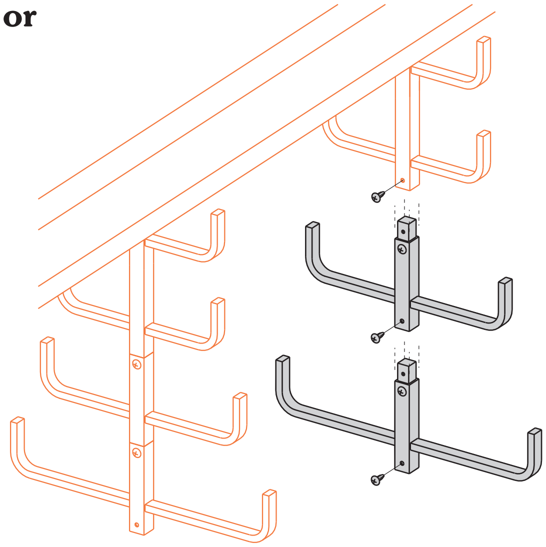


Guidelines (cont.):

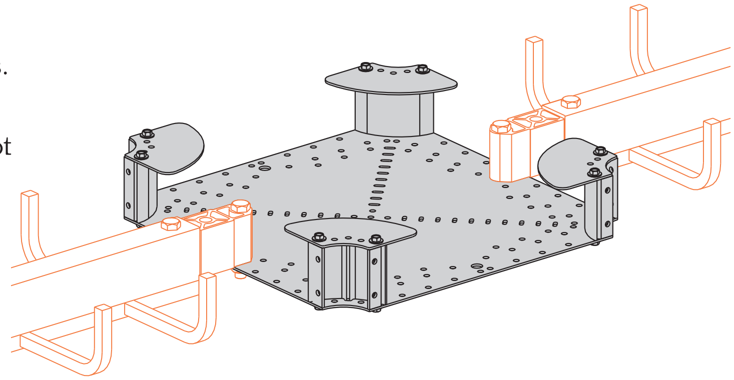
- **When using Add-A-Rung® with Verti-Rack® or Multi-Tier Half-Rack®:**
  - See loading data for maximum center rail load capacity to determine the maximum number of tiers allowed.
  - Insert Add-A-Rung® into end of vertical trunk.
  - Install included screw through pilot hole in trunk.



- **When using Add-A-Rung® with Verti-Rack® or Multi-Tier Half Rack® in Different Widths:**
  - See loading data for maximum center rail load capacity to determine the maximum number of tiers in different widths allowed.
  - 3", 6", 9" and 12" wide tiers.
  - Insert Add-A-Rung® into end of vertical trunk.
  - Install included screw through pilot hole in trunk.
  - See page CRR-13 for part number.

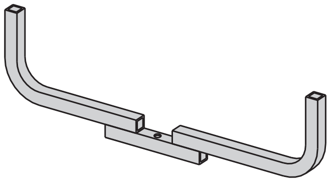


- **When using Universal Hub Fittings:**
  - Position hubs with rounded edges toward cables.
  - Attach pivot connectors to cable support surface using ATR, or bolt and nut through pivot hole. (If bolt and nut are used, tray must be supported using clevis hangers within 2 ft of pivot connectors.)
  - Connect tray ends to pivot connectors.
  - Position pivot connectors as desired and tighten hardware.
  - **Warning: Do not use as a support for personnel!**



Cent-R-Rail® - *Installation Suggestions*

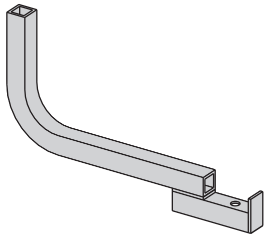
Data-Track® Bottom Rung Replacement



- #10 self-drilling attachments included.
- This product can act as a Rail-Riser™ for Data-Track®.

Cat. No.
● C3ADB-06-RK
● C3ADB-09-RK
● C3ADB-12-RK
● C3ADB-18-RK
● C3ADB-24-RK
● C4ADB-06-RK
● C4ADB-09-RK
● C4ADB-12-RK
● C4ADB-18-RK
● C4ADB-24-RK
● C6ADB-06-RK
● C6ADB-09-RK
● C6ADB-12-RK
● C6ADB-18-RK
● C6ADB-24-RK

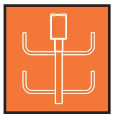
Half-Rack® Rung Replacement

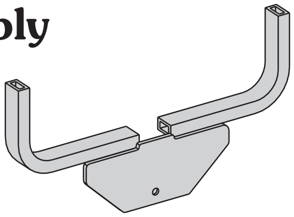


- #10 self-drilling attachments included.

Cat. No.
● C3A1H-03-RK
● C3A1H-06-RK
● C3A1H-09-RK
● C3A1H-12-RK
● C4A1H-03-RK
● C4A1H-06-RK
● C4A1H-09-RK
● C4A1H-12-RK
● C6A1H-03-RK
● C6A1H-06-RK
● C6A1H-09-RK
● C6A1H-12-RK

Verti-rack® Rung Replacement Assembly

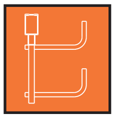


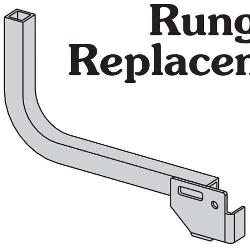


Cat. No.
● C2AV-03-RK
● C2AV-06-RK
● C2AV-09-RK
● C2AV-12-RK

- #10 self-drilling attachments included.

Multi-Tier Half-Rack® Rung Replacement



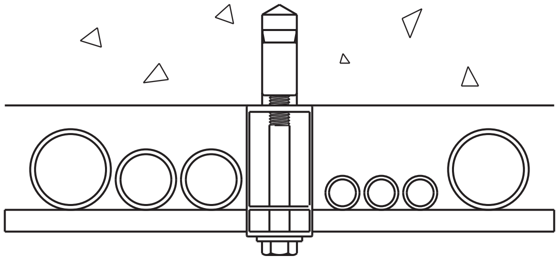


Cat. No.
● C3AM-03-RK
● C3AM-06-RK
● C3AM-09-RK
● C3AM-12-RK
● C4AM-03-RK
● C4AM-06-RK
● C4AM-09-RK
● C4AM-12-RK

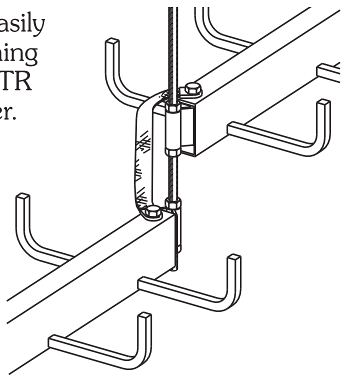
- #10 self-drilling attachments included.

Helpful Hints

- When installing cables near a ceiling, use straight rung DATA-TRACK® and bolt to ceiling through splice holes or use "U" brackets (pg. CRR-30).



- Vertical offsets can be easily field fabricated by attaching two trays to the same ATR with one above the other.



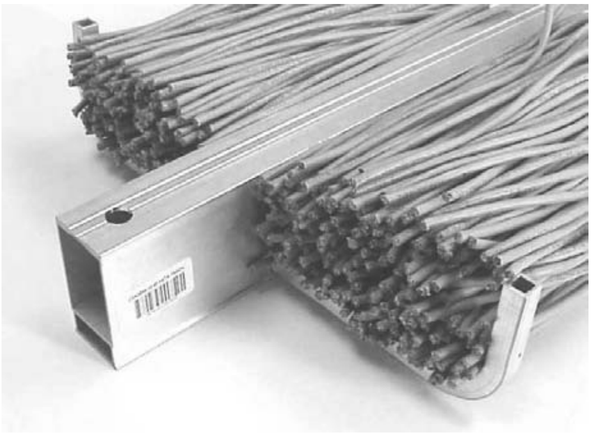
Note: Bonding jumper is required to maintain electrical continuity. (pg. CRR-35)

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cable Tray Fill

The National Electrical Code allows for 50% fill of ventilated cable tray for control or signal wiring (Article 318-9(b)). This rule requires that all the individual cable cross-sectional areas added up may not exceed one half the cable tray area. The cable tray area is equal to the width times the load depth.

In actual practice with Category 5 cables, however, the cable tray is completely full in order to reach the "50% cable fill". See the picture below. The tray is completely full, but the sum of the cable area is only 50% of the tray area, due to the empty spaces between the cables.



Picture shows 12" wide Cent-R-Rail cable tray with 3" load depth.
The tray contains 520 4 UTP Category 5 cables (.21" OD).

This being the case, there is a practical limit to the amount of cables that can be installed in the tray, based on the trays' width and load depth. The following chart shows the approximate cable weight that can be installed without exceeding the 50% fill rule:

Cable Tray Width	Cable Tray Fill Depth		
	3"	4"	6"
6"	7 lbs/ft Group 1	9 lbs/ft	13.5 lbs/ft
9"	10 lbs/ft	13.5 lbs/ft	20 lbs/ft
12"	13.5 lbs/ft	18 lbs/ft	27 lbs/ft
18"	20 lbs/ft	27 lbs/ft Group 2	41 lbs/ft
24"	27 lbs/ft	36 lbs/ft	50 lbs/ft

This chart was based on 50% fill of 4 UTP Category 5 cable (O.D. = .21", .026 lbs/ft).

This is not a maximum load rating for the tray, rather a practical guide to the amount of cable weight that can realistically be installed.

For analysis purposes, the loads are separated into 2 groups: less than 25 lbs/ft, and greater than 25 lbs/ft. These groups will be used in the eccentric load study on the following pages.

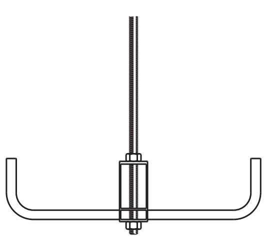
Data-Track® Allowable Unbalanced Load Distribution

Group 1 - Loads under 25 lbs/ft	Loading Balance %*
Method 1 - 1/2" all thread rod with hex nuts on top and bottom of tray	65/35
Method 2 - 1/2" all thread rod with CZNH-CD clevis hanger	65/35
Method 3 - 1/2" all thread rod stiffened with B22 and SC228's (pg. CRR-31)	80/20
Method 4 - using CZN-DRS-72 (pg. CRR-31)	100/0

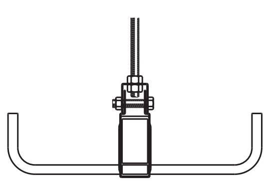
Group 2 - Loads between 25 lbs/ft and 50 lbs/ft	Loading Balance %*
Method 1 - 1/2" all thread rod with hex nuts on top and bottom of tray	60/40
Method 2 - 1/2" all thread rod with CZNH-CD clevis hanger	55/45
Method 3 - 1/2" all thread rod stiffened with B22 and SC228's (pg. CRR-31)	65/35
Method 4 - using CZN-DRS-72 (pg. CRR-31)	80/20

Failure was defined as a 6 degree horizontal tilt of the tray. Tests were performed on single sections of tray with a span of 12 ft between supports. Maximum hanger rod length tested was 6 ft. For study results refer to page CRR-58.

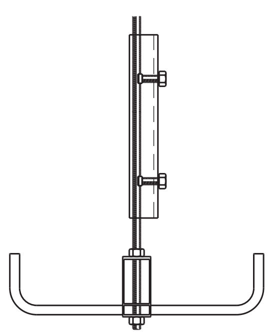
*Defined as percentage of total cable load allowed on one side of the tray.



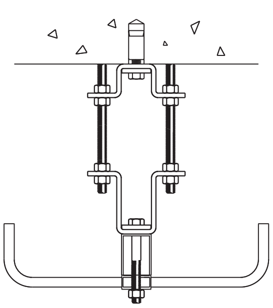
Method 1



Method 2



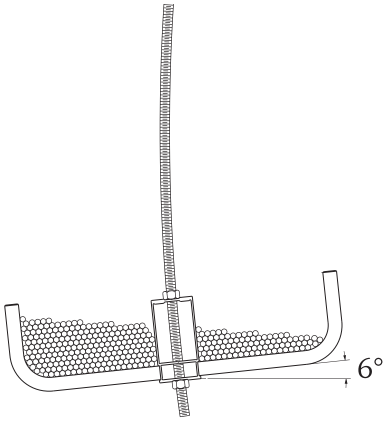
Method 3



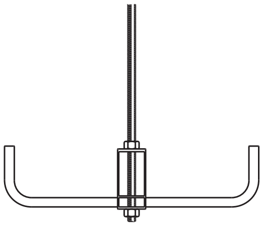
Method 4

Unbalanced Loading - The Study

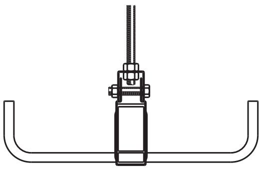
To better understand uneven loading on center rail systems, Cooper B-Line® ran a series of tests on Data-Track®. Tests were performed with supports on twelve foot centers using 1/2" threaded rod. The maximum allowable tilt was set at six degrees. This angle was chosen purely for aesthetic reasons. It is nowhere near structural failure, but the point at which it started to look unacceptable.



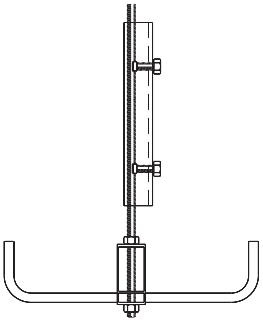
Center rail systems can be supported using different processes. For B-Line's study, the following four were used:



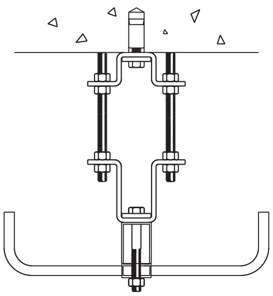
Method 1



Method 2



Method 3



Method 4

Method 1: 1/2" ATR passing through splice hangers (CAS-SB) with hex nuts on top and bottom.
Method 2: 1/2" ATR with clevis (CZNH-CD).
Method 3: 1/2" ATR reinforced with rod stiffener (B22 channel rod stiffener and SC228 hanger rod stiffener assembly).
Method 4: CZN-DRS-72 special purpose support assembly.

Combining the two loading groups and the four support methods, testing revealed the following:

Group 1-Under 25 lbs/ft	Loading Balance %*
Method 1	65/35
Method 2	65/35
Method 3	80/20
Method 4	100/0

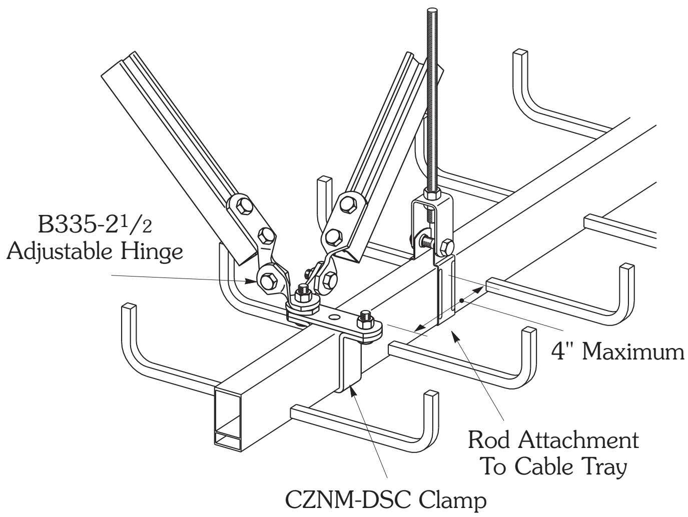
Group 2 - 25 lbs/ft to 50 lbs/ft	Loading Balance %*
Method 1	60/40
Method 2	55/45
Method 3	65/35
Method 4	80/20

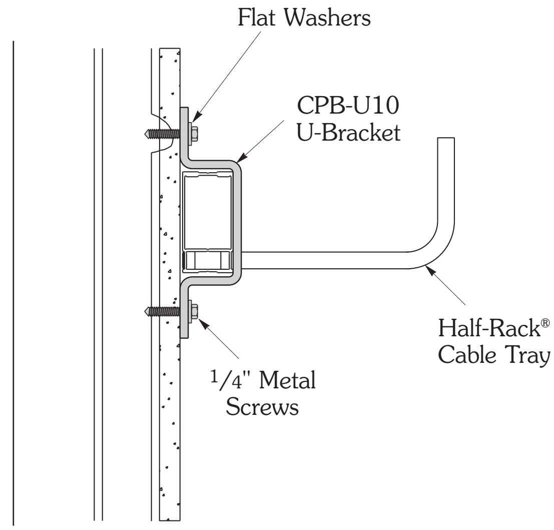
As a reminder, failure was defined as a 6° horizontal tilt. The supports were on 12 ft centers and the ATR drops were 6 ft. Cable loading was estimated for category 5 cable weighing .021 lbs/ft with a cross-sectional area of .0492 square inches. This information should be beneficial when considering eccentric loading and center rail systems.

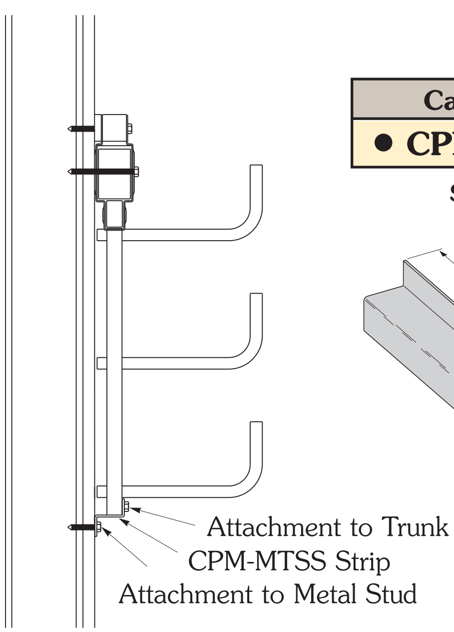
*Defined as percentage of total cable load allowed on one side of the tray.

Seismic Restraint Systems

- ❑ **SRS-00 Seismic Restraints**
  Multi-Directional bracing for electrical conduit, cable tray and mechanical piping systems. Standard mounting details and bracing schedules have been reviewed and stamped by a California structural engineer.
- ❑ **SRS-CR1 Cent-R-Rail Seismic Supplement**
  Multi-Directional bracing for Data-Track®, Half-Rack® and Multi-Tier Half-Rack® Systems. Standard mounting details and bracing schedules have been reviewed and stamped by a California structural engineer.

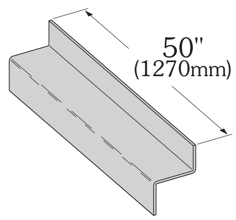


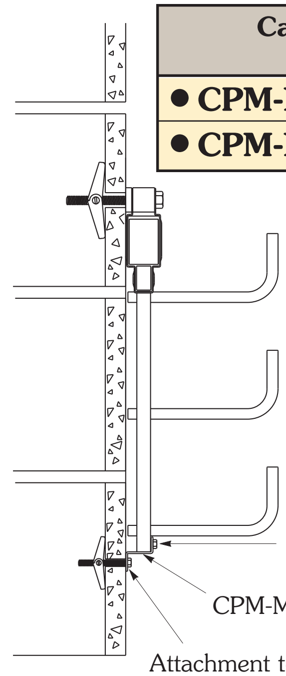




Cat. No.
● **CPM-MTSS**

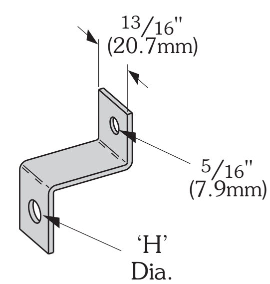
Strip





Cat. No.	'H' in.	'H' (mm)
● **CPM-MTSC-1/4**	5/16	(7.9)
● **CPM-MTSC-3/8**	7/16	(11.1)

Clip



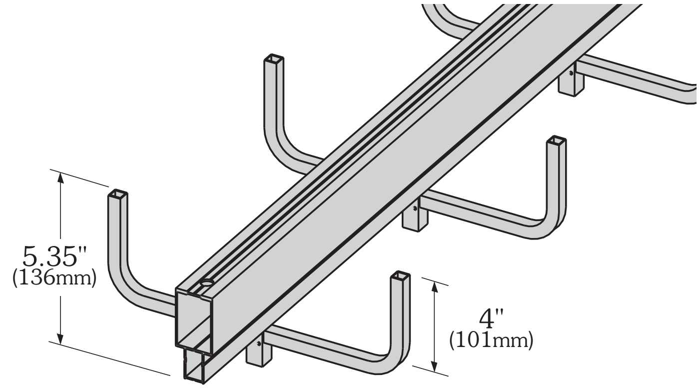
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

New - Verti-Rack®
4" Fill Depth to 24" Wide

Single Tier

Cat. No.
● C4A1V12-24-144

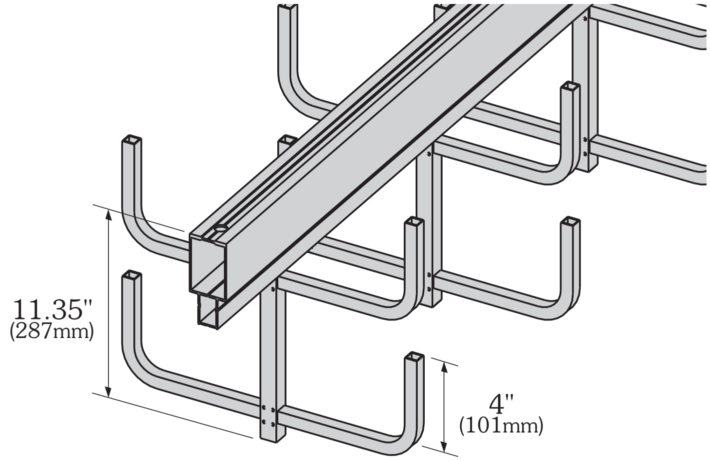
- Expandable with Add-A-Rung
- Center rail loading to NEMA 12C
- UL Classified
- Widths available: 6", 9", 12", 18" and 24"
- Lengths: 120" or 144"



Two Tier

Cat. No.
● C4A2V12-24-144

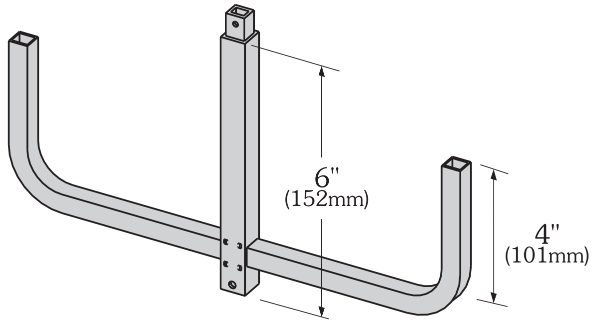
- Center rail loading to NEMA 12C
- UL Classified
- Widths available: 6", 9", 12", 18" and 24"
- Lengths: 120" or 144"



Add-A-Rung

Cat. No.
● CAR-1V424

- Attaches to bottom of existing tray
- Shipped with required hardware



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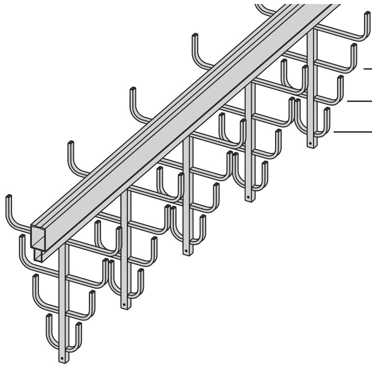
● Red = Normally long lead-time items (15 working days minimum)

Variable Width Verti-Rack®



**Variable Width Verti-Rack® 4 Tier Example		
C2A4V12-12-09-06-03-144		
Width		
Rung #1	=	12"
Rung #2	=	09"
Rung #3	=	06"
Rung #4	=	03"

Rung #1 being closest to the center rail

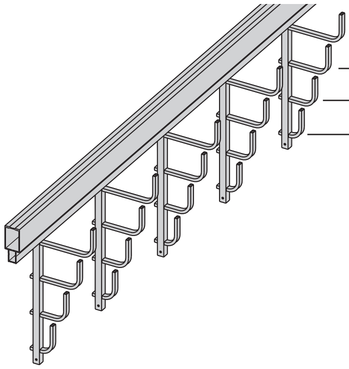
Variable Width Verti-RACK® Straight Section Part Numbering

C2 A 4V 12 - 12-09-06-03 - 144

Series	Material	Type	Rung Spacing	Width**	Length*
● C0 = Straight Rung	● A = Aluminum	● 2V = 2 tier	● 06 = 6"	● 03 = 3"	● 144 = 144"
● C2 = 2" Loading Depth		● 3V = 3 tier	● 09 = 9"	● 06 = 6"	● 120 = 120"
		● 4V = 4 tier	● 12 = 12"	● 09 = 9"	
		● 5V = 5 tier	(Specials available)	● 12 = 12"	
		● 6V = 6 tier			

* Actual tray lengths are 142" and 118" to allow for splice hangers

Variable Width Multi-Tier Verti-Rack®



**Variable Width Multi-Tier Half-Rack® 4 Tier Example		
C3A4M09-12-09-06-03-144		
Width		
Rung #1	=	12"
Rung #2	=	09"
Rung #3	=	06"
Rung #4	=	03"

Rung #1 being closest to the center rail

Variable Width Multi-Tier Half-RACK® Straight Section Part Numbering

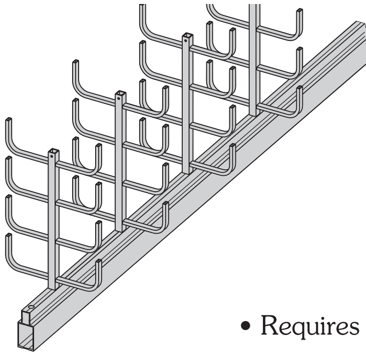
C3 A 4M 09 - 12-09-06-03 - 144

Series	Material	Type	Rung Spacing	Width**	Length*
● C0 = Straight Rung	● A = Aluminum	● 2M = 2 tier	● 06 = 6"	● 03 = 3"	● 144 = 144"
● C3 = 3" Loading Depth		● 3M = 3 tier	● 09 = 9"	● 06 = 6"	● 120 = 120"
● C4 = 4" Loading Depth		● 4M = 4 tier	● 12 = 12"	● 09 = 9"	
		(Specials available)		● 12 = 12"	

* Actual tray lengths are 142" and 118" to allow for splice hangers

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Inverted Verti-Rack®



Used as a floor mounted system

• Requires splice CAS-SBVI

Inverted Verti-Rack® Straight Section Part Numbering

C2 A 4VI 12 - 09 - 144

Series
- ● C0 = Straight Rung
- ● C2 = 2" Loading Depth

Material
- ● A = Aluminum

Type
- ● 2VI = 2 tier
- ● 3VI = 3 tier
- ● 4VI = 4 tier
- ● 5VI = 5 tier
- ● 6VI = 6 tier

Rung Spacing
- ● 06 = 6"
- ● 09 = 9"
- ● 12 = 12"

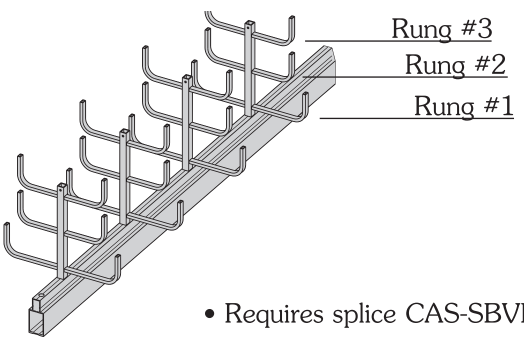
(Specials available)

Width**
- ● 03 = 3"
- ● 06 = 6"
- ● 09 = 9"
- ● 12 = 12"

Length*
- ● 144 = 144"
- ● 120 = 120"

* Actual tray lengths are 142" and 118" to allow for splice hangers

Inverted Variable Width Verti-Rack®



Used as a floor mounted system

• Requires splice CAS-SBVI

**Inverted Variable Width Verti-Rack® 3 Tier Example

C2A3VI12-12-09-09-144

Width

Rung #1 = 12"
Rung #2 = 09"
Rung #3 = 09"

Rung #1 being closest to the center rail

Inverted Variable Width Verti-Rack® Straight Section Part Numbering

C2 A 3VI 12 - 12-09-09 - 144

Series
- ● C0 = Straight Rung
- ● C2 = 2" Loading Depth

Material
- ● A = Aluminum

Type
- ● 2VI = 2 tier
- ● 3VI = 3 tier
- ● 4VI = 4 tier
- ● 5VI = 5 tier
- ● 6VI = 6 tier

Rung Spacing
- ● 06= 6"
- ● 09= 9"
- ● 12=12"

(Specials available)

Width**
- ● 03 = 3"
- ● 06 = 6"
- ● 09 = 9"
- ● 12 = 12"

Length*
- ● 144 = 144"
- ● 120 = 120"

* Actual tray lengths are 142" and 118" to allow for splice hangers

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

COOPER B-Line

Redi-Rail

Redi-Rail Rung

An "I"-Beam shaped rung provides a great strength-to-weight ratio. Patented fastener hole is designed to provide maximum grip for the fastener threads.

Redi-Rail Rung Fastener

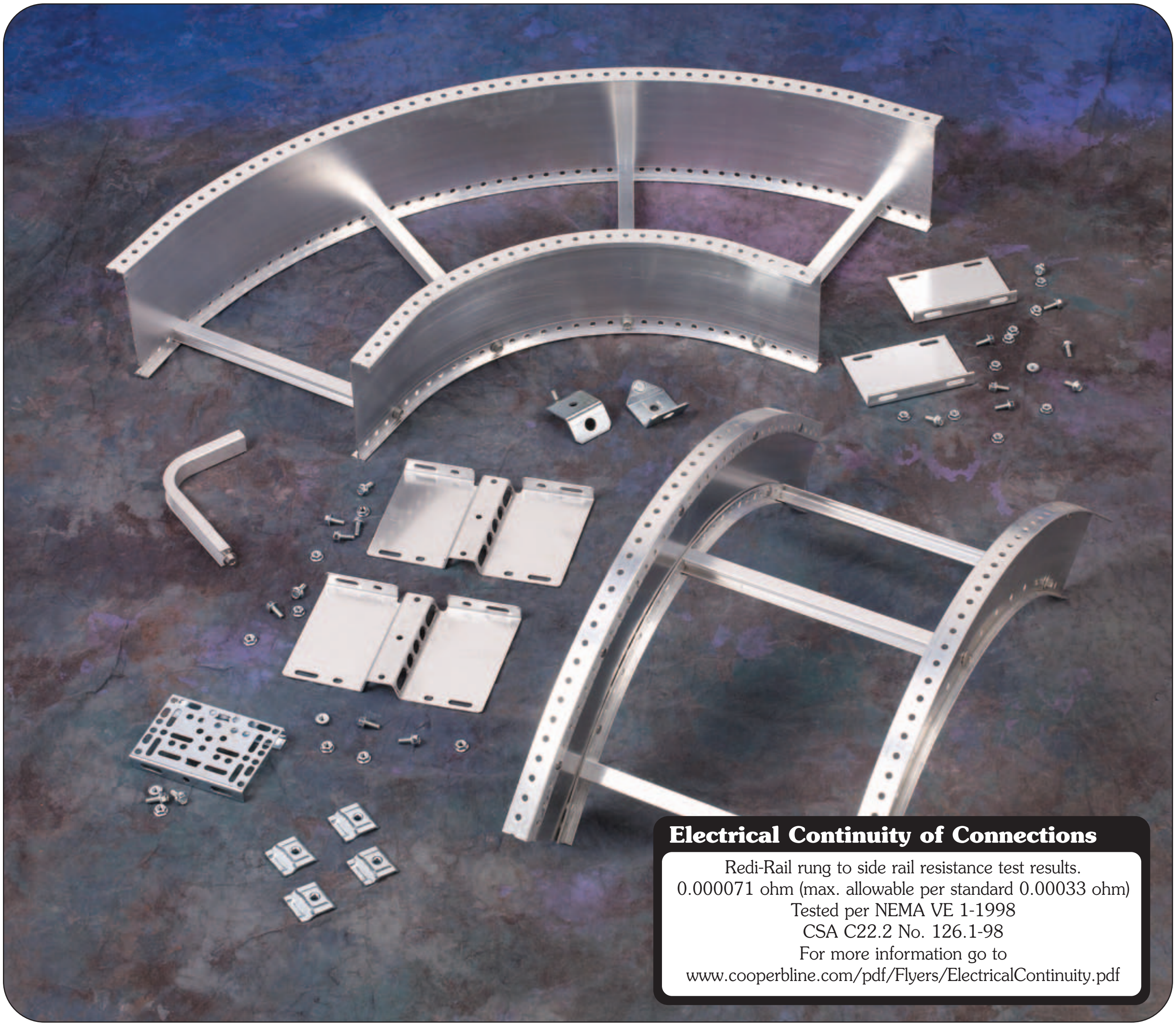
Specially designed and finished rung fastener. Rung pullout tested to over 3000 lbs. Vibration tested for your confidence.

Multi-Functional Pre-Punched Holes

Act as holes for splice plate hardware: allow for field cutting to any length, no field-drilling necessary. Holes also allow rungs to be repositioned. Holes allow for easy attachment of accessory items requiring 1/4" hardware (or smaller).

Patent Information

U.S. Patent D361982; 5,580,014
Canada 2,137,879
UK Patent 2,285,343
Other United States and foreign patents are pending.



Electrical Continuity of Connections

Redi-Rail rung to side rail resistance test results.
0.000071 ohm (max. allowable per standard 0.00033 ohm)
Tested per NEMA VE 1-1998
CSA C22.2 No. 126.1-98
For more information go to
www.cooperbline.com/pdf/Flyers/ElectricalContinuity.pdf

How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Example: (from page RR-4)	**H1**	**6AR**	**150KO**	**09**	**-**	**12**	**-**	**120**
	●	●	●	●		●		●
Lead time(days)	3-5	3-5	**5-10**	3-5		3-5		5-10

Part will typically ship in 5-10 days, because of the 150KO knockout type.

Redi-Rail - Straight Sections

H14A and H15A Straight Sections

Straight Section Part Numbering

Prefix

Example: **H1 4 A R 075KO 09 - 12 - 120**

Series
- ● H1

Height
- ● 4 = 4"
- ● 5 = 5"

Material
- Aluminum

Construction
- Redi-Rail

Knockout Type
- ● Blank = None
- ● 050KO = 1/2" KO
- ● 075KO = 3/4" KO
- ● 100KO = 1" KO

Bottom Type

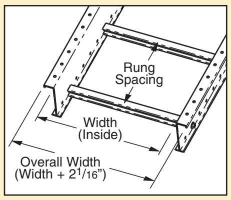
Ladder-
- ● 06 = 6" rung spacing
- ● 09 = 9" rung spacing
- ● 12 = 12" rung spacing

Trough-
- ● 04 = Vented Bottom
- ● SB = Non-Ventilated Bottom

Width
- ● 06 = 6"
- ● 09 = 9"
- ● 12 = 12"
- ● 18 = 18"
- ● 24 = 24"
- ● 30 = 30"
- ● 36 = 36"

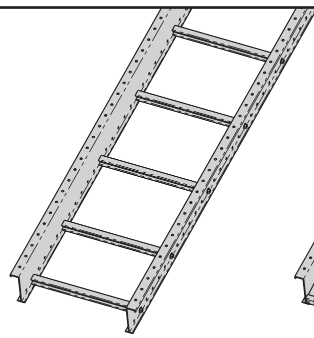
Length
- ● ①**144** = 12 ft.
- ● ②120 = 10 ft.

①Primary
②Secondary

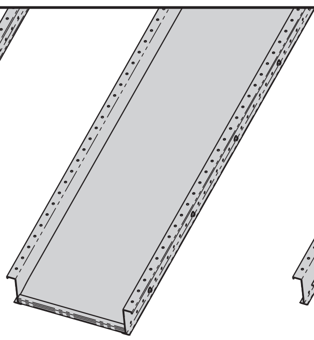


Values are based on simple beam tests per VE-1 on 36" wide cable tray with rungs spaced on 12" centers. The published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply the published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the tray. These systems will support without collapse a 200 lb. concentrated load.

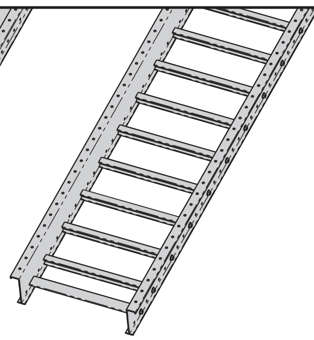
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)



Ladder Type
(Specify Rung Spacing)



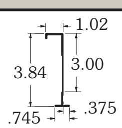
Non-Ventilated Trough

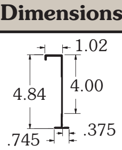


Ventilated Trough

• Splices included with straight sections

Redi-Rail with knockouts.
Available in H16A & H17A only.
(See Part Numbering Below)

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
H14A	 1.02, 3.84, 3.00, .745, .375	NEMA: 12B	6	224	0.0015	Area=0.98 in^2	1.8	333	0.025	Area=6.32 cm^2
		CSA: D1-3m	8	194	0.0047	Sx=0.93 in^3	2.4	288	0.080	Sx=15.24 cm^3
		UL Cross-Sectional	10	124	0.0110	Ix=1.97 in^4	3.0	184	0.195	Ix=82.00 cm^4
		Area: 0.60 in^2	12	86	0.0240		3.7	128	0.404	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
H15A	 1.02, 4.84, 4.00, .745, .375	NEMA: 12C	6	224	0.0015	Area=1.06 in^2	1.8	333	0.025	Area=6.84 cm^2
		CSA: D1-3m	8	224	0.0047	Sx=1.29 in^3	2.4	288	0.080	Sx=21.14 cm^3
		UL Cross-Sectional	10	147	0.0110	Ix=3.44 in^4	3.0	219	0.195	Ix=143.18 cm^4
		Area: 0.60 in^2	12	102	0.0240		3.7	152	0.404	

When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%.
Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

H16A and H17A Straight Sections

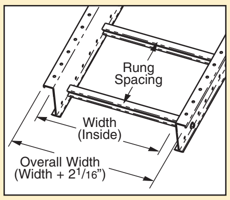
Straight Section Part Numbering

Prefix

Example: **H1 6 A R 150KO 09 - 12 - 120**

Series	Height	Material	Construction	Knockout Type	Bottom Type	Width	Length
● H1	● 6 = 6" ● 7 = 7"	Aluminum	Redi-Rail	● Blank = None ● 050KO = 1/2" KO ● 075KO = 3/4" KO ● 100KO = 1" KO ● 125KO = 1 1/4" KO ● 150KO = 1 1/2" KO	**Ladder-** ● 06 = 6" rung spacing ● 09 = 9" rung spacing ● 12 = 12" rung spacing **Trough-** ● 04 = Vented Bottom ● SB = Non-Ventilated Bottom	● 06 = 6" ● 09 = 9" ● 12 = 12" ● 18 = 18" ● 24 = 24" ● 30 = 30" ● 36 = 36"	● ①**144** = 12 ft. ● ②120 = 10 ft.

①Primary
②Secondary



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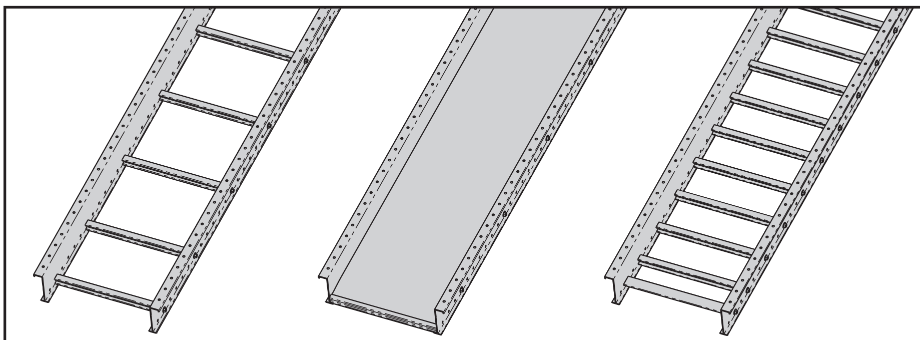
● Red = Normally long lead-time items (15 working days minimum)



Ladder Type (Specify Rung Spacing) — Non-Ventilated Trough — Ventilated Trough

• Splices included with straight sections

Redi-Rail with knockouts.
Available in H16A & H17A only.
(See Part Numbering Below)

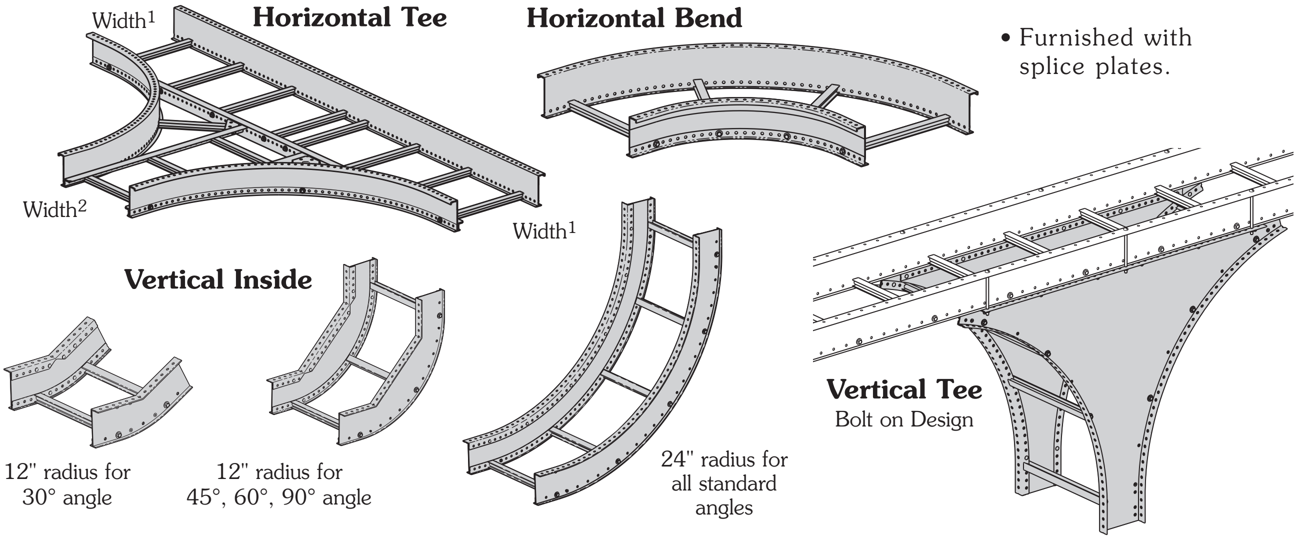
B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
H16A	1.02, 5.84, 5.00, .745, .375	NEMA: 12C	6	224	0.0015	Area=1.26 in^2	1.8	333	0.025	Area=8.13 cm^2
		CSA: D1-3m	8	224	0.0047	Sx=1.75 in^3	2.4	333	0.080	Sx=28.68 cm^3
		UL Cross-Sectional	10	164	0.0110	Ix=5.51 in^4	3.0	244	0.195	Ix=229.34 cm^4
		Area: 1.00 in^2	12	114	0.0240		3.7	170	0.404	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
H17A	1.02, 6.84, 6.00, .745, .375	NEMA: 12C	6	224	0.0015	Area=1.41 in^2	1.8	333	0.025	Area=9.10 cm^2
		CSA: D1-3m	8	224	0.0047	Sx=2.24 in^3	2.4	333	0.080	Sx=36.71 cm^3
		UL Cross-Sectional	10	144	0.0110	Ix=8.18 in^4	3.0	214	0.195	Ix=340.89 cm^4
		Area: 1.00 in^2	12	100	0.0240		3.7	149	0.404	

When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%.
Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

Redi-Rail - Fittings

Fittings For H14A, H15A, H16A and H17A



Fittings Part Numbering

Prefix / Suffix

Example: **H1 4 A R - 09 - 30 HB 12**

Series	Height	Material	Construction	Width	Angle	Type	Radius
● H1	● 4 = 4"	Aluminum	Redi-Rail	● 06 = 6"	● 30 = 30°	● HB = Horizontal Bend	● 12 = 12"
	● 5 = 5"			● 09 = 9"	● 45 = 45°	● *HT = Horizontal Tee	● 24 = 24"
	● 6 = 6"			● 12 = 12"	● 60 = 60°	● *HX = Horizontal Cross	● 36 = 36"
	● 7 = 7"			● 18 = 18"	● 90 = 90°	● VI = Vertical Inside Bend	
				● 24 = 24"		● VO = Vertical Outside Bend	
				● 30 = 30"		● VT = Vertical Tee	
				● 36 = 36"			

*Angle not required on HT & HX

Horizontal Reducing / Expanding Tee or Cross Fittings Part Numbering

Prefix / Suffix

Example: **H1 4 A R - 09 - 12 - HT 12**

Series	Height	Material	Construction	Width¹	Width²	Type	Radius
● H1	● 4 = 4"	Aluminum	Redi-Rail	06 = 6"	06 = 6"	● HT = Horizontal Tee	● 12 = 12"
	● 5 = 5"			09 = 9"	09 = 9"	● HX = Horizontal Cross	● 24 = 24"
	● 6 = 6"			12 = 12"	12 = 12"		● 36 = 36"
	● 7 = 7"			18 = 18"	18 = 18"		
				24 = 24"	24 = 24"		
				30 = 30"	30 = 30"		
				36 = 36"	36 = 36"		

For aluminum 4", 5", 6", 7" vented or non-ventilated bottom add 04 or SB as shown below.

Prefix
H15AR04 - 24 - 90HB24
Vented Bottom

Prefix
H15ARSB - 24 - 90HB24
Non-Ventilated Bottom

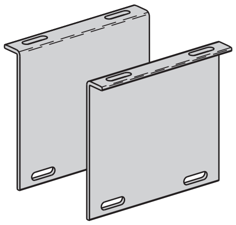
For stainless steel rung attachment hardware on all aluminum straight sections and fittings add SS as shown below.

Prefix
H15AR04 - 24 - 90HB24SS
Stainless Steel

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Standard Splice Plates

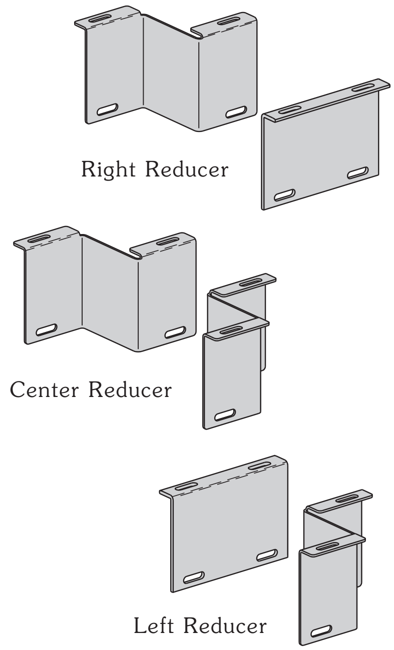
- Furnished in pairs with 1/4" hardware.
- UL Classified.



Tray Series	Catalog No.
H14A	● 9A-R004
H15A	● 9A-R005
H16A	● 9A-R006
H17A	● 9A-R007

Offset Reducing Splice Plates

- Furnished in pairs with 1/4" hardware.
- UL Classified.



Right Reducer

Center Reducer

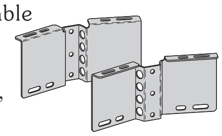
Left Reducer

Tray Series	Catalog No.
H14A	● 9A-R064-†r
H15A	● 9A-R065-†r
H16A	● 9A-R066-†r
H17A	● 9A-R067-†r

r = reduction
† Specify L = left reducer
C = center reducer
R = right reducer

Flex-Mount Adjustable Splice Plates

- Furnished in pairs with 1/4" hardware.
- Horizontally adjustable to 90°.
- Vertically adjustable to 15°.
- UL Classified.
- For optional rung, see page RR-13.

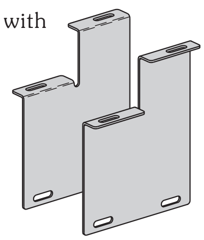


Requires supports within 24" on both sides, per NEMA VE 2.

Tray Series	Catalog No.
H14A	● 9A-R034
H15A	● 9A-R035
H16A	● 9A-R036
H17A	● 9A-R037

Step Down Splice Plates

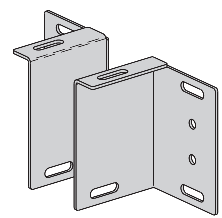
- Furnished in pairs with 1/4" hardware.
- UL Classified.



Tray Series	Catalog No.
H15A to H14A	● 9A-R045
H16A to H14A	● 9A-R046
H17A to H14A	● 9A-R047
H16A to H15A	● 9A-R060
H17A to H15A	● 9A-R061
H17A to H16A	● 9A-R062

Tray To Box Splice Plates

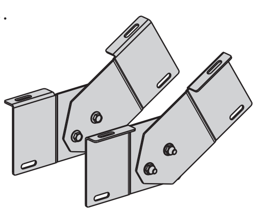
- Furnished in pairs with 1/4" hardware.
- UL Classified.



Tray Series	Catalog No.
H14A	● 9A-R054
H15A	● 9A-R055
H16A	● 9A-R056
H17A	● 9A-R057

Vertical Adjustable Splice Plates

- Furnished in pairs with 1/4" hardware.
- UL Classified.

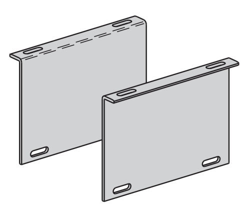


Requires supports within 24" on both sides, per NEMA VE 2.

Tray Series	Catalog No.
H14A	● 9A-R024
H15A	● 9A-R025
H16A	● 9A-R026
H17A	● 9A-R027

Expansion Splice Plates

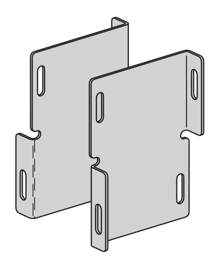
- Furnished in pairs with 1/4" hardware.
- Bonding jumper required.



Tray Series	Catalog No.
H14A	● 9A-R014
H15A	● 9A-R015
H16A	● 9A-R016
H17A	● 9A-R017

Reversing Splice Plates

- Furnished in pairs with 1/4" hardware.
- UL Classified.



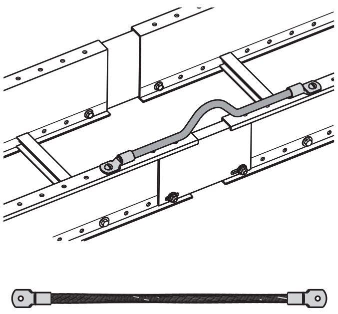
Tray Series	Catalog No.
H14A	● 9A-R964
H15A	● 9A-R965
H16A	● 9A-R966
H17A	● 9A-R967

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Redi-Rail - Accessories

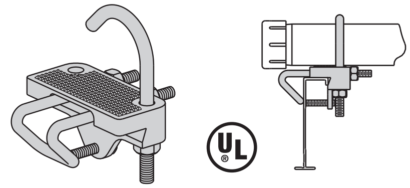
Bonding Jumper

- Furnished with 1/4" hardware.
- UL Classified.



Ampacity	Catalog No.
1200	● 99-30

Conduit to Tray Adaptors



Conduit Size in	Conduit Size mm	Catalog No.
1/2, 3/4	15, 20	● 9G-1158-1/2, 3/4
1, 1 1/4	25, 32	● 9G-1158-1, 1 1/4
1 1/2, 2	40, 50	● 9G-1158-1 1/2, 2
2 1/2, 3	65, 80	● 9G-1158-2 1/2, 3
3 1/2, 4	90, 100	● 9G-1158-3 1/2, 4

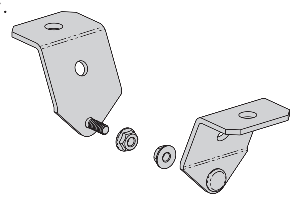
Conduit to Tray Adaptors

- Mounting hardware <u>not</u> included.

Conduit Size	Catalog No.
1/2	● BL1400
3/4	● BL1410
1	● BL1420
1 1/2	● BL1430

Hanger Rod Bracket

- Furnished as pair of studded clamps with 1/4" serrated flanged lock nuts.
- Loading is 1,000 lbs. (4.45kN) per pair with safety factor of 3.
- Position ATR 3" (76mm) wider than cable tray.

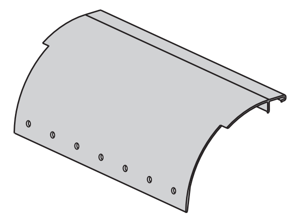


Support ATR Size	Catalog No.
3/8"	● 9(*)-R238
1/2"	● 9(*)-R250

(*) Insert ZN or SS

Drop-Out

- Provides 4" (101mm) radius.
- Holes provided to secure cables.

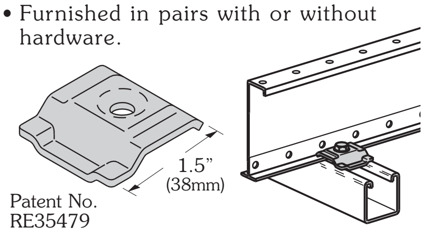


Catalog No.	● 9A-R104-†

† = tray width

Redi-Rail™ Clamp/Guide

- Features a no-twist design.
- Has four times the strength of the traditional design.
- Each side is labeled to ensure proper installation.
- Designed for 1/4" hardware.
- Furnished in pairs with or without hardware.

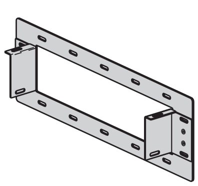


Patent No.
RE35479

Catalog No.
● **9ZN-1204** (without hardware)
● **9ZN-1204NB** (with hardware)

Frame Type Box Connector

- Furnished with 1/4" hardware for tray connection.

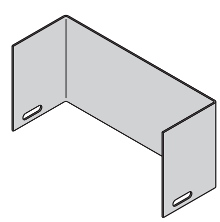


Tray Series	Catalog No.
H14A	● 9A-R074-†
H15A	● 9A-R075-†
H16A	● 9A-R076-†
H17A	● 9A-R077-†

† = tray width

Blind End

- Furnished as one plate with 1/4" hardware.

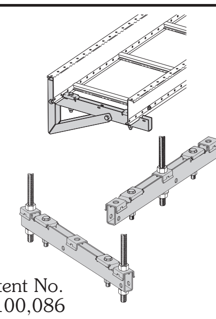


Tray Series	Catalog No.
H14A	● 9A-R084-†
H15A	● 9A-R085-†
H16A	● 9A-R086-†
H17A	● 9A-R087-†

† = tray width

Support Bracket

- Designed for center hung or trapeze supports.
- Load capacity is 600 lbs. (2.67kN) with safety factor of 3.
- All components are zinc plated.



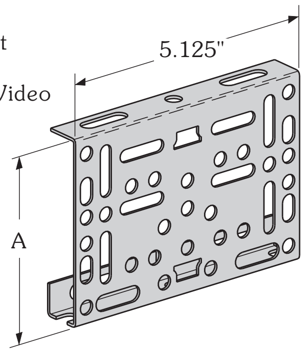
Patent No.
5,100,086

Catalog No. Center Hung or Trapeze	Catalog No. Wall Mount	For Tray Width in	For Tray Width mm
● 9ZN-5106	● 9ZN-5106-WB	6	152
● 9ZN-5109	● 9ZN-5109-WB	9	226
● 9ZN-5112	● 9ZN-5112-WB	12	305
● 9ZN-5118	● 9ZN-5118-WB	18	452
● 9ZN-5124	● 9ZN-5124-WB	24	609

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Mounting Bracket

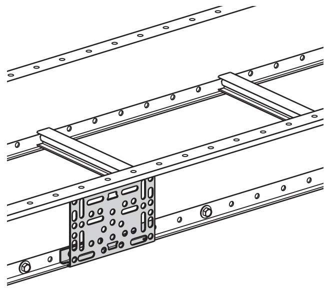
- Furnished with $1/4$" hardware.
- #12-24 U-Nuts sold separately.
- Attaches to Redi-Rail in over 20 positions.
- EIA/TIA panel mounting holes - both sides.
- Mounting holes for NEMA outlet/junction boxes.
- Zinc plated steel.
- Includes mounting screws.
- Inside flange application bracket must match side rail height.
- See page 113 for Voice/Data/Video and Power Options.



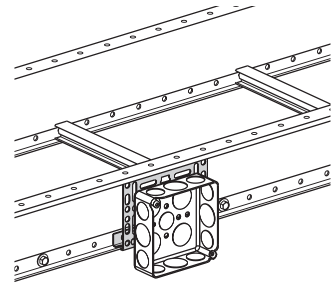
Catalog No.	Inside Flange Application	Outside Flange Application	A in	A mm
● **9ZN-MB1-4**	4" for H14AR	4" or 5" as desired	$3^5/8$	92
● **9ZN-MB1-5**	5" for H15AR	4" or 5" as desired	$4^5/8$	117

See www.cooperbline.com/product/cabletray/bracket.asp for mounting options.

Inside Side Rail Flange Application

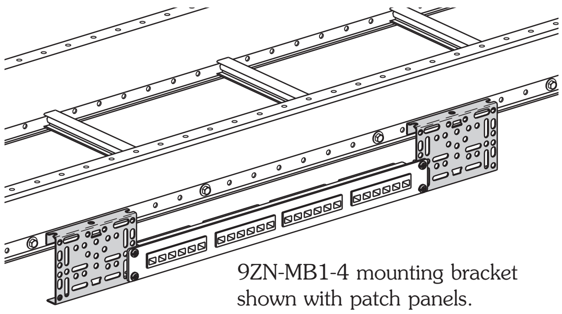


9ZN-MB1-4 mounting bracket shown.



9ZN-MB1-4 mounting bracket shown with 4" electrical box.

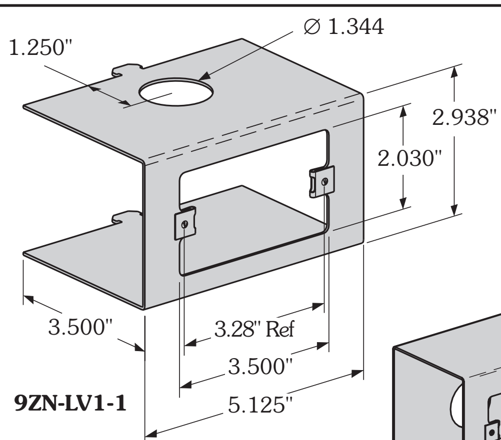
Outside Side Rail Flange Application



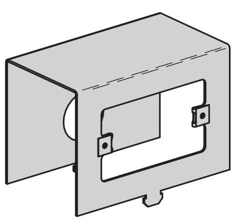
9ZN-MB1-4 mounting bracket shown with patch panels.

Low Voltage Adapter

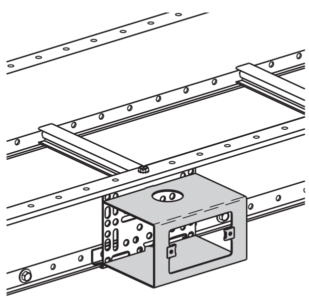
- Mounting for low voltage wall plates.
- Snaps into mounting bracket 9ZN-MB1-4 or 9ZN-MB1-5.
- Zinc plated steel.
- #6 - 32 U-nuts included.
- See page 113 for Voice/Data/Video and Power Options.



9ZN-LV1-1



9ZN-LV1A-1



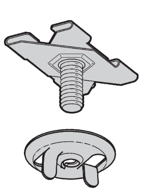
9ZN-LV1-1 shown

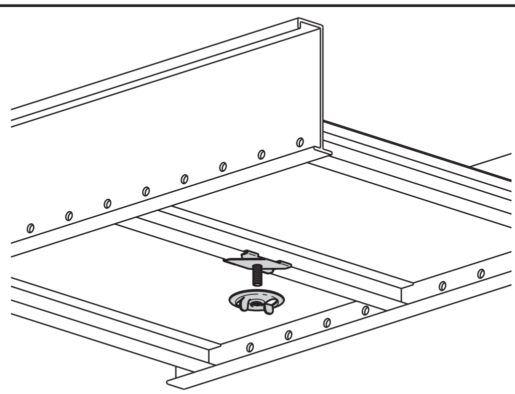
Catalog No.
● **9ZN-LV1-1** (cutout on front)
● **9ZN-LV1A-1** (cutout on bottom)

Under Rung Fastener Attachment

- Supports electrical fixtures from bottom of rung or siderails.
- Wing nut included.
- Various $1/4$"-20 stud lengths available.
- Static Load Capacity: 75 Lbs. (34kg).

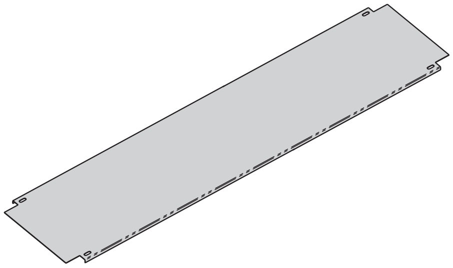
Catalog No.	Stud Length
● **BAX-4-16**	$5/8$" (16mm)
● **BAX-4-16-24**	$1^1/2$" (38mm)
● **BAX-4-16-32**	2" (51mm)
● **BAX-4-16-48**	3" (76mm)





● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Redi-Rail - Accessories



Covers for H14A, H15A, H16A, and H17A

- Corners notched for splice hardware clearance.
- Slots provided for easy attachment (hardware **not** included).
- Over-lap seam designed - fittings only.

Aluminum Cover Part Numbering

Prefix

Example: **88 7 A 40 - 12 - 72**

Cover Type	Detail	Material	Material Thickness	Tray Width	Item Description
● 88 = Solid	● 7 = Flanged	● Aluminum	● 40 = .040	● 06 = 6" ● 09 = 9" ● 12 = 12" ● 18 = 18" ● 24 = 24" ● 30 = 30" ● 36 = 36"	For Straight Section Cover: ● 144 = 12 ft. ● 120 = 10 ft. ● 72 = 6 ft. ● 60 = 5 ft. For fitting covers: Insert suffix of fitting to be covered. See example below.

Note: For ventilated covers add a "V" suffix to cover part number.
Example: 887A40-12-72V

Examples of Catalog Numbers for Fitting Covers:

Horizontal Bend Cover

Prefix / Suffix

88 7 A 40 - 18 - 90 HB 24

- Radius
- Fitting
- Angle
- Width
- Material Thickness
- Material
- Detail
- Cover Type

Vertical Inside & Outside Bend Cover

Prefix / Suffix

88 7 A 40 - 24 - 90 V* 24 - 4

- Side Rail Height
- Radius
- Fitting
- Angle
- Width
- Material Thickness
- Material
- Detail
- Cover Type

* Insert I for Inside or O for Outside Bend

Horizontal Expanding Cross Cover

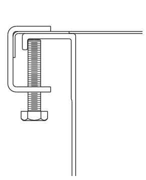
Prefix / Suffix

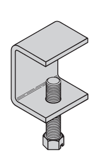
88 7 A 40 - 12 - 24 - HX 24

- Radius
- Fitting
- Width²
- Width¹
- Material Thickness
- Material
- Detail
- Cover Type

Standard Cover Clamp

- Setscrew included.
- Sold each.

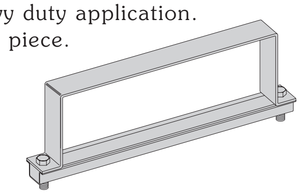




Tray Type	Side Rail Height	Catalog No.
Aluminum	All Sizes	● 9ZN-9012
		● 9A-9012

Heavy Duty Cover Clamp

- For heavy duty application.
- Sold per piece.

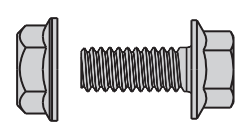


Tray Series	Catalog No.
H14A	● 9A-†-R044
H15A	● 9A-†-R054
H16A	● 9A-†-R064
H17A	● 9A-†-R074

† = tray width

Cover Attachment Hardware

- 4 Pack of 1/4" - 20 nuts and 1/4" - 20 x 5/8" bolts.

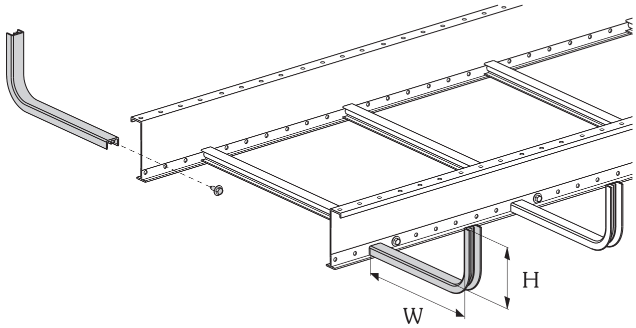


Catalog No.	● 9ZN-1420NB

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Out Board Rungs

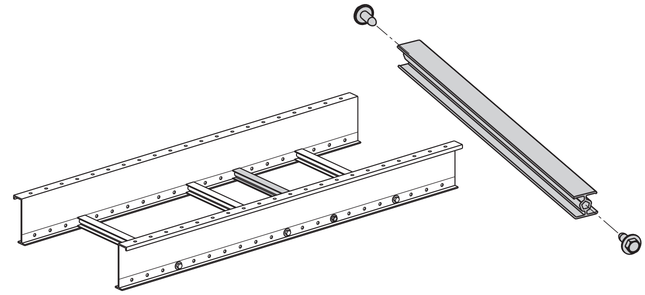
- Formed aluminum rung with attachment screw.
- Field installs as required.
- Torque rung fasteners to 6 ft/lbs.
- See page 113 for Voice/Data/Video and Power Options.
- Uniform load capacity on rung: 10 lbs.



Catalog No.	Fill Depth 'H' in	Fill Depth 'H' mm	For Tray Width 'W' in	For Tray Width 'W' mm
● 9A-SR0406	4	101	6	152
● 9A-SR0409	4	101	9	226
● 9A-SR0506	5	127	6	152
● 9A-SR0509	5	127	9	226

Add-A- Rung Kit

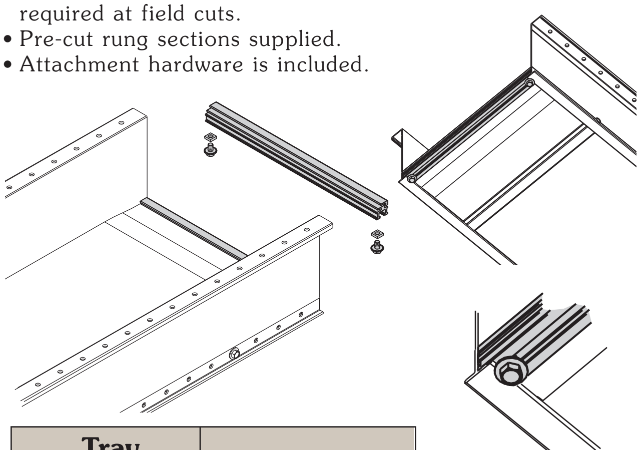
- Kit allows an additional rung to be added to a desired location throughout the tray system.
- Pre-cut rung sections supplied.
- Attachment hardware is included.
- Torque rung fasteners to 18 ft/lbs.



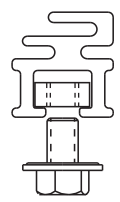
Tray Width in	Tray Width mm	Catalog No.
6	152	● 9A-R06RK
9	226	● 9A-R09RK
12	305	● 9A-R12RK
18	452	● 9A-R18RK
24	609	● 9A-R24RK
30	762	● 9A-R30RK
36	914	● 9A-R36RK

End Rung Kit For Solid Bottom

- Special rung captures solid bottom plate when required at field cuts.
- Pre-cut rung sections supplied.
- Attachment hardware is included.



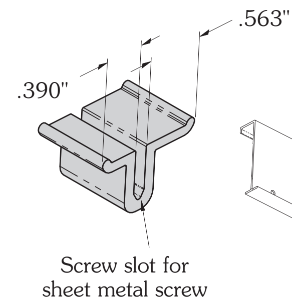
Tray Width in	Tray Width mm	Catalog No.
6	152	● 9A-R06SBERK
9	226	● 9A-R09SBERK
12	305	● 9A-R12SBERK
18	452	● 9A-R18SBERK
24	609	● 9A-R24SBERK
30	762	● 9A-R30SBERK
36	914	● 9A-R36SBERK

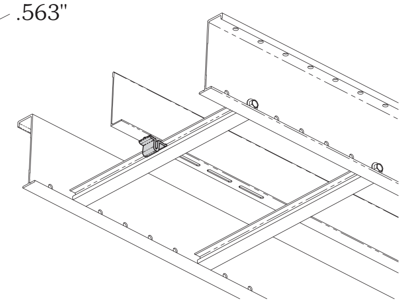


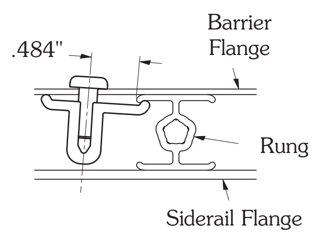
Barrier Strip Clip

- Provides attachment to Redi-Rail rung.
- Allows for installed barrier adjustment.
- Asymmetrical clip provides a wide range for screw location.
- Barriers strip clips and hardware are included with all barriers.

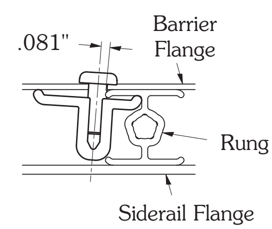
Catalog No.	● 9A-RBC







Maximum Distance
Long leg adjacent to rung fully extended



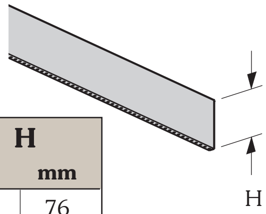
Minimum Distance
Short leg adjacent to rung fully extended

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Redi-Rail - Accessories

Straight Section Barrier Strip

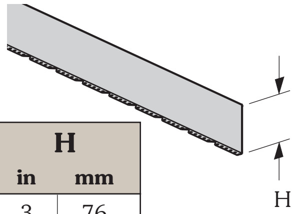
- Furnished with four (4) barrier strip clips, mounting hardware and splice.
- Standard lengths are 144" (12 ft) & 120" (10 ft).



Tray Series	Catalog No.	H in	H mm
H14A	● 73AR-Length	3	76
H15A	● 74AR-Length	4	101
H16A	● 75AR-Length	5	127
H17A	● 76AR-Length	6	152

Horizontal Bend Barrier Strip

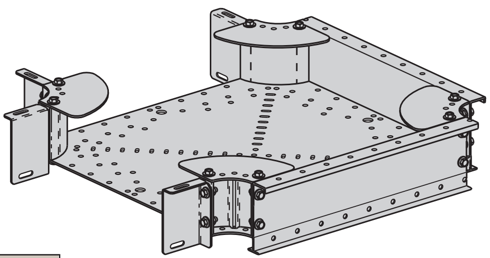
- Kit allows an additional rung to be added to a desired location throughout the tray system.
- Pre-cut rung sections supplied.
- Attachment hardware is included.
- Torque rung fasteners to 18 ft/lbs.



Tray Series	Catalog No.	H in	H mm
H14A	● 73AR-90HBFL	3	76
H15A	● 74AR-90HBFL	4	101
H16A	● 75AR-90HBFL	5	127
H17A	● 76AR-90HBFL	6	152

Universal Fitting

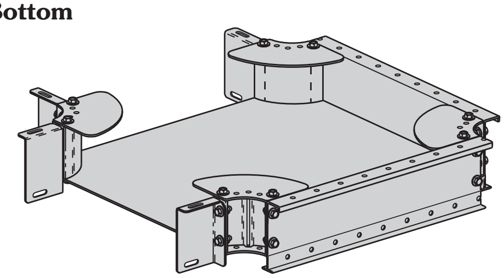
- Aluminum construction.
- 3" smooth radius.
- UL Classified.
- Shipped as a 90° horizontal bend.
- Field modify to create a tee or cross.
- Includes four pairs of splice plates.
- Accommodates Rail-Riser™.
- Patent Pending.



Punched Bottom

Tray Width	Catalog No. Punched	Catalog No. Solid
6"	● UR(*)A-06	● UR(*)ASB-06
9"	● UR(*)A-09	● UR(*)ASB-09
12"	● UR(*)A-12	● UR(*)ASB-12
18"	● UR(*)A-18	● UR(*)ASB-18
24"	● UR(*)A-24	● UR(*)ASB-24

(*) Insert 3", 4", 5", 6" for load depth (ie UR3A-06 to use on a 4" cable tray)



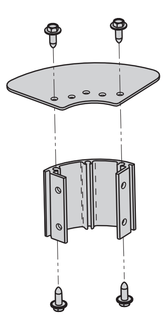
Solid Bottom

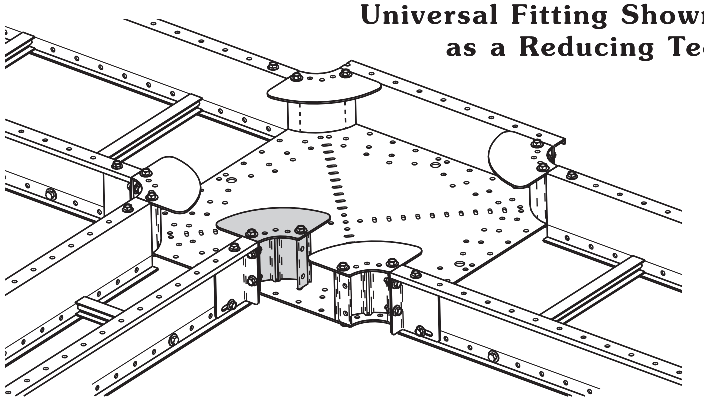
Covers: Cover catalog number is UA-†-C where †=tray width.
Example: UA-12-C is a cover for UR4A-12 universal fitting shipped with attachment screws.

Corner Post For Universal Fitting

- Use to create reducing fittings.
- Furnished with hardware.
- 3" inside radius.
- UL Classified.

Universal Fitting Shown as a Reducing Tee



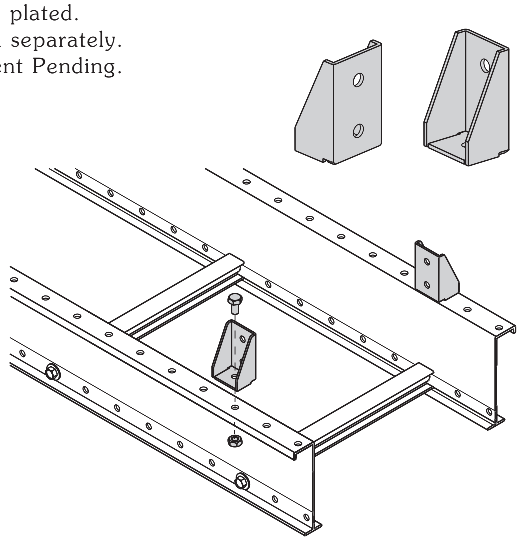


Loading Depth	Catalog No.
3"	● U3A-CP
4"	● U4A-CP
5"	● U5A-CP
6"	● U6A-CP

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Rail-Riser™ For Redi-Rail™ Cable Support Systems

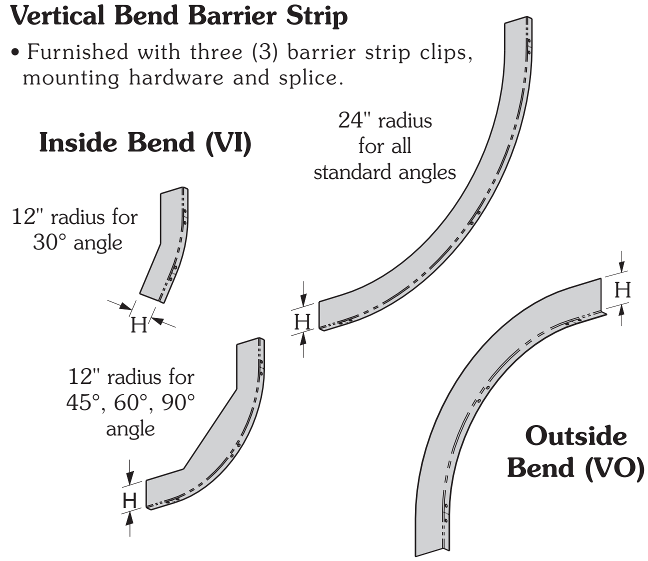
- Provides expansion capabilities for existing systems where additional cable fill area is required.
- Increases fill-depth by two inches.
- Recommended installation frequency: two required every three feet, depending on cable density.
- Provides controlled cable exit locations.
- Does not interfere with cable fill area.
- Comes complete with necessary mounting hardware.
- Zinc plated.
- Sold separately.
- Patent Pending.



Catalog No.	● 9ZN-RR2RR

Vertical Bend Barrier Strip

- Furnished with three (3) barrier strip clips, mounting hardware and splice.



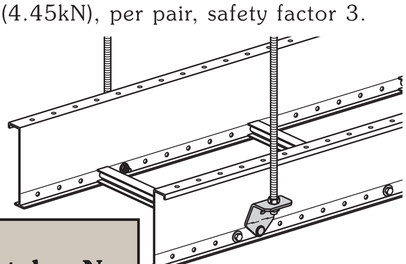
Tray Series	Catalog No. Inside Bend	Catalog No. Outside Bend	H in	H mm
H14A	● 73AR-(**)VI(†)	● 73AR-(**)VO(†)	3	76
H15A	● 74AR-(**)VI(†)	● 74AR-(**)VO(†)	4	101
H16A	● 75AR-(**)VI(†)	● 75AR-(**)VO(†)	5	127
H17A	● 76AR-(**)VI(†)	● 76AR-(**)VO(†)	6	152

(**) Insert 30°, 45°, 60°, 90° for angles
(†) Insert 12, 24 for radius

Hanger Rod Bracket

- Studded bracket bolts to Redi-Rail™ holes.
- For 3/8" ATR.
- Loading is 1,000 lbs. (4.45kN), per pair, safety factor 3.

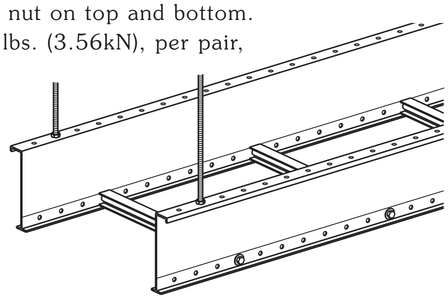
- Position ATR 3" wider than cable tray width.



Support ATR Size	Catalog No.
3/8"	● 9(*)-R238
1/2"	● 9(*)-R250

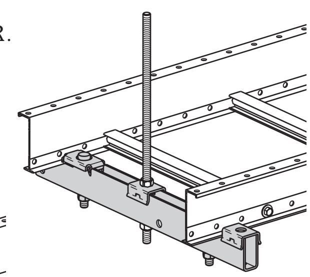
(*) Insert ZN or SS

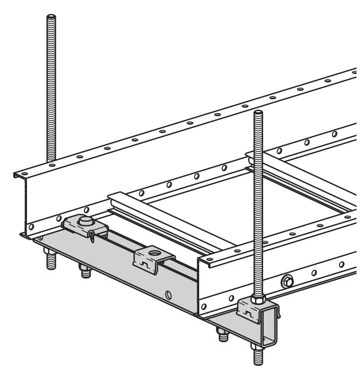
- 1/4" ATR through Redi-Rail™ holes on top flange. Hex nut on top and bottom.
- Loading is 800 lbs. (3.56kN), per pair, safety factor 3.



Center Hung Trapeze

- Designed for 1/2" and 3/8" ATR.
- Loading is 600 lbs. (2.67kN), safety factor 3.
- Zinc plated.





Pre-assembled hanger system that can be used as a trapeze or a center hung support.

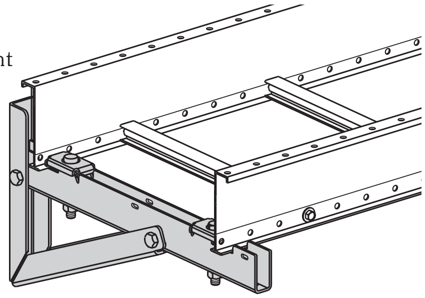
Catalog No.	For Tray Width in	For Tray Width mm
● 9ZN-5106	6	152
● 9ZN-5109	9	226
● 9ZN-5112	12	305
● 9ZN-5118	18	452
● 9ZN-5124	24	609

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Redi-Rail - Accessories

Wall-Mount Assembly

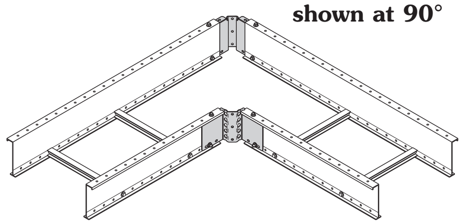
- Pre-assembled wall-mount hanger system.

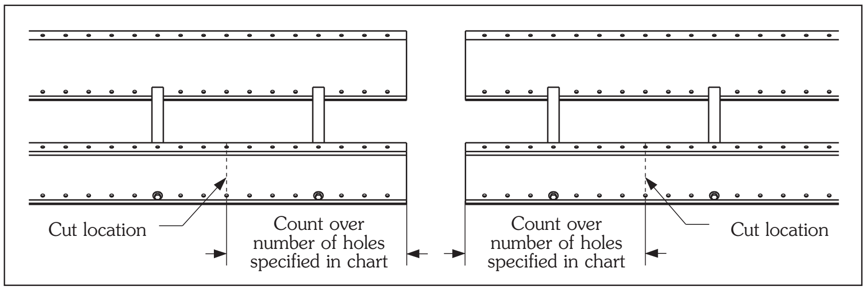


Catalog No.	For Tray Width in	For Tray Width mm
● 9ZN-5106-WB	6	152
● 9ZN-5109-WB	9	226
● 9ZN-5112-WB	12	305
● 9ZN-5118-WB	18	452
● 9ZN-5124-WB	24	609

How to miter cut Redi-Rail™ cable tray for use with flex-mount splice plates.

H15AR09-12-144
shown at 90°





H15AR09-12-144 Straight Section shown with required side rail removed to form 90° fitting.

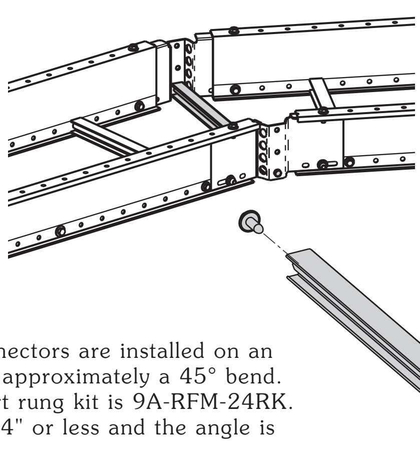
Example: For a 12" wide 90° bend, the cuts must be made through the eighth hole from the end.

- Mark desired hole/cut locations per chart.
- Remove any rungs (if necessary) affected by cuts.
- Cut side rails through center of required holes per chart.
- Mount outside flex-mount splice plate with provided hardware and bend Redi-Rail sections to desired angle.
- Form inside flex-mount splice plate to fit contour of inner rails and bolt into place.
- Reinstall (if necessary) appropriate rungs. Torque to 18 ft./lbs.
- If Splice Rung Kit (see below) is required, order separately.
- Recommend adding one to the value in the chart if the first hole is less than 3/8" from the end of tray.

Tray Width	Number Of Holes For Desired Angle 30°	45°	60°	90°	Angle Adjustment Allowed
6	1	2	2	4	± 14.5
9	2	2	3	6	± 9.7
12	2	3	4	8	± 7.3
18	3	5	7	11	± 4.9
24	4	6	9	15	± 3.6
30	5	8	11	19	± 2.9
36	6	10	13	23	± 2.4

Flex-Mount Splice Rung Kit

- Kit allows a support rung to be added to flex-mount splice plates so that cables may be supported through a bend.
- The support rung is available in three lengths and should be ordered based upon tray width.
- The rung length is sized so that it will fit a maximum tray width when flex-mount splices are used to make a bend up to 90°.
- Once the flex-mount splices are installed in the cable tray system, the distance between the splice mounting surfaces should be measured. Cut support rung to the measured distance and install using the hardware included. Torque to 18 ft./lbs.

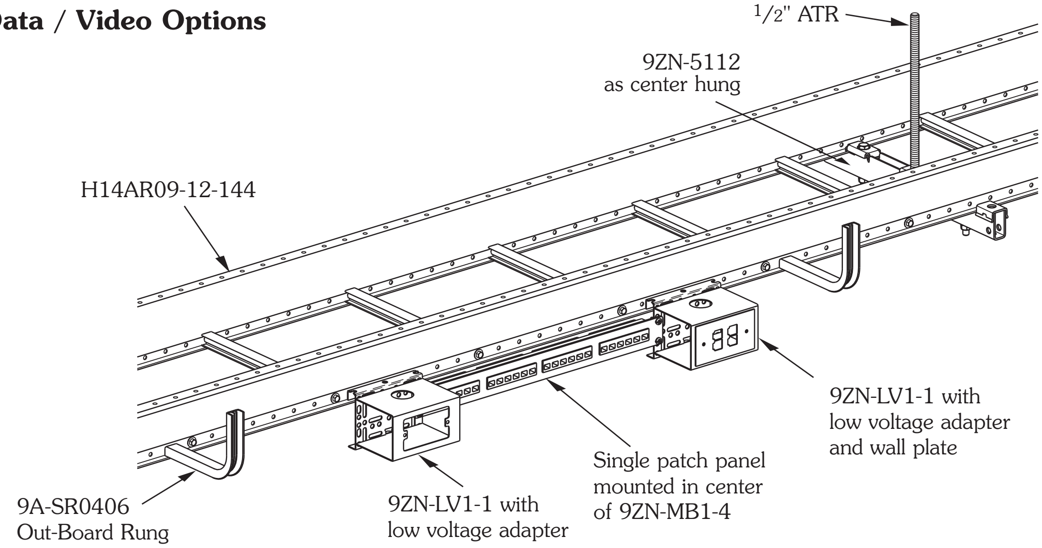


For Tray Width	Catalog No.	Actual Rung Length
Up to 12"	● 9A-RFM-12RK	20"
18" & 24"	● 9A-RFM-24RK	37"
30" & 36"	● 9A-RFM-36RK	54"

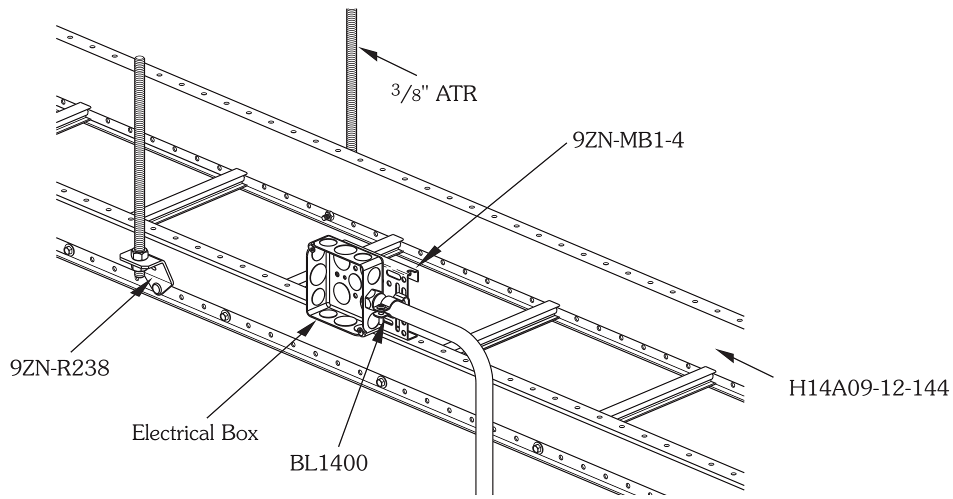
Example: Flex connectors are installed on an 18" wide tray with approximately a 45° bend. The correct support rung kit is 9A-RFM-24RK. The tray width is 24" or less and the angle is less than 90°.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Voice / Data / Video Options



Power Options



Data Cables

The National Electrical Code allows for 50% fill of ventilated cable tray for control or signal wiring (Article 392-9(b)). This rule requires that all the individual cable cross-sectional areas added up may not exceed one half the cable tray area. The cable tray area is equal to the width times the load depth.

In actual practice with data cables, however, the cable tray becomes completely full in reaching the "50% cable fill". See the picture below. The tray is completely full, but the sum of the cable areas is only 50% of the tray area, due to the empty spaces between the cables.

Data Cable Fill and Weight Chart

Number of Category 5/5e/6 Cables and Calculated Cable Weight in Lbs/Ft

"50%" Fill Per NEC Cross Sectional Area Calculation

Tray Depth		Tray Width													
in	mm	6"		9"		12"		18"		24"		30"		36"	
		Cables	lbs/ft	Cables	lbs/ft	Cables	lbs/ft	Cables	lbs/ft	Cables	lbs/ft	Cables	lbs/ft	Cables	lbs/ft
3”	76	260	7	390	10	520	14	780	21	1040	26	1299	32	1559	41
4”	101	347	9	520	13	693	18	1040	27	1386	35	1733	43	2079	54
5”	127	433	12	650	17	866	23	1299	34	1733	43	2166	53	2599	68
6”	152	520	14	780	20	1040	27	1559	41	2079	52	2599	64	3119	81

This chart was based on 50% fill of 4 UTP Category 5, 5e, or 6 cables (O.D. = .21" .026 lbs/ft).
In the above loading grid, the weight of the cables is not the issue. The volume capacity of the tray governs.
For example, the worst case (6" load depth, 36" wide) has a total cable weight of 81 lbs/ft.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Redi-Rail - Specifications

Section 161xx - Redi-Rail™ Cable Tray

Part 1 - General

1.01 Section Includes

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, tests and services to install complete cable tray systems as shown on the drawings.

B. Cable tray systems are defined to include, but are not limited to straight sections of [ladder type] [vented bottom type] [solid bottom type] cable trays, bends, tees, elbows, drop-outs, supports and accessories.

1.02 References

A. ANSI/NFPA 70 - National Electrical Code

B. NEMA VE 1-1998 - Metallic Cable Tray Systems

C. NEMA VE 2-2000 - Cable Tray installation Guidelines

1.03 Drawings

A. The drawings, which constitute a part of these specifications, indicate the general route of the cable tray systems. Data presented on these drawings are as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification, of all dimensions, routing, etc., is directed.

B. Specifications and drawings are for assistance and guidance, but exact routing, locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings.

1.04 Submittals

A. Submittal Drawings: Submit drawings of cable tray and accessories including clamps, brackets, hanger rods, splice plate connectors, expansion joint assemblies, and fittings, showing accurately scaled components.

B. Product Data: Submit manufacturer's data on cable tray including, but not limited to, types, materials, finishes, rung spacings, inside depths and fitting radii. For side rails and rungs, submit cross sectional properties including Section Modulus (Sx) and Moment of Inertia (Ix).

1.05 Quality Assurance

A. Manufacturers: Firms regularly engaged in manufacture of cable trays and fittings of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. NEMA Compliance: Comply with NEMA Standards Publication Number VE 1, “Cable Tray Systems”.

C. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable tray and cable channel systems (Article 392, NEC).

D. UL Compliance: Provide products that are UL-classified and labeled.

E. NFPA Compliance: Comply with NFPA 70B, “Recommended Practice for Electrical Equipment Maintenance” pertaining to installation of cable tray systems.

1.06 Delivery, Storage and Handling

A. Deliver cable tray systems and components carefully to avoid breakage, denting and scoring finishes. Do not install damaged equipment.

B. Store cable trays and accessories in original cartons and in clean dry space; protect from weather and construction traffic. Wet materials should be unpacked and dried before storage.

Part 2 - Products

2.01 Acceptable Manufacturers

A. Subject to compliance with these specifications, cable tray systems shall be as manufactured by Cooper B-Line, Inc.

2.02 Cable Tray Sections and Components

A. General: Except as otherwise indicated, provide metal cable trays, of types, classes, and sizes indicated; with splice plates, bolts, nuts and washers or connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features. Cable tray shall be installed according to the latest revision of NEMA VE-2.

B. Material and Finish: Straight sections, fitting side rails, rungs and splice plates shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052.

2.03 Type of Tray System

A. Ladder Cable Trays shall consist of two longitudinal members (side rails) with transverse members (rungs) mechanically fastened to the side rails. Rungs shall be spaces [6] [9] [12] inches on center. Rung spacing in radiused fittings shall be industry standard 9" and measured at the center of the tray's width. Each rung must be capable of supporting 1 200 lb. concentrated load at the center of a 24" wide cable tray with a safety factor of 1.5 (See following rung loading table). Rungs shall be capable of easy removal, reinstallation, or replacement if necessary.

Rung Loading Table

Design Factors	Material Type	Single Rung Uniform Load Capacity (lbs.) with safety factor of 1.5						
		Tray Width						
		6	9	12	18	24	30	36
$I_x = 0.0130\ in^4$ $S_x = 0.0343\ in^3$	Aluminum Series H1	1480	987	740	493	370	296	224

B. Ventilated Bottom Cable Trays shall consist of two longitudinal members (side rails) with rungs spaced 4" on center.

C. Solid Bottom Cable Trays shall consist of two longitudinal members (side rails) with a solid sheet over rungs spaced on 12" centers.

D. Cable tray loading depth shall be [3] [4] [5] [6] inched per NEMA VE-1.

E. Straight sections shall be supplied in standard [10 foot (3.05m)] [12 foot (3.65m)] lengths.

F. Cable tray widths shall be [6] [9] [12] [18] [24] [30] [36] inches or as shown on drawings.

G. Splice plates shall have (4) four nuts and bolts per plate. The resistance of fixed splice connections between adjacent sections of tray shall not exceed 0.00033 ohms. Splice plates shall be furnished with straight sections and fittings.

H. All fittings must have a minimum radius of [12] [24] [36] inches.

2.04 Loading Capacities

A. Cable trays shall meet NEMA class designation: [86 lbs./ft. on 12 ft. span] [100 lbs./ft. on 12 ft. span].

Or

A. Cable tray shall be capable of carrying a uniformly distributed load of ________ lbs./ft on a ______ foot support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1 Section 5.2.

Part 3 - Execution

3.01 Installation

A. Install cable trays as indicated: Installation shall be in accordance with equipment manufacturer's instructions, and with recognized industry practices to ensure that cable tray equipment comply with requirements of NEC and applicable portions of NFPA 70B. Reference NEMA VE-2 for general cable tray installation guidelines.

B. Coordinate cable tray with other electrical work as necessary to properly integrate installation of cable tray work with other work.

C. Provide sufficient space encompassing cable trays to permit access for installing and maintaining cables.

D. Cable tray fitting supports shall be located such that they meet the strength requirements of straight sections. Install fitting supports per NEMA VE-2 guidelines, or in accordance with manufacturer's instructions.

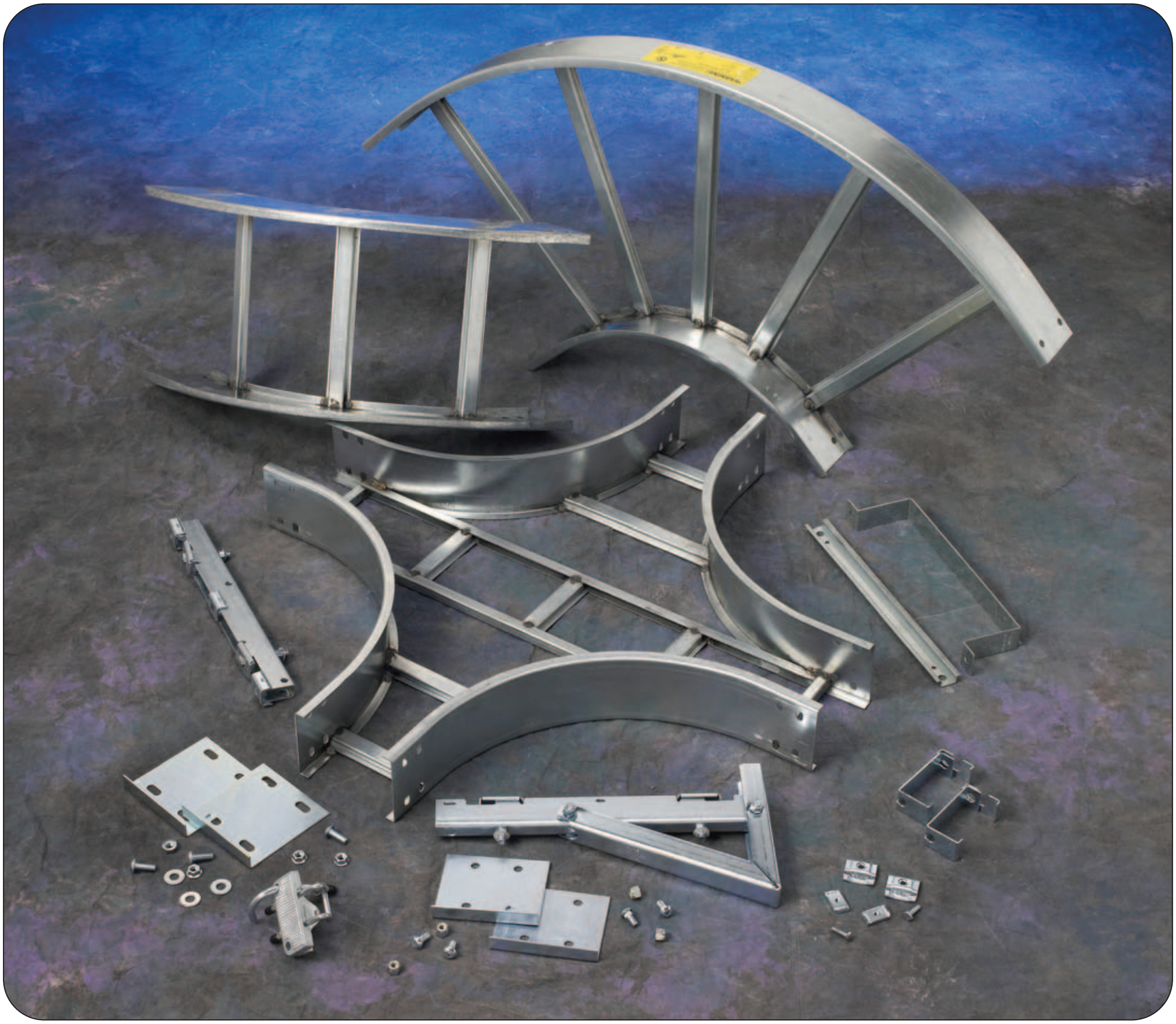
3.02 Testing

A. Test cable trays to ensure electrical continuity of bonding and grounding connections, and to demonstrate compliance with specified maximum grounding resistance. See NFPA 70B, Chapter 18, for testing and test methods.

B. Manufacturer shall provide test reports witnessed by an independent testing laboratory of the "worst case" loading conditions outlined in this specification and performed in accordance with the latest revision of NEMA VE-1-2002/CSA C22.2 No. 126.1-02.

End Of Section.

Series 1 Steel



How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Example: (from page LST-4)	**156G** ●	**09** ●	-	**24** ●	-	**144** ●
Lead time(days)	15	3-5		3-5		3-5

Part will typically ship in 15 days minimum, because of the 156G material.

Changing the part number from 156G to 156P will change the coding to black for all sections of the tray to be 5-10 working days, instead of the original 15 days minimum.

3" NEMA VE 1 Loading Depth

Actual Loading Depth = 3.077"

Straight Section Part Numbering

Prefix

Example: **148 P 09 - 24 - 144**

Series

148

Material

● **P** = Pre-Galvanized Steel

● **G** = Hot Dip Galvanized After Fabrication Steel

Type

Ladder-

● **06** = 6" rung spacing

● **09** = 9" rung spacing

● **12** = 12" rung spacing

Trough-

6" thru 24" wide

● **VT** = Vented Trough

● **ST** = Non-Ventilated Trough

Width

● **06** = 6"

● **09** = 9"

● **12** = 12"

● **18** = 18"

● **24** = 24"

● **30** = 30"

● **36** = 36"

Length

● ① **144** = 12 ft.

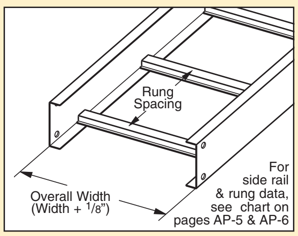
● ② 120 = 10 ft.

148

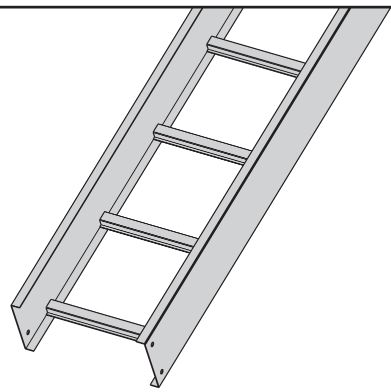
①Primary Length.

②Secondary Length.

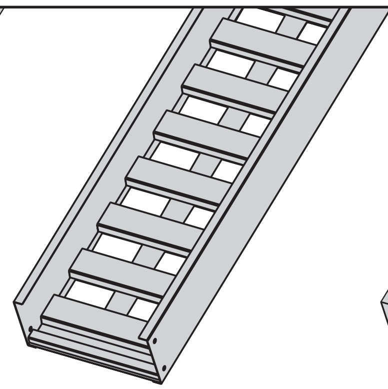
See page CTS-23 for explanation of lengths.



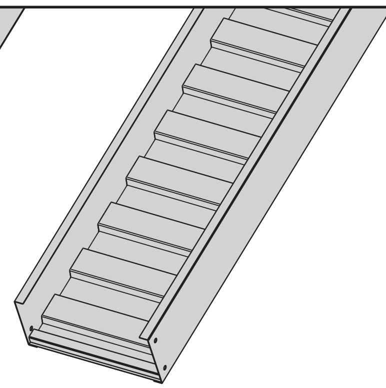
See page AP-1 for additional rung options. *SB available for all widths.



Ladder Type
(Specify Rung Spacing)

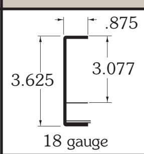


Ventilated Trough



Non-Ventilated Trough

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. The published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply the published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
148		NEMA: 12A, 8C	6	204*	0.0011	Area=0.51 in^2	1.8	304*	0.019	Area=3.29 cm^2
		CSA: C1-3m	8	115	0.0036	Sx=0.48 in^3	2.4	171	0.061	Sx=7.87 cm^3
		UL Cross-Sectional	10	73	0.0087	Ix=0.89 in^4	3.0	109	0.149	Ix=37.04 cm^4
		Area: 0.40 in^2	12	51	0.0181		3.7	76	0.309	

*When using 12" rung spacing load capacity is limited to 195 lbs/ft (290.16 kg/m) for 36" tray width. When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

4" NEMA VE 1 Loading Depth

Actual Loading Depth = 3.628"

Straight Section Part Numbering

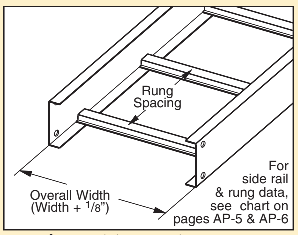
Prefix

Example: **156 P 09 - 24 - 144**

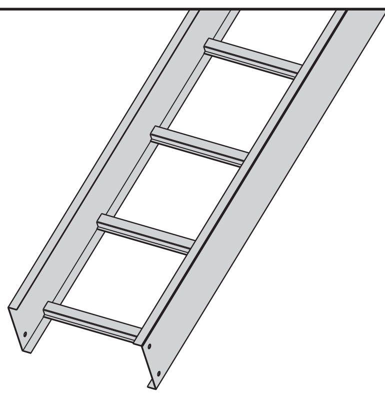
Series	Material	Type	Width	Length
156	● **P** = Pre-Galvanized Steel ● **G** = Hot Dip Galvanized After Fabrication Steel	**Ladder-** ● **06** = 6" rung spacing ● **09** = 9" rung spacing ● **12** = 12" rung spacing **Trough-** ● **04** = Vented Bottom ● **SB** = Non-Ventilated Bottom	● **06** = 6" ● **09** = 9" ● **12** = 12" ● **18** = 18" ● **24** = 24" ● **30** = 30" ● **36** = 36"	● ① **144** = 12 ft. 156 ● ② 120 = 10 ft.

①Primary Length.
②Secondary Length.

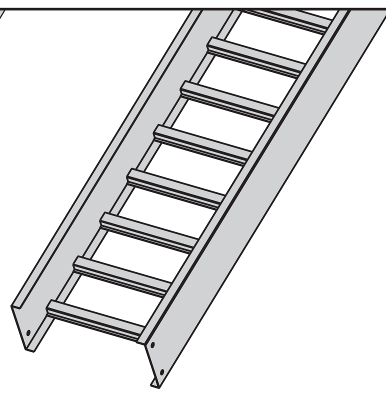
See page CTS-23 for explanation of lengths.



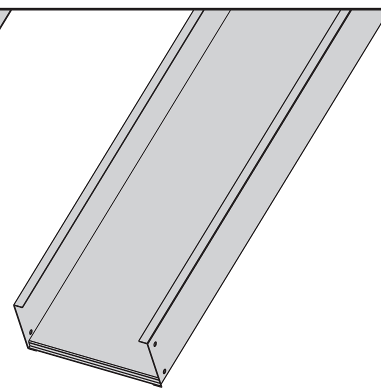
See page AP-1 for additional rung options. *SB available for all widths.



Ladder Type
(Specify Rung Spacing)

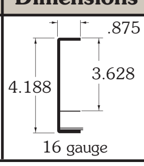


Ventilated Bottom



Non-Ventilated

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above the published loads. The published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply the published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
156		NEMA: 12B, 8C	6	304*	0.0007	Area=0.68 in^2	1.8	452*	0.011	Area=4.39 cm^2
		CSA: C1-3m	8	171	0.0021	Sx=0.724 in^3	2.4	254	0.036	Sx=11.86 cm^3
		UL Cross-Sectional	10	109	0.0051	Ix=1.517 in^4	3.0	163	0.087	Ix=63.14 cm^4
		Area: 0.40 in^2	12	76	0.011		3.7	113	0.181	

*When using 12" rung spacing, load capacity is limited to 234 lbs/ft (348.192 kg/m) for 30" tray width and 195 lbs/ft (290.16 kg/m) for 36" tray width. When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

5" NEMA VE 1 Loading Depth
Actual Loading Depth = 4.628"

Straight Section Part Numbering

Prefix

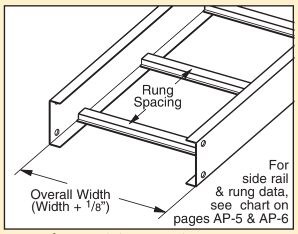
Example: **166 P 09 - 24 - 144**

Series

166

Material

● **P** = Pre-Galvanized Steel
● **G** = Hot Dip Galvanized After Fabrication Steel



Type

Ladder-
● **06** = 6" rung spacing
● **09** = 9" rung spacing
● **12** = 12" rung spacing

Trough-
● **04** = Vented Bottom
● **SB** = Non-Ventilated Bottom

Width

● **06** = 6"
● **09** = 9"
● **12** = 12"
● **18** = 18"
● **24** = 24"
● **30** = 30"
● **36** = 36"

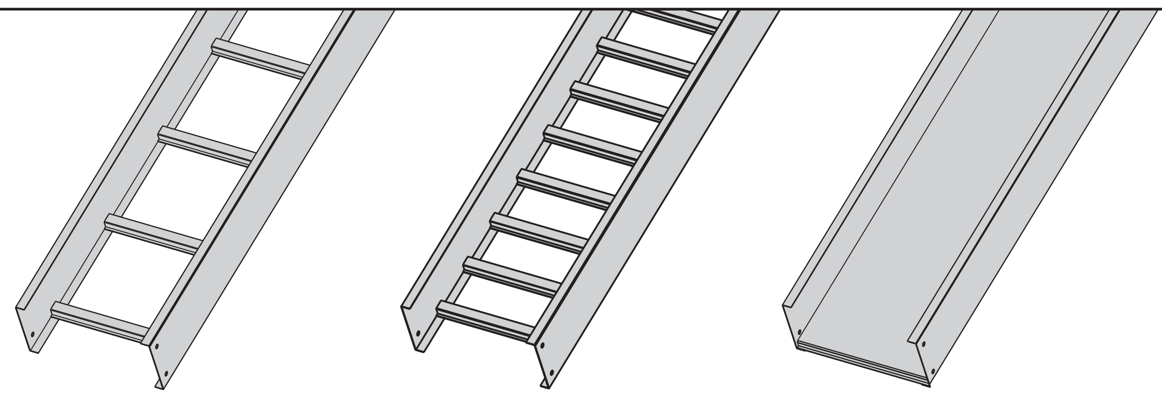
Length

● ① **144** = 12 ft. 166
● ② 120 = 10 ft.

①Primary Length.
②Secondary Length.

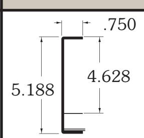
See page CTS-23 for explanation of lengths.

See page AP-1 for additional rung options. *SB available for all widths.



Ladder Type (Specify Rung Spacing) | Ventilated Bottom | Non-Ventilated

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. The published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply the published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
166	 .750 4.628 5.188 16 gauge	NEMA: 12B, 8C	6	308*	0.0004	Area=0.77 in^2	1.8	458*	0.007	Area=4.97 cm^2
		CSA: C1-3m	8	173	0.0013	Sx=0.93 in^3	2.4	258	0.023	Sx=15.24 cm^3
		UL Cross-Sectional	10	111	0.0032	Ix=2.40 in^4	3.0	165	0.055	Ix=99.90 cm^4
		Area: 0.70 in^2	12	77	0.0067		3.7	115	0.114	

*When using 12" rung spacing, the load capacity is limited to 234 lbs/ft (348.192 kg/m) for 30" tray width and 195 lbs/ft (290.16 kg/m) for 36" tray width. When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

6" NEMA VE 1 Loading Depth

Actual Loading Depth = 5.628"

Straight Section Part Numbering

Prefix

Example: **176 P 09 - 24 - 144**

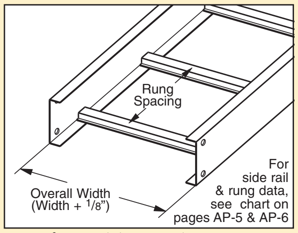
Series

176

Material

● **P** = Pre-Galvanized Steel

● **G** = Hot Dip Galvanized After Fabrication Steel



Type

Ladder-

● **06** = 6" rung spacing

● **09** = 9" rung spacing

● **12** = 12" rung spacing

Trough-

● **04** = Vented Bottom

● **SB** = Non-Ventilated Bottom

Width

● **06** = 6"

● **09** = 9"

● **12** = 12"

● **18** = 18"

● **24** = 24"

● **30** = 30"

● **36** = 36"

Length

● ① **144** = 12 ft. 176

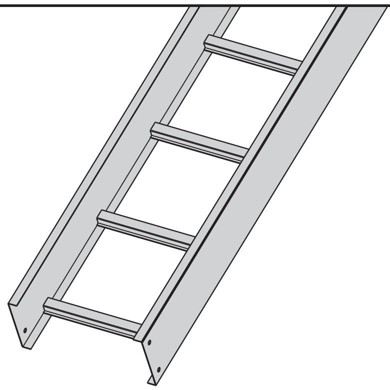
● ② 120 = 10 ft.

①Primary Length.

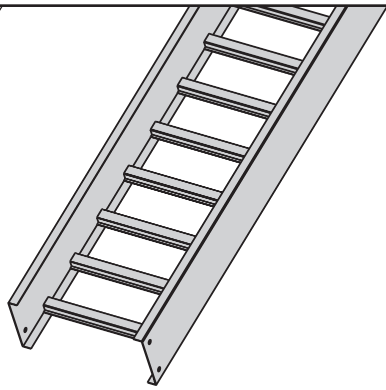
②Secondary Length.

See page CTS-23 for explanation of lengths.

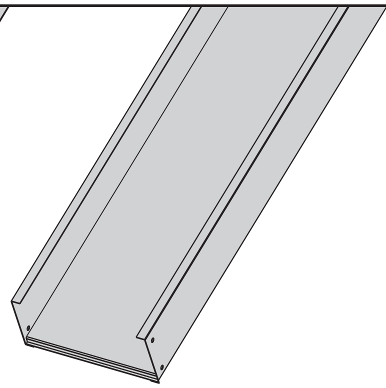
See page AP-1 for additional rung options. *SB available for all widths.



Ladder Type
(Specify Rung Spacing)



Ventilated Bottom



Non-Ventilated

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. The published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
176	.750, 5.628, 6.188, 16 gauge	NEMA: 12B, 8C CSA: 137 kg/m 3.7m UL Cross-Sectional Area: 0.70 in^2	8 10 12	194 124 86	0.0008 0.0020 0.0042	Area=0.89 in^2 Sx=1.23 in^3 Ix=3.80 in^4	2.4 3.0 3.7	288 184 128	0.014 0.035 0.072	Area=5.74 cm^2 Sx=20.16 cm^3 Ix=158.2 cm^4

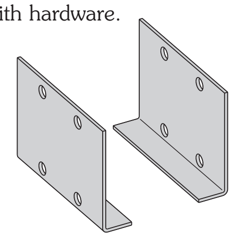
When cable trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 1 Steel - *Accessories*

Standard (L-Shaped) Splice Plates

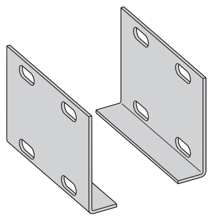
- One pair including hardware provided with each section.
- Furnished in pairs with hardware.
- Prepackaged in pairs in a plastic bag, with hardware.
- 4-hole pattern L-shaped splice plates.
- L-shaped lay-in design.
- (*) Insert ZN or G



Tray Series	Catalog No.
148	**9(*)-4004**
156	**9(*)-4005**
166	**9(*)-4006**
176	**9(*)-4007**

Expansion (L-Shaped) Splice Plates

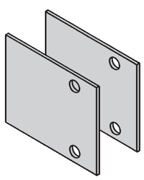
- Expansion plates allow for one inch expansion or contraction of the cable tray, or where expansion joints occur in the supporting structure.
- **Bonding Jumpers are required. Order Separately.**
- L-shaped lay-in design.
- Furnished in pairs with hardware.
- (*) Insert ZN or G



Tray Series	Catalog No.
148	**9(*)-4014**
156	**9(*)-4015**
166	**9(*)-4016**
176	**9(*)-4017**

Universal Splice Plates

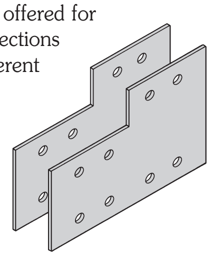
- Used to splice to existing cable tray systems.
- Furnished in pairs with hardware.
- (*) Insert P or G



Tray Series	Catalog No.
148	**9(*)-2004-1/2**
156	**9(*)-2005-1/2**
166	**9(*)-2006-1/2**
176	**9(*)-2007-1/2**

Step Down Splice Plates

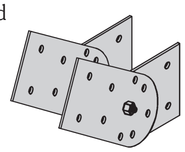
- These splice plates are offered for connecting cable tray sections having side rails of different heights.
- Furnished in pairs with hardware.
- (*) Insert ZN or G



Tray Series	Catalog No.
156 to 148	**9(*)-8004**
166 to 156 or 148	**9(*)-8045**
176 to 156 or 148	**9(*)-8046**
176 to 166	**9(*)-8060**

Vertical Adjustable Splice Plates

- These plates provide for changes in elevation that do not conform to standard vertical fittings.
- Furnished in pairs with hardware.
- (*) Insert ZN or G



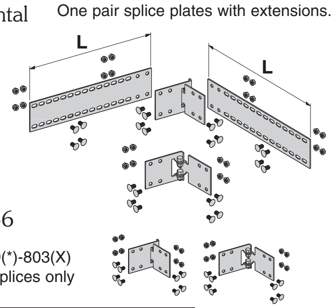
Requires supports within 24" on both sides, per NEMA VE 2.

Tray Series	Catalog No.
148	**9(*)-7024**
156	**9(*)-8024**
166	**9(*)-8025**
176	**9(*)-8026**

Horizontal Adjustable Splice Plates

- Offered to adjust a cable tray run for changes in direction in a horizontal plane that do not conform to standard horizontal fittings.
- Furnished in pairs with hardware.
- New design bonding jumpers **not** required.
- (*) Insert ZN or G
- (X) Insert 4 for series 148 or 156
  5 for series 166
  6 for series 176

9(*)-803(X)-12 or 9(*)-803(X)-36
One pair splice plates with extensions.



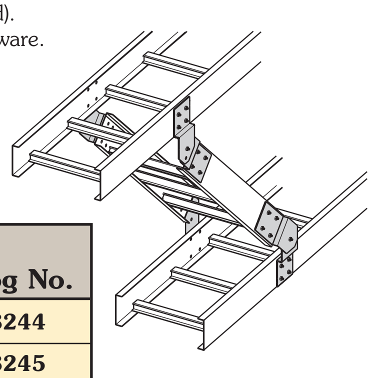
9(*)-803(X)
Splices only

Catalog No.	Cable Tray End Cut	Tray Width	'L'
9(*)-803(X)	Mitered	Thru 36"	N/A
9(*)-803(X)-12	Not mitered	Thru 12"	16"
9(*)-803(X)-36	Not mitered	Thru 36"	41"

Requires supports within 24" on both sides, per NEMA VE 2.

Branch Pivot Connectors

- Branch from existing cable tray runs at any point.
- Pivot to any required angle.
- UL Classified for grounding (bonding jumper not required).
- Furnished in pairs with hardware.
- (*) Insert ZN or G



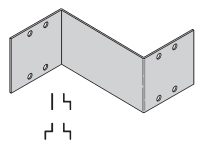
Tray Series	Catalog No.
156 to148	**9(*)-8244**
166	**9(*)-8245**
176	**9(*)-8246**

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 1 Steel - Accessories

Offset Reducing Splice Plate

- This plate is used for joining cable trays having different widths. When used in pairs they form a straight reduction; when used singly with a standard splice plate they form an offset reduction.
- Furnished as one plate with hardware.
- (‡) Insert reduction
- (*) Insert P or G



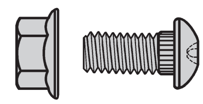
Tray Series	Catalog No.
148	9(*)-8064-(‡)
156	9(*)-8064-(‡)
166	9(*)-8065-(‡)
176	9(*)-8066-(‡)

Tray Hardware

Pre-Galvanized Tray Hardware

Catalog No. ● **RNCB 3/8"-16 x 3/4" Znplt**
Ribbed Neck Carriage Bolt ASTM A307 Grade A

Catalog No. ● **SFHN 3/8"-16 Znplt**
Serrated Flange Hex Nut ASTM A563 Grade A



Finish: Zinc Plated ASTM B633, SC1

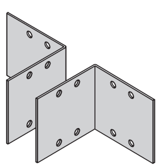
Hot Dip Galvanized Tray Hardware

Catalog No. ● **RNCB 3/8"-16 x 3/4" CZ** Ribbed Neck Carriage Bolt Chromium Zinc ASTM F-1136-88

Catalog No. ● **SFHN 3/8"-16 CZ** Serrated Flange Hex Nut Chromium Zinc ASTM F-1136-88

Tray to Box Splice Plates

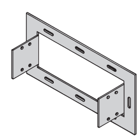
- Used to attach the end of a cable tray run to a distribution box or control panel.
- Furnished in pairs with hardware.
- (*) Insert P or G



Tray Series	Catalog No.
148	9(*)-8054
156	9(*)-8054
166	9(*)-8055
176	9(*)-8056

Frame Type Box Connector

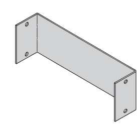
- Designed to attach the end of a cable tray run to a distribution cabinet or control center to help reinforce the box at the point of entry.
- Furnished with tray connection hardware.
- (‡) Insert tray width
- (*) Insert ZN or G



Tray Series	Catalog No.
148	9(*)-8074-(‡)
156	9(*)-8074-(‡)
166	9(*)-8075-(‡)
176	9(*)-8076-(‡)

Blind End

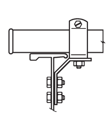
- This plate forms a closure for a dead end cable tray.
- Furnished as one plate with hardware.
- (‡) Insert tray width
- (*) Insert P or G

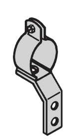


Tray Series	Catalog No.
148	9(*)-8084-(‡)
156	9(*)-8084-(‡)
166	9(*)-8085-(‡)
176	9(*)-8086-(‡)

Conduit to Tray Adaptor

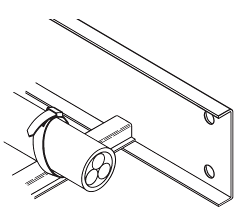
- Assembly required.
- Mounting hardware included.
- Conduit clamp included
- (‡) = Conduit size (1/2" thru 4").



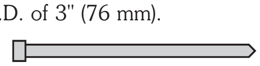


Catalog No. 9ZN-1150-(‡)

Cable Tie (Ladder Tray)



Nylon ties provide easy attachment of cable to ladder rungs; maximum cable O.D. of 3" (76 mm).



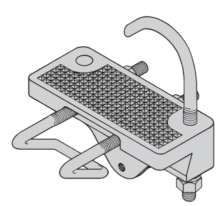
Overall Length 15"

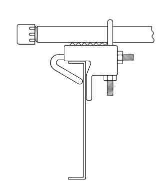
Refer to Section CF Cable Fixing

Catalog No. ● 99-2125-15

Conduit to Tray Adaptor

- For easy attachment of conduit terminating at a cable tray.
- Use on aluminum or steel cable trays.





Catalog No.	Conduit Size in.	Conduit Size mm
● 9G-1158-1/2, 3/4	1/2, 3/4	15, 20
● 9G-1158-1, 1 1/4	1, 1 1/4	25, 32
● 9G-1158-1 1/2, 2	1 1/2, 2	40, 50
● 9G-1158-2 1/2, 3	2 1/2, 3	65, 80
● 9G-1158-3 1/2, 4	3 1/2, 4	90, 100

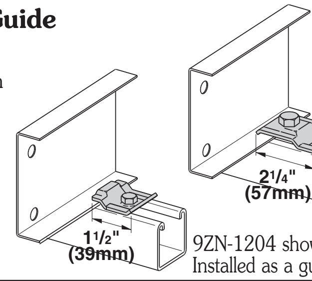
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 1 Steel - Accessories

Cable Tray Clamp/Guide

- Features a no-twist design.
- Has four times the strength of the traditional design.
- Each side is labeled to ensure proper installation.
- Furnished in pairs, with or without hardware.

Patent # RE35479



9ZN-1208 shown. Installed as a clamp.

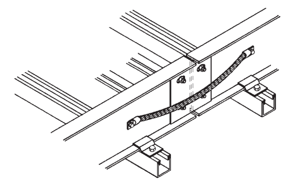
9ZN-1204 shown. Installed as a guide.

Catalog No.		Overall Length		Hardware Size	Finish
Without Hardware	With Hardware	in.	mm		
● 9ZN-1204	● 9ZN-1204NB	1 1/2	38	1/4"	Znplt
● 9ZN-1208	● 9ZN-1208NB	2 1/4	57	3/8"	Znplt

Bonding Jumper

Use at each expansion splice and where the cable tray is not mechanically/electrically continuous to ground.
Sold individually.

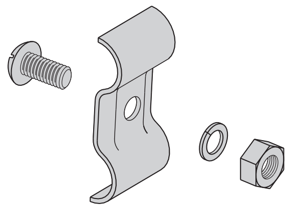
- Hardware included.
- See table 392.7(B)(2) on page 15 for amperage ratings required to match the UL cross-sectional area of the tray.
- 600 amp rating.
- Bonding jumper is 16" long.



Catalog No.	Cross-Sectional Area	Ampacity
● 99-N1	1.5 Square inches	600

Ground Clamp

- Mechanically attaches grounding cables to cable tray.
- Hardware included.
- (*) Insert ZN or SS4

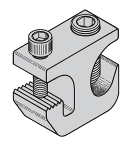


Catalog No.	Cable Size
9(*)-2351	#1 thru 2/0
9(*)-2352	3/0 thru 250 MCM

Grounding Clamp

B-Line Cable Tray is UL® classified as to its suitability as an equipment grounding conductor. If a separate conductor for additional grounding capability is desired, B-Line offers this clamp for bolting the conductor at least once to each tray section.

- Accepts #6 AWG to 250 MCM.

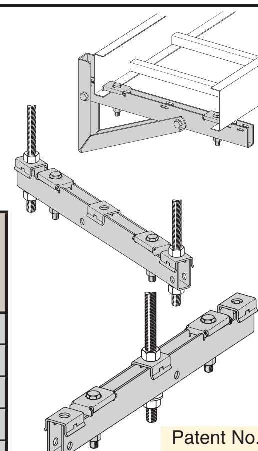


Catalog No.	Material	Item
● 9A-2130	Tin Plated Aluminum	Grounding Clamp

Support Bracket

- Designed for center hung or trapeze supports.
- Can be purchased as a wall mounted bracket.
- Load capacity is 600 lbs. (272.1 kg), safety factor 3.
- All components are zinc plated.
- 1/2" threaded rod and 1/2" hex nuts not included.

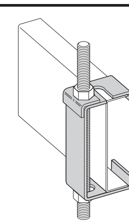
Catalog No.		For Cable Tray Width	
Center Hung or Trapeze	Wall Mount	in.	mm
● 9ZN-5106	● 9ZN-5106-WB	6	152
● 9ZN-5109	● 9ZN-5109-WB	9	226
● 9ZN-5112	● 9ZN-5112-WB	12	305
● 9ZN-5118	● 9ZN-5118-WB	18	452
● 9ZN-5124	● 9ZN-5124-WB	24	609



Patent No. 5,100,086

Hanger Rod Clamp

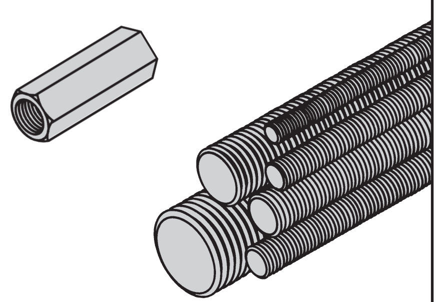
- For 1/2" ATR.
- Furnished in pairs.
- Order ATR and hex nuts separately.
- Two piece "J"-hanger design.
- 9ZN-1113 has 275 lbs./pair safety factor 3 capacity.
- 9ZN-532(X) has 1500 lbs./pair capacity safety factor 3.



Tray Series	Catalog No.
148	● 9ZN-1113
156	● 9ZN-5324
166	● 9ZN-5325
176	● 9ZN-5326

Threaded Rod (ATR) & Rod Coupling

Size	Loading lbs.	Catalog No.	Available Lengths	Coupling Cat. No.
3/8-16	730	● ATR 3/8 x Length	36", 72", 120", 144"	● B655-3/8
1/2-13	1350	● ATR 1/2 x Length	36", 72", 120", 144"	● B655-1/2



Loading based on safety factor 5.

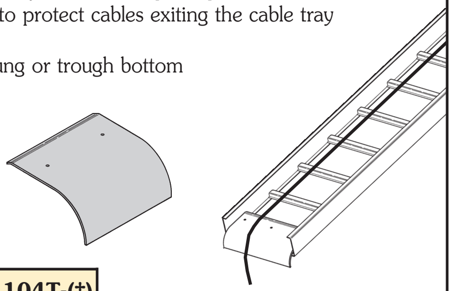
Standard Finish: Zinc plated

See B-Line Strut Systems Catalog for other sizes and finishes.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Ladder or Trough Type Drop-Out

- This special designed, easy to install drop-out provides a 4" (101.6 mm) radius to protect cables exiting the cable tray from damage.
- Attaches to a ladder rung or trough bottom (148 series only).
- Hardware included.
- (*) Insert P or G
- (‡) Insert tray width

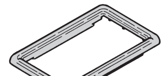


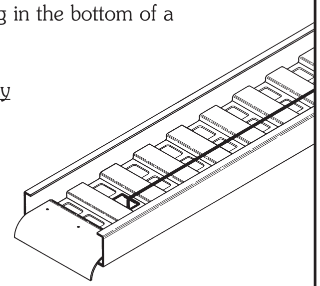
Catalog No.	9(*)-1104T-(‡)

Trough Drop-Out Bushing (Plastic)

- These snap-in plastic bushings provide a round surface to protect cables exiting from an opening in the bottom of a ventilated trough tray.

For 148 Series Only



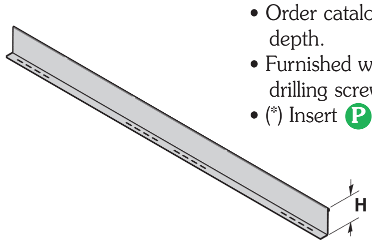


Catalog No.	● 99-1124

Barriers

Straight Section

- Standard length: 120" (3 m) 144" (12 ft.).
- Order catalog number based on loading depth.
- Furnished with four #10 x 1/2" plated self-drilling screws and a 99-9982 splice.
- (*) Insert P or G

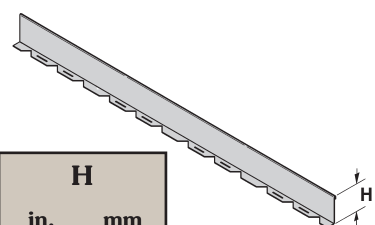


Tray Series	Catalog No.	H in.	H mm
148	72(*)-Length	2.8	58
156	737(*)-Length	3.4	70
166	747(*)-Length	4.4	91
176	757(*)-Length	5.4	112

Length = 144 for 12' or 120 for 10'

Horizontal Bend

- Horizontal Bend Barriers are flexible in order to conform to any horizontal fitting radius. Cut to length.
- Order catalog number based on loading depth.
- Furnished with three #10 x 1/2" zinc plated self-drilling screws and a 99-9982 Barrier Strip Splice.
- Standard length is 72" (6 ft.), sold individually.
- (*) Insert P or G

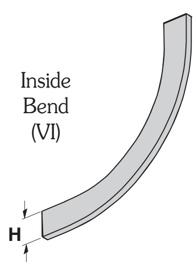


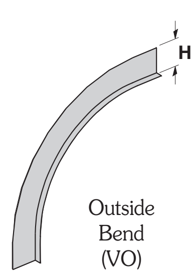
Tray Series	Catalog No.	H in.	H mm
148	72(*)-90HBFL	2.8	58
156	737(*)-90HBFL	3.4	70
166	747(*)-90HBFL	4.4	91
176	757(*)-90HBFL	5.4	112

Vertical Bend Barriers

- Vertical Bend Barriers are preformed to conform to a specific vertical fitting.
- Furnished with three #10 x ½" plated self-drilling screws and a 99-9982 Barrier Strip Splice.
- (*) Insert P or G
- (**) Insert 30, 45, 60 or 90 for degrees
- (†) Insert 12, 24, or 36 for radius

Inside Bend (VI)



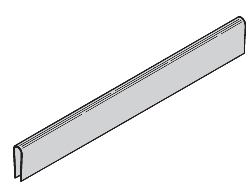


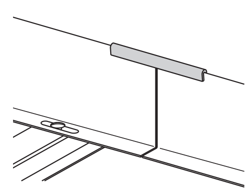
Outside Bend (VO)

Tray Series	Catalog No. Inside Bend	Catalog No. Outside Bend	H in.	H mm
148	72(*)-(**)VI(†)	72(*)-(**)VO(†)	2.8	58
156	737(*)-(**)VI(†)	737(*)-(**)VO(†)	3.4	70
166	747(*)-(**)VI(†)	747(*)-(**)VO(†)	4.4	91
176	757(*)-(**)VI(†)	757(*)-(**)VO(†)	5.4	112

Barrier Strip Splice

- Plastic splice holds adjoining barrier strips in straight alignment.





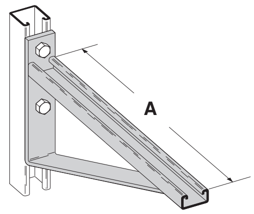
Catalog No.	● 99-9982

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 1 Steel

Series 1 Steel - Accessories

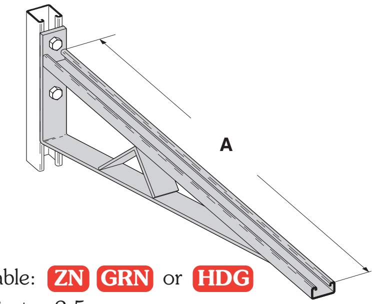
Cantilever Bracket



Finishes available: ZN GRN or HDG
Safety Load Factor 2.5

Catalog No.	Uniform Load		Tray Width		'A'	
	lbs	kN	in.	mm	in.	mm
B494-12	1580	7.02	6 & 9	152 & 229	12	304.8
B494-18	1000	4.45	12	305	18	457.2
B494-24	996	4.43	18	457	24	609.6

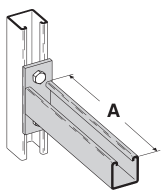
Cantilever Bracket



Finishes available: ZN GRN or HDG
Safety Load Factor 2.5

Catalog No.	Uniform Load		Tray Width		'A'	
	lbs	kN	in.	mm	in.	mm
B494-30	924	4.11	24	609.6	30	762.0
B494-36	864	3.84	30	762.0	36	914.4
B494-42	580	2.58	36	914.4	42	1066.8

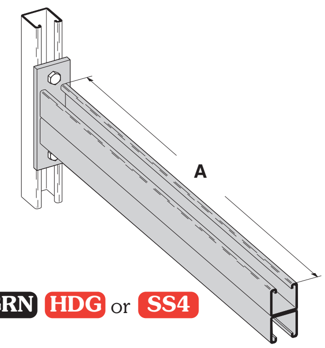
Cantilever Bracket



Finishes available: ZN GRN HDG SS4 or SS6
Safety Load Factor 2.5

Catalog No.	Uniform Load		Tray Width		'A'	
	lbs	kN	in.	mm	in.	mm
B409-12	960	4.27	6 & 9	152 & 228	12	304.8
B409-18	640	2.84	12	305	18	457.2
B409-24	480	2.13	18	457	24	609.6

Cantilever Bracket



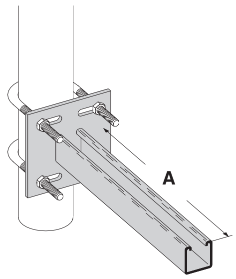
Finishes available: ZN GRN HDG or SS4
Safety Load Factor 2.5

Catalog No.	Uniform Load		Tray Width		'A'	
	lbs	kN	in.	mm	in.	mm
B297-30	665	2.95	24	609.6	30	762.0
B297-36	550	2.44	30	762.0	36	914.4
B297-42	465	2.06	36	914.4	42	1066.8

Underfloor Support (U-Bolts not included)

U-Bolt Size	Fits Pipe O.D.
B501-3/4	.841 - 1.050
B501-1	1.051 - 1.315
B501-1 1/4	1.316 - 1.660
B501-1 1/2	1.661 - 1.900
B501-2	1.901 - 2.375
B501-2 1/2	2.376 - 2.875

- Order properly sized U-Bolts separately.

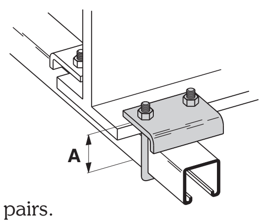


Finish available: ZN
Safety Load Factor 2.5

Catalog No.	Uniform Load		Tray Width		'A'	
	lbs	kN	in.	mm	in.	mm
B409UF-12	800	3.55	6 & 9	152 & 229	12	305
B409UF-21	450	2.00	12 & 18	305 & 457	21	533

Beam Clamp

- Finishes available: ZN or HDG
- Sold in pieces with hardware.



Design load when used in pairs.
Safety Load Factor 5.0

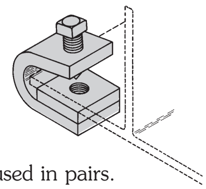
Catalog No.	Design Load*		'A'	
	lbs	kN	in.	mm
B441-22	1200	5.34	3 3/8	86
B441-22A	1200	5.34	5	127

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 1 Steel - Accessories

Beam Clamp

- Finishes available: ZN GRN or HDG
- Setscrew included.

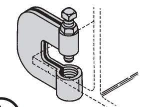


Design load when used in pairs.
Safety Load Factor 5.0

Cat. No.	B210		B210A	
Design Load	800 lbs.	3.56 kN	300 lbs.	1.33 kN
Tap Size	1/2"-13	-	3/8"-16	-
Mat'l. Thickness	3/8"	9.5 mm	1/4"	6.4 mm

Steel C-Clamp With Locknut

- Finishes available:
  ZN for 3/8 & 1/2
  ZN for 5/8 & 3/4
  SS4 all sizes

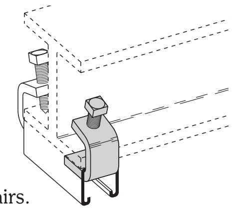


Safety Load Factor 5.0

Catalog Number	Rod Size	Design Load lbs	Design Load kN
B351L-3/8	3/8"-16	300	0.89
B351L-1/2	1/2"-13	380	1.69
B351L-5/8	5/8"-11	550	2.44
B351L-3/4	3/4"-10	630	2.80

Beam Clamp

- Finishes available: ZN GRN or HDG
- Sold in pieces.

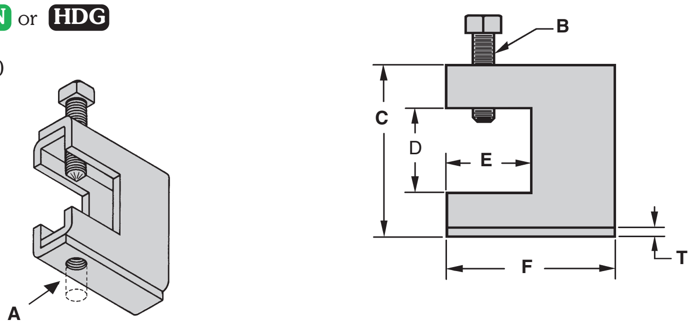


Design load when used in pairs.
Safety Load Factor 5.0

Cat. No.	B212-1/4		B212-3/8	
Design Load	600 lbs.	2.67 kN	1000 lbs.	4.45 kN
Max. Flange Thick	3/4"	19 mm	1 1/8"	28.6 mm
Mat'l. Thickness	1/4"	6.3 mm	3/8"	9.5 mm

B305 Thru B308 & B321 Series Beam Clamps

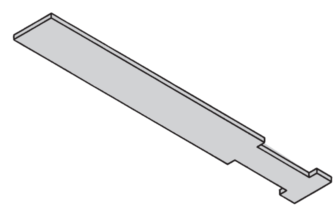
- Finishes available: ZN or HDG
- Setscrew included.
- Safety Load Factor 5.0



Cat. No.	Rod Size A	B	C	D	E	F	T	Design Load lbs	Design Load kN
B305	3/8"-16	3/8"-16	2 5/16"	7/8"	1 1/8"	2 1/2"	11 Ga.	600	2.67
B306	3/8"-16	1/2"-13	2 7/16"	7/8"	1 1/8"	2 1/2"	7 Ga.	1100	4.90
B307	1/2"-13	1/2"-13	2 7/16"	7/8"	1 1/8"	2 1/2"	7 Ga.	1100	4.90
B308	1/2"-13	1/2"-13	2 9/16"	7/8"	1 1/8"	2 1/2"	1/4"	1500	6.68
B321-1	3/8"-16	1/2"-13	3 9/16"	1 11/16"	1 5/8"	3 1/4"	1/4"	1300	5.79
B321-2	1/2"-13	1/2"-13	3 9/16"	1 11/16"	1 5/8"	3 1/4"	1/4"	1400	6.23

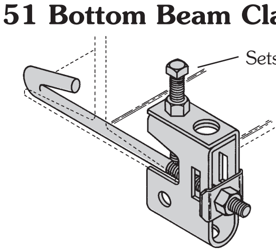
B312 Anchor Strap

- Finishes available: ZN or HDG
- For a maximum beam thickness of 3/4".
- For thicker beams, step up one flange width size.

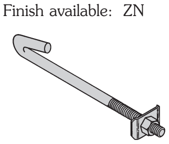


Cat. No.	Flange Width
B312-6	Up to 6"
B312-9	6" - 9"
B312-12	9" - 12"

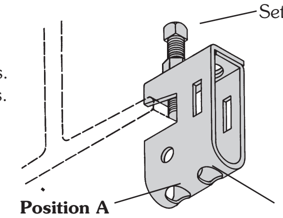
B751 Bottom Beam Clamp and Accessories

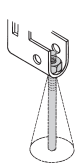


Finish available: ZN

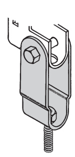


Loading position A - 500 lbs.
Loading position B - 300 lbs.
Safety Load Factor 5.0





B753



B752

Provides a full 15° swivel in any direction. (State the desired rod size.)

Assembly No. / To Fit Flange Sizes	B751 Clamp,Setscrew & J-Hook	B701J_ J-Hook,Clip & Square Nut	B752 Swivel & Bolt Only	B753 Swivel Nut Only
4"-5 7/8"	● B751-J4-3/8*	● B701-J4-3/8	● B752	● B753-**
6"-8 7/8"	● B751-J6-3/8*	● B701-J6-3/8	● B752	● B753-**
9"-11 7/8"	● B751-J9-3/8*	● B701-J9-3/8	● B752	● B753-**

* Clamp Assembly complete with J-Hook Assembly. Setscrew included.
** Insert 1/4, 3/8 or 1/2 for the desired rod size.

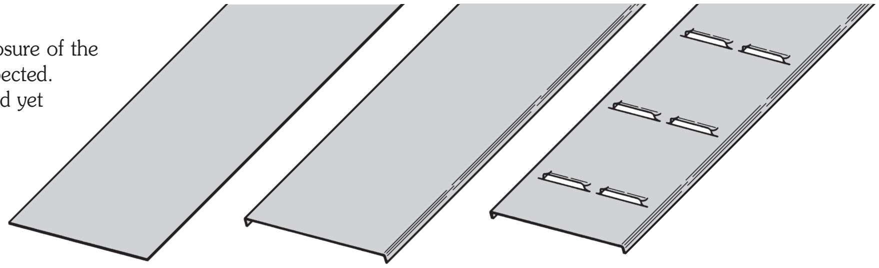
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 1 Steel - *Accessories*

Covers

Solid covers should be used when maximum enclosure of the cables is desired and no accumulation of heat is expected. **Ventilated covers** provide an overhead cable shield yet allow heat to escape.

Cooper B-Line recommends that covers on vertical cable tray runs to a height of 6 ft. (1.83 m) to 8 ft. (2.44 m) above the floor to isolate both cables and personnel. **Flanged covers** have a .30 in. (7.6 mm) flange. Cover clamps are not included with the cover and must be ordered separately.



Solid Non-Flanged | **Solid Flanged** | **Ventilated Flanged**

Covers Part Numbering

Prefix

Example: **80 1 P - 20 - 24 - 144**

Cover Type
- 🟢 80 = Solid
- ⚫ 81 = Ventilated

Detail
- 🟢 1 = Flanged
- ⚫ 9 = Non-Flanged

Material
- 🟢 P = Pre-Galvanized
- 🔴 G = HDGAF

Material Thickness
- 🟢 20 = 20 Ga. Steel for Pre-Galvanized
- 🔴 18 = 18 Ga. Steel for HDGAF

Tray Width
- 🟢 06 = 6"
- 🟢 09 = 9"
- 🟢 12 = 12"
- 🟢 18 = 18"
- 🟢 24 = 24"
- 🟢 30 = 30"
- 🟢 36 = 36"

Item Description

For Straight Section Cover:

Pre-Galvanized Only:
- 🟢 144 = 12 ft. (3.66 m)
- 🟢 120 = 10 ft. (3.05 m)

Pre-Galvanized & HDGAF
- ⚫ 72 = 6 ft. (1.83 m)
- ⚫ 60 = 5 ft. (1.52 m)

For fitting covers: Insert suffix of fitting to be covered. See example below.

Covers 30" and 36" wide have reinforcing ridges.

Example of Catalog Number for Fitting Cover:

Vertical Bend Cover

Prefix Suffix

80 1 P 20 - 24 - 90 VO 24 - 4*

- Side Rail* Height
- Radius
- Fitting
- Angle
- Width
- Material Thickness
- Material
- Detail
- Cover Type

* Required for VO fittings only.

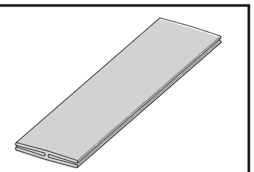
Quantity of Standard Cover Clamps Required

Straight Section 60" or 72"........................4 pcs.
Straight Section 120" or 144"....................6 pcs.
Horizontal/Vertical Bends...........................4 pcs.
Tees..6 pcs.
Crosses..8 pcs.

Note: When using the Heavy Duty Cover Clamp, only one-half the number of clamps stated above is required.

Cover Joint Strip

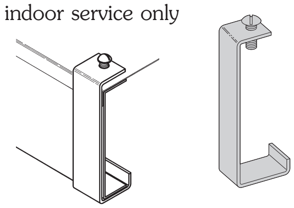
- Used to join covers
- Plastic
- (‡) Insert tray width



Cat. No. 🟢 **99-9980-(‡)**

Standard Cover Clamp

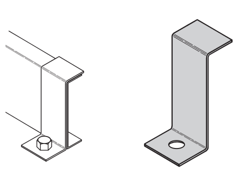
- Sold per piece
- For indoor service only



Tray Series	Catalog No. Znplt	Catalog No. HDGAF
148	🟢 **9ZN-9019**	🔴 **9G-9019**
156	🟢 **9ZN-9014**	🔴 **9G-9014**
166	🟢 **9ZN-9015**	🔴 **9G-9015**
176	🟢 **9ZN-9016**	🔴 **9G-9016**

Combination Hold Down & Cover Clamp

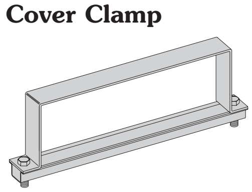
- Sold per piece
- For indoor service only



Tray Series	Catalog No. Znplt/Pre-Galv.	Catalog No. HDGAF
148	🟢 **9ZN-9243**	🔴 **9G-9243**
156	🟢 **9P-9043**	🔴 **9G-9043**
166	🟢 **9P-9053**	🔴 **9G-9053**
176	🟢 **9P-9063**	🔴 **9G-9063**

Heavy Duty Cover Clamp

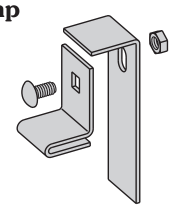
- (‡) Insert tray width



Tray Series	Catalog No. Pre-Galv.	Catalog No. HDGAF
148	🟢 **9P-(‡)-9040**	🔴 **9G-(‡)-9040**
156	🟢 **9P-(‡)-9044**	🔴 **9G-(‡)-9044**
166	🟢 **9P-(‡)-9054**	🔴 **9G-(‡)-9054**
176	🟢 **9P-(‡)-9064**	🔴 **9G-(‡)-9064**

Raised Cover Clamp

- For indoor service only.
- Sold per piece
- For use with flanged covers only.



† Specify gap of 1", 2", 3" or 4".

Tray Series	Catalog No.
Series 1	⚫ **9ZN-910†**

🟢 Green = Fastest shipped items (normally 3 to 5 working days)
⚫ Black = Normal lead-time items (normally 5 to 10 working days)
🔴 Red = Normally long lead-time items (15 working days minimum)

Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, cable tray systems shall be as manufactured by Cooper B-Line, Inc.

Section 2- Cable Tray Sections and Components

2.01 General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features. Cable tray shall be installed according to the latest revision of NEMA VE 2.

2.02 Pre-Galvanized Steel: Straight sections, fitting side rails, rungs, and covers shall be made from structural quality steel meeting the minimum mechanical properties and mill galvanized in accordance with ASTM A653 SS, Grade 33, coating designation G90. Hardware finish shall be electro-galvanized zinc per ASTM B633.

2.03 Hot dip Galvanized Steel: All side rails, covers, splice plates, and rungs shall be made from structural quality steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 for 14 gauge and heavier, ASTM A1008, Grade 33 Type 2 for 16 gauge and lighter, and shall be hot dip galvanized after fabrication in accordance with ASTM A123. Mill galvanized covers are not acceptable for hot dipped galvanized cable tray. Hardware finish shall be chromium zinc per ASTM F-1136-88.

2.04 Ladder Cable Trays shall consist of two longitudinal members (side rails) with transverse members (rungs) welded to the side rails. Rungs shall be spaced [6] [9] [12] inches on center. Rung spacing in radiused fittings shall be industry standard 9" and measured at the center of the tray's width. No portion of the rungs shall protrude below the bottom plane of the side rails.

2.05 Ventilated Trough Cable Trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails or rungs spaced 4" on center. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/4$" and shall be spaced on 6" centers. To provide ventilation in the tray, the valleys of the corrugated bottom shall have $2^1/4$" x 4" rectangular holes punched along the width of the bottom.

2.06 Non-Ventilated Bottom Trough Cable Trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails or a solid sheet over rungs. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/4$" and shall be spaced on 6" centers.

2.07 Cable tray loading depth shall be [3] [4] [5] [6] inches per NEMA VE 1.

2.08 Straight sections shall be supplied in standard [12 foot] [10 foot (3 m)] lengths.

2.09 Cable tray widths shall be [6] [9] [12] [18] [24] [30] [36] inches or as shown on drawings.

2.10 Splice plates shall be L-shaped with 4 nuts and bolts per plate. The resistance of fixed splice connections between an adjacent section of tray shall not exceed 0.00033 ohm.

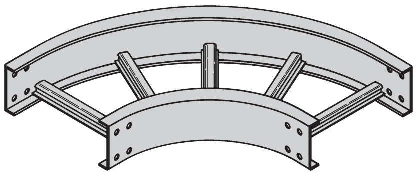
2.11 All fittings must have a minimum radius of [12] [24] inches.

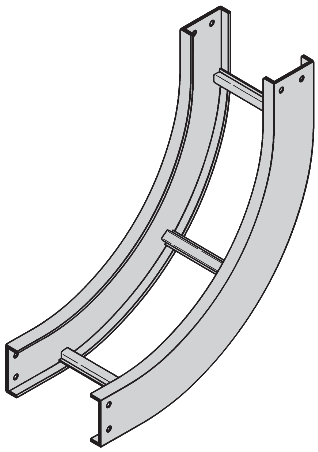
Section 3- Loading Capacities and Testing

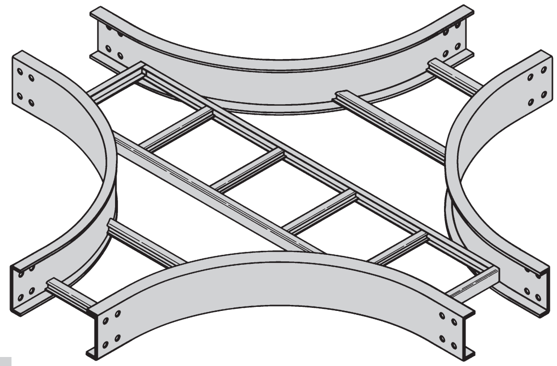
3.01 Cable tray shall be capable of carrying a uniformly distributed load of ______ lbs./ft. on a _______ ft. support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1 5.2. Cable tray shall be made to manufacturing tolerances as specified by NEMA.

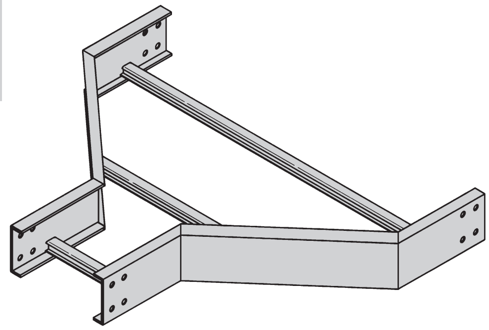
3.02 Upon request, manufacturer shall provide test reports in accordance with the latest revision of NEMA VE 1 or CSA C22.2 No. 126.

Series 1 - Fittings









Fittings engineered with 3" tangents for splicing integrity.

Fittings Part Numbering

Prefix

Example: 1 4 P - 24 - 90 HB 24 (9" rung spacing is standard)

Series	Height	Material	Width	Angle	Type	Radius
1	🟢 4 = 148	⚫ P = Pre-Galvanized	🟢 06 = 6" (152)	⚫ 30 = 30°	🟢 HB = Horizontal Bend	🟢 12 = 12" (305)
	🟢 5 = 156	🔴 G = HDGAF	🟢 09 = 9" (228)	🟢 45 = 45°	🟢 HT = Horizontal Tee	🟢 24 = 24" (609)
	🟢 6 = 166		🟢 12 = 12" (305)	⚫ 60 = 60°	🟢 HX = Horizontal Cross	⚫ 36 = 36" (914)
	🟢 7 = 176		🟢 18 = 18" (457)	🟢 90 = 90°	🟢 VI = Vertical Inside Bend	
			🟢 24 = 24" (609)		🟢 VO = Vertical Outside Bend	
			🟢 30 = 30" (762)		⚫ LR = Left Reducer	
			🟢 36 = 36" (914)		⚫ RR = Right Reducer	
					⚫ SR = Straight Reducer	

For steel and aluminum 4" vented or solid trough add VT or ST as shown below.

Prefix
14PVT - 24 - HT24 — Vented Trough

Prefix
14PST - 24 - HT24 — Non-Ventilated Trough

For steel 5", 6", 7" vented or non-ventilated add 04 or SB as shown below.

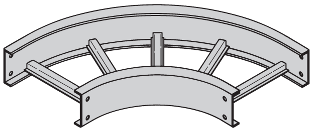
Prefix
15P04 - 24 - 90HB24 — Vented Bottom

Prefix
15PSB - 24 - 90HB24 — Non-Ventilated

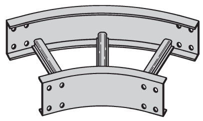
🟢 Green = Fastest shipped items (normally 3 to 5 working days)
⚫ Black = Normal lead-time items (normally 5 to 10 working days)
🔴 Red = Normally long lead-time items (15 working days minimum)

Horizontal Bends 90° 60° 45° 30° (HB)

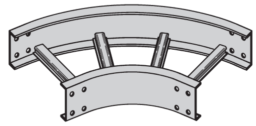
1 pair splice plates with hardware included.



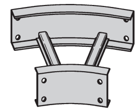
90° Horizontal Bend



45° Horizontal Bend

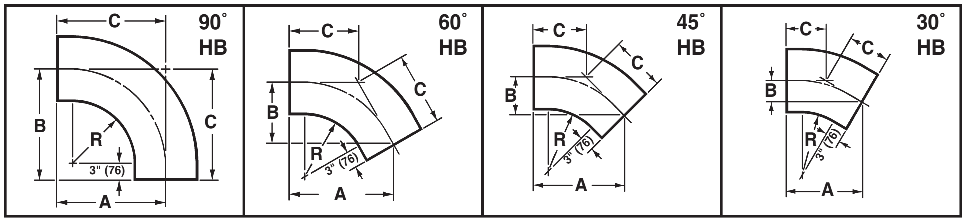


60° Horizontal Bend



30° Horizontal Bend

Bottoms manufactured:
Ladder = 9" Rung Spacing
VT & 04 = 4" Rung Spacing
ST & SB = Flat sheet over 12" Rung Spacing



Bend Radius R in.	Bend Radius R mm	Tray Width in.	Tray Width mm	90° Horizontal Bend Dimensions Catalog No.	A in.	A mm	B in.	B mm	C in.	C mm	60° Horizontal Bend Dimensions Catalog No.	A in.	A mm	B in.	B mm	C in.	C mm
		6	152	**(Pre)-06-90HB12**	18	450	18	450	18	450	**(Pre)-06-60HB12**	17 1/2	445	10 1/8	257	11 11/16	297
		9	228	**(Pre)-09-90HB12**	19 1/2	495	19 1/2	495	19 1/2	495	**(Pre)-09-60HB12**	18 13/16	478	10 7/8	276	12 1/2	318
		12	305	**(Pre)-12-90HB12**	21	533	21	533	21	533	**(Pre)-12-60HB12**	20 1/16	510	11 5/8	295	13 3/8	340
12	305	18	457	**(Pre)-18-90HB12**	24	600	24	600	24	600	**(Pre)-18-60HB12**	22 11/16	576	13 1/8	333	15 1/8	384
		24	609	**(Pre)-24-90HB12**	27	686	27	686	27	686	**(Pre)-24-60HB12**	25 5/16	643	14 5/8	372	16 7/8	429
		30	762	**(Pre)-30-90HB12**	30	750	30	750	30	750	**(Pre)-30-60HB12**	27 7/8	708	16 1/8	410	18 9/16	472
		36	914	**(Pre)-36-90HB12**	33	838	33	838	33	838	**(Pre)-36-60HB12**	30 1/2	775	17 5/8	448	20 5/16	516
		6	152	**(Pre)-06-90HB24**	30	750	30	750	30	750	**(Pre)-06-60HB24**	27 7/8	708	16 1/8	410	18 9/16	472
		9	228	**(Pre)-09-90HB24**	31 1/2	800	31 1/2	800	31 1/2	800	**(Pre)-09-60HB24**	29 3/16	741	16 7/8	429	19 7/16	494
		12	305	**(Pre)-12-90HB24**	33	838	33	838	33	838	**(Pre)-12-60HB24**	30 1/2	775	17 5/8	448	20 5/16	516
24	609	18	457	**(Pre)-18-90HB24**	36	914	36	914	36	914	**(Pre)-18-60HB24**	33 1/16	840	19 1/8	486	22 1/16	560
		24	609	**(Pre)-24-90HB24**	39	991	39	991	39	991	**(Pre)-24-60HB24**	35 11/16	907	20 5/8	524	23 13/16	605
		30	762	**(Pre)-30-90HB24**	42	1067	42	1067	42	1067	**(Pre)-30-60HB24**	38 1/4	972	22 1/8	562	25 1/2	648
		36	914	**(Pre)-36-90HB24**	45	1143	45	1143	45	1143	**(Pre)-36-60HB24**	40 7/8	1038	23 5/8	600	27 1/4	692
				45° Horizontal Bend							**30° Horizontal Bend**						
		6	152	**(Pre)-06-45HB12**	15 3/4	400	6 1/2	165	9 3/16	233	**(Pre)-06-30HB12**	13 1/8	333	3 1/2	89	7	175
		9	228	**(Pre)-09-45HB12**	16 13/16	427	6 15/16	176	9 13/16	249	**(Pre)-09-30HB12**	13 7/8	352	3 11/16	94	7 7/16	189
		12	305	**(Pre)-12-45HB12**	17 7/8	454	7 3/8	187	10 7/16	265	**(Pre)-12-30HB12**	14 5/8	372	3 15/16	100	7 13/16	198
12	305	18	457	**(Pre)-18-45HB12**	20	500	8 1/4	210	11 11/16	297	**(Pre)-18-30HB12**	16 1/8	410	4 5/16	135	8 5/8	219
		24	609	**(Pre)-24-45HB12**	22 1/16	560	9 1/8	232	12 15/16	329	**(Pre)-24-30HB12**	17 5/8	448	4 11/16	119	9 7/16	240
		30	762	**(Pre)-30-45HB12**	24 3/16	614	10	250	14 3/16	360	**(Pre)-30-30HB12**	19 1/8	486	5 1/8	130	10 1/4	260
		36	914	**(Pre)-36-45HB12**	26 5/16	668	10 15/16	278	15 7/16	392	**(Pre)-36-30HB12**	20 5/8	524	5 1/2	140	11 1/16	281
		6	152	**(Pre)-06-45HB24**	24 3/16	614	10	250	14 3/16	360	**(Pre)-06-30HB24**	19 1/8	486	5 1/8	130	10 1/4	260
		9	228	**(Pre)-09-45HB24**	25 1/4	641	10 1/2	267	14 13/16	376	**(Pre)-09-30HB24**	19 7/8	505	5 5/16	135	10 5/8	270
		12	305	**(Pre)-12-45HB24**	26 5/16	668	10 15/16	278	15 7/16	392	**(Pre)-12-30HB24**	20 5/8	524	5 1/2	140	11 1/16	281
24	609	18	457	**(Pre)-18-45HB24**	28 7/16	722	11 13/16	300	16 11/16	424	**(Pre)-18-30HB24**	22 1/8	562	5 15/16	151	11 13/16	300
		24	609	**(Pre)-24-45HB24**	30 9/16	776	12 11/16	322	17 15/16	456	**(Pre)-24-30HB24**	23 5/8	600	6 5/16	160	12 5/8	321
		30	762	**(Pre)-30-45HB24**	32 11/16	830	13 9/16	345	19 1/8	486	**(Pre)-30-30HB24**	25 1/8	638	6 3/4	172	13 7/16	341
		36	914	**(Pre)-36-45HB24**	34 13/16	884	14 7/16	367	20 3/8	518	**(Pre)-36-30HB24**	26 5/8	676	7 1/8	181	14 1/4	362

(Pre) See page LST-15 for catalog number prefix.

All dimensions in parentheses are millimeters unless otherwise specified.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

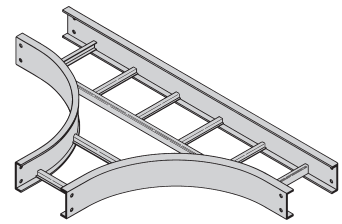
Horizontal Tee (HT)

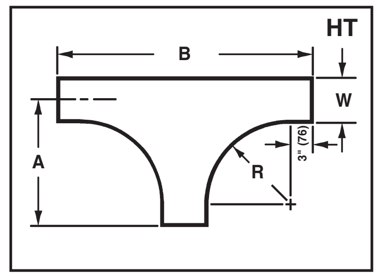
2 pair splice plates with hardware included.

Bend Radius R in.	mm	Tray Width in.	mm	Catalog No.	A in.	A mm	B in.	B mm
12	305	6	152	**(Prefix)-06-HT12**	18	457	36	914
		9	228	**(Prefix)-09-HT12**	19½	495	39	991
		12	305	**(Prefix)-12-HT12**	21	533	42	1067
		18	457	**(Prefix)-18-HT12**	24	610	48	1219
		24	609	**(Prefix)-24-HT12**	27	686	54	1372
		30	762	**(Prefix)-30-HT12**	30	762	60	1524
		36	914	**(Prefix)-36-HT12**	33	838	66	1676
24	609	6	152	**(Prefix)-06-HT24**	30	762	60	1524
		9	228	**(Prefix)-09-HT24**	31½	800	63	1600
		12	305	**(Prefix)-12-HT24**	33	838	66	1676
		18	457	**(Prefix)-18-HT24**	36	914	72	1829
		24	609	**(Prefix)-24-HT24**	39	991	78	1981
		30	762	**(Prefix)-30-HT24**	42	1067	84	2134
		36	914	**(Prefix)-36-HT24**	45	1143	90	2286

Horizontal Tee Dimensions

(Prefix) See page LST-15 for catalog number prefix.





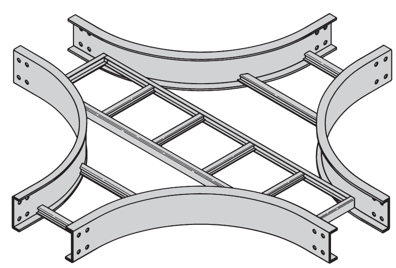
Horizontal Cross (HX)

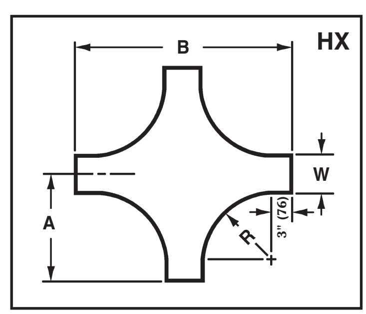
3 pair splice plates with hardware included.

Bend Radius R in.	mm	Tray Width in.	mm	Catalog No.	A in.	A mm	B in.	B mm
12	305	6	152	**(Prefix)-06-HX12**	18	457	36	914
		9	228	**(Prefix)-09-HX12**	19½	495	39	991
		12	305	**(Prefix)-12-HX12**	21	533	42	1067
		18	457	**(Prefix)-18-HX12**	24	610	48	1219
		24	609	**(Prefix)-24-HX12**	27	686	54	1372
		30	762	**(Prefix)-30-HX12**	30	762	60	1524
		36	914	**(Prefix)-36-HX12**	33	838	66	1676
24	609	6	152	**(Prefix)-06-HX24**	30	762	60	1524
		9	228	**(Prefix)-09-HX24**	31½	800	63	1600
		12	305	**(Prefix)-12-HX24**	33	838	66	1676
		18	457	**(Prefix)-18-HX24**	36	914	72	1829
		24	609	**(Prefix)-24-HX24**	39	991	78	1981
		30	762	**(Prefix)-30-HX24**	42	1067	84	2134
		36	914	**(Prefix)-36-HX24**	45	1143	90	2286

Horizontal Cross Dimensions

(Prefix) See page LST-15 for catalog number prefix.



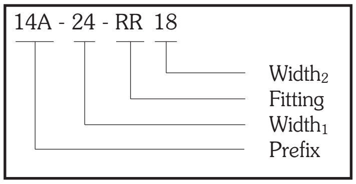


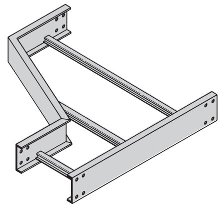
All dimensions in parentheses are millimeters unless otherwise specified.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

Reducers (LR, SR, RR)

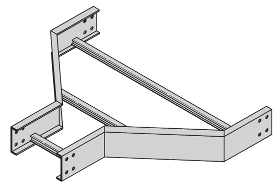
1 pair splice plates with hardware included.

Reducer Part Numbering

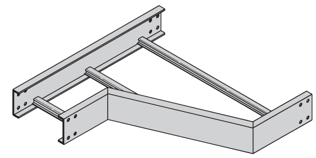




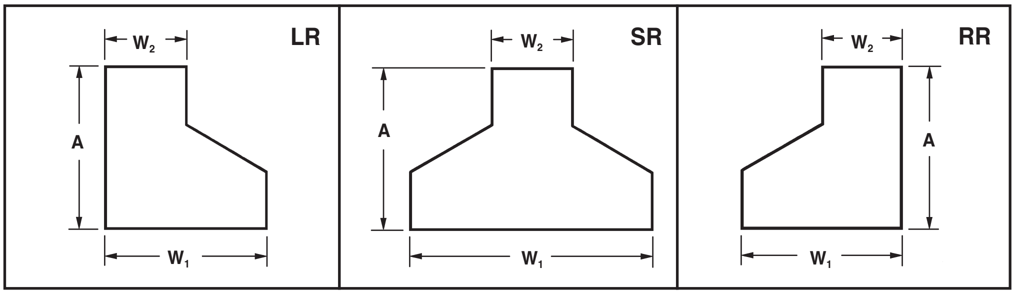
Left Reducer



Straight Reducer



Right Reducer



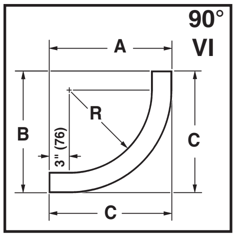
Tray Width				Left Hand Reducer			Straight Reducer			Right Hand Reducer		
W1		W2		Catalog No.	A		Catalog No.	A		Catalog No.	A	
in.	mm	in.	mm		in.	mm		in.	mm		in.	mm
9	228	6	152	**(Prefix)-09-LR06**	9 3/4	248	**(Prefix)-09-SR06**	8 7/8	225	**(Prefix)-09-RR06**	9 3/4	248
12	305	6	152	**(Prefix)-12-LR06**	11 1/2	292	**(Prefix)-12-SR06**	9 3/4	248	**(Prefix)-12-RR06**	11 1/2	292
		9	228	**(Prefix)-12-LR09**	9 3/4	248	**(Prefix)-12-SR09**	8 7/8	225	**(Prefix)-12-RR09**	9 3/4	248
18	457	6	152	**(Prefix)-18-LR06**	14 15/16	379	**(Prefix)-18-SR06**	11 1/2	292	**(Prefix)-18-RR06**	14 15/16	379
		9	228	**(Prefix)-18-LR09**	13 3/16	340	**(Prefix)-18-SR09**	10 5/8	270	**(Prefix)-18-RR09**	13 3/16	340
		12	305	**(Prefix)-18-LR12**	11 1/2	292	**(Prefix)-18-SR12**	9 3/4	248	**(Prefix)-18-RR12**	11 1/2	292
24	609	6	152	**(Prefix)-24-LR06**	18 3/8	467	**(Prefix)-24-SR06**	13 3/16	340	**(Prefix)-24-RR06**	18 3/8	467
		9	228	**(Prefix)-24-LR09**	16 11/16	424	**(Prefix)-24-SR09**	12 3/8	314	**(Prefix)-24-RR09**	16 11/16	424
		12	305	**(Prefix)-24-LR12**	14 15/16	379	**(Prefix)-24-SR12**	11 1/2	292	**(Prefix)-24-RR12**	14 15/16	379
		18	457	**(Prefix)-24-LR18**	11 1/2	292	**(Prefix)-24-SR18**	9 3/4	248	**(Prefix)-24-RR18**	11 1/2	292
30	762	6	152	**(Prefix)-30-LR06**	21 7/8	555	**(Prefix)-30-SR06**	14 15/16	380	**(Prefix)-30-RR06**	21 7/8	555
		9	228	**(Prefix)-30-LR09**	20 1/8	511	**(Prefix)-30-SR09**	14 1/16	358	**(Prefix)-30-RR09**	20 1/8	511
		12	305	**(Prefix)-30-LR12**	18 3/8	462	**(Prefix)-30-SR12**	13 3/16	335	**(Prefix)-30-RR12**	18 3/8	462
		18	459	**(Prefix)-30-LR18**	14 15/16	380	**(Prefix)-30-SR18**	11 1/2	292	**(Prefix)-30-RR18**	14 15/16	380
		24	609	**(Prefix)-30-LR24**	11 1/2	292	**(Prefix)-30-SR24**	9 3/4	248	**(Prefix)-30-RR24**	11 1/2	292
36	914	6	152	**(Prefix)-36-LR06**	25 5/16	643	**(Prefix)-36-SR06**	16 11/16	424	**(Prefix)-36-RR06**	25 5/16	643
		9	228	**(Prefix)-36-LR09**	23 9/16	598	**(Prefix)-36-SR09**	15 13/16	402	**(Prefix)-36-RR09**	23 9/16	598
		12	305	**(Prefix)-36-LR12**	21 7/8	555	**(Prefix)-36-SR12**	14 15/16	380	**(Prefix)-36-RR12**	21 7/8	555
		18	457	**(Prefix)-36-LR18**	18 3/8	462	**(Prefix)-36-SR18**	13 3/16	335	**(Prefix)-36-RR18**	18 3/8	462
		24	609	**(Prefix)-36-LR24**	14 15/16	380	**(Prefix)-36-SR24**	11 1/2	292	**(Prefix)-36-RR24**	14 15/16	380
		30	762	**(Prefix)-36-LR30**	11 1/2	292	**(Prefix)-36-SR30**	9 3/4	248	**(Prefix)-36-RR30**	11 1/2	292

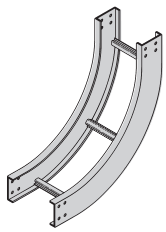
(Prefix) **See page LST-15 for catalog number prefix.**

All dimensions in parentheses are millimeters unless otherwise specified.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

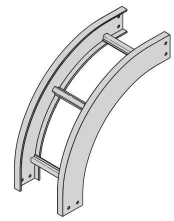
Vertical Bend 90° (VO, VI)

1 pair splice plates with hardware included.

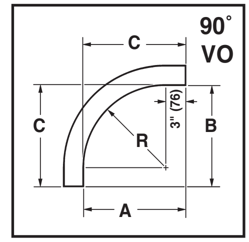




90° Vertical Inside



90° Vertical Outside



VO Dimensions All Series 1			
Bend Radius R	A	B	C
90° Vertical Bend			
12" (305)	15" (381)	15" (381)	15" (381)
24" (609)	27" (686)	27" (686)	27" (686)

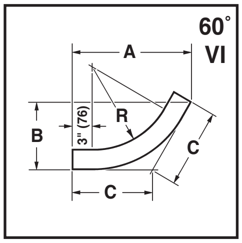
90° Vertical Inside Bend

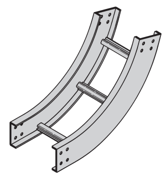
Bend Radius R		Width		Catalog No.	VI Dimensions											
					Series 14 Steel			Series 15 Steel			Series 16 Steel			Series 17 Steel		
in.	mm	in.	mm		A	B	C	A	B	C	A	B	C	A	B	C
12	305	6	152	**(Pre)-06-90(*)12**	18 7/16" (468)	18 7/16" (468)	18 7/16" (468)	19 3/16" (487)	19 3/16" (487)	19 3/16" (487)	20 3/16" (513)	20 3/16" (513)	20 3/16" (513)	21 3/16" (538)	21 3/16" (538)	21 3/16" (538)
		9	228	**(Pre)-09-90(*)12**												
		12	305	**(Pre)-12-90(*)12**												
		18	457	**(Pre)-18-90(*)12**												
		24	609	**(Pre)-24-90(*)12**												
		30	762	**(Pre)-30-90(*)12**												
		36	914	**(Pre)-36-90(*)12**												
24	609	6	152	**(Pre)-06-90(*)24**	30 7/16" (773)	30 7/16" (773)	30 7/16" (773)	31 3/16" (792)	31 3/16" (792)	31 3/16" (792)	32 3/16" (817)	32 3/16" (817)	32 3/16" (817)	33 3/16" (843)	33 3/16" (843)	33 3/16" (843)
		9	228	**(Pre)-09-90(*)24**												
		12	305	**(Pre)-12-90(*)24**												
		18	457	**(Pre)-18-90(*)24**												
		24	609	**(Pre)-24-90(*)24**												
		30	762	**(Pre)-30-90(*)24**												
		36	914	**(Pre)-36-90(*)24**												

(Pre) See page LST-15 for catalog number prefix.
(*) = Insert VI for Vertical Inside Bend. Insert VO for Vertical Outside Bend.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

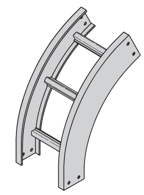
Vertical Bend 60° (VO, VI)

1 pair splice plates with hardware included.

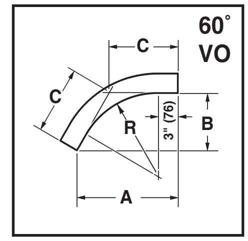




60° Vertical Inside



60° Vertical Outside



VO Dimensions All Series 1			
Bend Radius R	**A**	**B**	**C**
60° Vertical Bend			
12" (305)	14 7/8" (378)	8 5/8" (219)	9 15/16" (252)
24" (609)	25 5/16" (643)	14 5/8" (371)	16 7/8" (428)

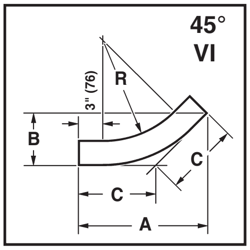
60° Vertical Inside Bend

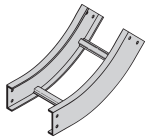
Bend Radius R		Tray Width		Catalog No.	VI Dimensions											
					Series 14 Steel			Series 15 Steel			Series 16 Steel			Series 17 Steel		
in.	mm	in.	mm		A	B	C	A	B	C	A	B	C	A	B	C
12	305	6	152	**(Pre)-06-60(*)12**	18 1/16" (459)	10 7/16" (265)	12" (305)	18 1/2" (470)	10 11/16" (271)	12 3/8" (314)	19 3/8" (492)	11 3/16" (284)	12 15/16" (328)	20 1/4" (514)	11 11/16" (297)	13 1/2" (343)
		9	228	**(Pre)-09-60(*)12**												
		12	305	**(Pre)-12-60(*)12**												
		18	457	**(Pre)-18-60(*)12**												
		24	609	**(Pre)-24-60(*)12**												
		30	762	**(Pre)-30-60(*)12**												
		36	914	**(Pre)-36-60(*)12**												
24	609	6	152	**(Pre)-06-60(*)24**	28 7/16" (722)	16 7/16" (417)	18 15/16" (481)	28 15/16" (735)	16 11/16" (424)	19 1/4" (489)	29 3/4" (755)	17 3/16" (436)	19 7/8" (505)	30 5/8" (778)	17 11/16" (449)	20 7/16" (519)
		9	228	**(Pre)-09-60(*)24**												
		12	305	**(Pre)-12-60(*)24**												
		18	457	**(Pre)-18-60(*)24**												
		24	609	**(Pre)-24-60(*)24**												
		30	762	**(Pre)-30-60(*)24**												
		36	914	**(Pre)-36-60(*)24**												

(Pre) See page LST-15 for catalog number prefix.
(*) = Insert VI for Vertical Inside Bend. Insert VO for Vertical Outside Bend.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

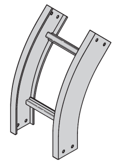
Vertical Bend 45° (VO, VI)

1 pair splice plates with hardware included.

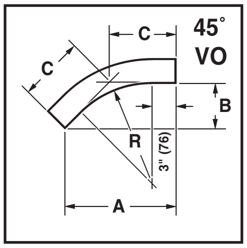




45° Vertical Inside



45° Vertical Outside



VO Dimensions All Series 1			
Bend Radius R	A	B	C
45° Vertical Bend			
12" (305)	13 5/8" (346)	5 5/8" (143)	8" (203)
24" (609)	22 1/16" (560)	9 1/8" (232)	12 15/16" (328)

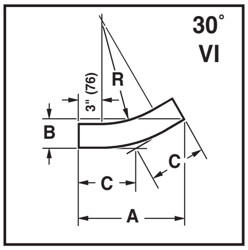
45° Vertical Inside Bend

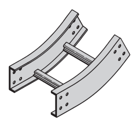
Bend Radius R in.	Bend Radius R mm	Tray Width in.	Tray Width mm	Catalog No.	VI Dimensions Series 14 Steel A	Series 14 Steel B	Series 14 Steel C	Series 15 Steel A	Series 15 Steel B	Series 15 Steel C	Series 16 Steel A	Series 16 Steel B	Series 16 Steel C	Series 17 Steel A	Series 17 Steel B	Series 17 Steel C
12	305	6	152	**(Pre)-06-45(*)12**	16 3/16" (411)	6 11/16" (170)	9 1/2" (241)	16 9/16" (420)	6 7/8" (174)	9 11/16" (246	17 1/4" (438)	7 3/16" (182)	10 1/8" (257	18" (457)	7 7/16" (189)	10 9/16" (268)
		9	228	**(Pre)-09-45(*)12**												
		12	305	**(Pre)-12-45(*)12**												
		18	457	**(Pre)-18-45(*)12**												
		24	609	**(Pre)-24-45(*)12**												
		30	762	**(Pre)-30-45(*)12**												
		36	914	**(Pre)-36-45(*)12**												
24	609	6	152	**(Pre)-06-45(*)24**	24 11/16" (627)	10 3/16" (259)	14 7/16" (367)	25 1/16" (662)	10 3/8" (263)	11 14/16" (373)	25 3/4" (654)	10 11/16" (271)	15 1/16" (382	26 1/2" (673)	11" (279)	15 1/2" (394)
		9	228	**(Pre)-09-45(*)24**												
		12	305	**(Pre)-12-45(*)24**												
		18	457	**(Pre)-18-45(*)24**												
		24	609	**(Pre)-24-45(*)24**												
		30	762	**(Pre)-30-45(*)24**												
		36	914	**(Pre)-36-45(*)24**												

(Pre) See page LST-15 for catalog number prefix.
(*) = Insert VI for Vertical Inside Bend. Insert VO for Vertical Outside Bend.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

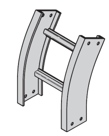
Vertical Bend 30° (VO, VI)

1 pair splice plates with hardware included.

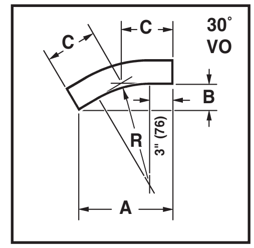




30° Vertical Inside



30° Vertical Outside



VO Dimensions All Series 1			
Bend Radius R	A	B	C
30° Vertical Bend			
12" (305)	11 5/8" (295)	3 1/8" (79)	6 3/16" (157)
24" (609)	17 5/8" (448)	4 11/16" (119)	9 7/16" (240)

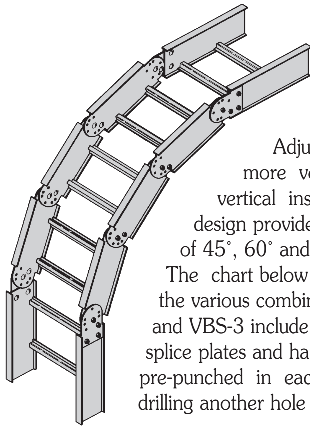
30° Vertical Inside Bend

Bend Radius R		Tray Width		Catalog No.	VI Dimensions											
					Series 14 Steel			Series 15 Steel			Series 16 Steel			Series 17 Steel		
in.	mm	n.	mm		A	B	C	A	B	C	A	B	C	A	B	C
		6	152	**(Pre)-06-30(*)12**												
		9	228	**(Pre)-09-30(*)12**												
		12	305	**(Pre)-12-30(*)12**	13 7/16"	3 5/8"	7 3/16"	13 11/16"	3 11/16"	7 5/16"	14 3/16"	3 13/16"	7 5/8"	14 11/16"	3 15/16"	7 7/8"
12	305	18	457	**(Pre)-18-30(*)12**												
		24	609	**(Pre)-24-30(*)12**	(341)	(92)	(182)	(347)	(93)	(186.2)	(360)	(97)	(193)	(373)	(100)	(200)
		30	762	**(Pre)-30-30(*)12**												
		36	914	**(Pre)-36-30(*)12**												
		6	152	**(Pre)-06-30(*)24**												
		9	228	**(Pre)-09-30(*)24**												
		12	305	**(Pre)-12-30(*)24**	19 7/16"	5 3/16"	10 7/16"	19 11/16"	5 5/16"	10 9/16"	20 3/16"	5 7/16"	10 13/16"	20 11/16"	5 9/16"	11 1/16"
24	609	18	457	**(Pre)-18-30(*)24**												
		24	609	**(Pre)-24-30(*)24**	(494)	(132)	(265)	(500)	(135)	(268)	(513)	(138)	(274)	(525)	(141)	(281)
		30	762	**(Pre)-30-30(*)24**												
		36	914	**(Pre)-36-30(*)24**												

(Pre) See page LST-15 for catalog number prefix.
(*) = Insert VI for Vertical Inside Bend. Insert VO for Vertical Outside Bend.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

Series 1 - *Fittings*

Vertical Bend Segments (VBS)



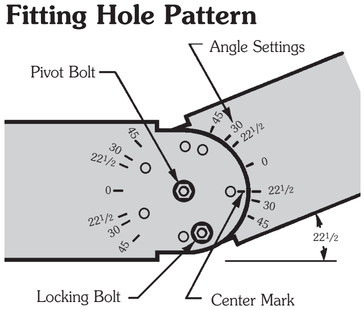
Available for **148P** and **148G** only.

Adjustable Vertical Bends are made up of one or more vertical bend segments and can be used as a vertical inside (VI) or vertical outside (VO) bend. This design provides for vertical changes in direction with angles of 45˚, 60˚ and 90˚ for 12" (305 mm) or 24" (609 mm) radius. The chart below shows the number of segments required for the various combinations of angles and radii. The VBS-1, VBS-2 and VBS-3 include one, two or three segments respectively with splice plates and hardware. Holes for setting standard angles are pre-punched in each segment. Other angles can be set by field drilling another hole for the locking bolt.

Nominal Bend Radius		Catalog No.	Dimensions											
			VO						VI					
			A		B		R		A		B		R	
in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
90˚ Vertical Inside or Outside														
12	305	**14(*)†-(‡)-VBS-1**	8¼	210	8¼	210	6½	165	12⅛	303	12⅛	303	10½	267
24	609	**14(*)†-(‡)-VBS-3**	24	610	24	610	22¼	565	27⅞	708	27⅞	708	26¼	667
60˚ Vertical Inside or Outside														
12	305	**14(*)†-(‡)-VBS-1**	11¾	298	6½	165	12	305	14¾	375	8½	216	16	406
24	609	**14(*)†-(‡)-VBS-2**	11¾	298	6½	165	12	305	14¾	375	8½	216	16	406
45˚ Vertical Inside or Outside														
12	305	**14(*)†-(‡)-VBS-1**	12¾	324	5¼	133	17⅛	435	15½	394	6⅞	175	21	540
24	609	**14(*)†-(‡)-VBS-1**	12¾	324	5¼	133	17⅛	435	15½	394	6⅞	175	21	540

Notes:
1. (*) Insert material type: P=Pre Galvanized, G=HDGAF
2. (†) Contact home office for information on Ventilated Trough and Solid Trough availability
3. (‡) Insert width 6, 9, 12, 18, 24, 30, 36

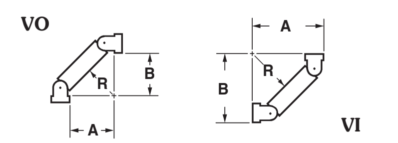
Fitting Hole Pattern



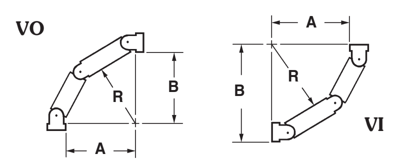
Setting the Angle
To find correct angle setting, divide angle of offset by the number of segments plus one. The result is equal to the angle setting stamped on the vertical bend segment and the splice plate. After inserting center pivot bolt, align the mark at the end of the segment or splice plate with the angle and insert locking bolt in the pre-punched hole.

Example: 90˚ bend, 24" radius requires 3 segments
3 segments + 1 = 4
90˚ divided by 4 = 22½˚
Set all vertical segments at 22½˚

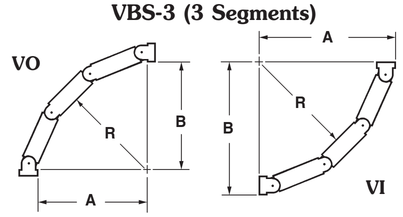
VBS-1 (1 Segment)



VBS-2 (2 Segments)



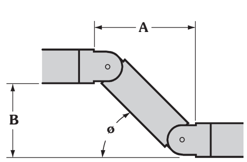
VBS-3 (3 Segments)



Offset Dimensions

One vertical bend segment can be used to complete a vertical offset. Offset dimensions are shown.

Angle ø	A		B	
	in.	mm	in.	mm
45˚	12	305	8½	216
30˚	14	355	5¾	146
22½˚	14¼	362	5	127

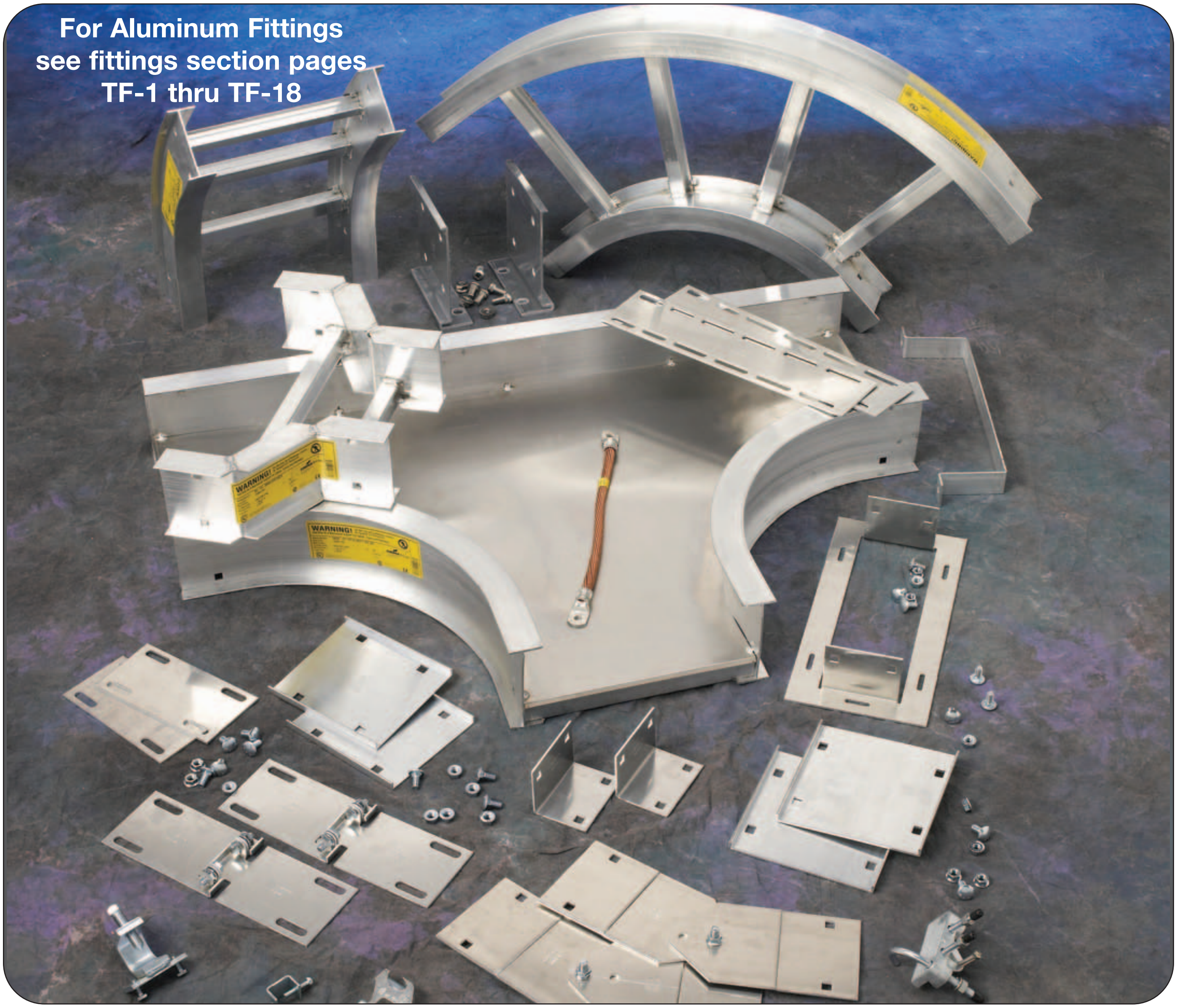


All dimensions in parentheses are millimeters unless otherwise specified.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Aluminum

Series 2, 3, 4, & 5 Aluminum



For Aluminum Fittings see fittings section pages TF-1 thru TF-18

How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Example: (from page AT-3)	**34A**	**VT**	-	**24**	-	**144**
	●	●		●		●
Lead time(days)	3-5	3-5		3-5		3-5

Part will typically ship in 5-10 days, because of the VT bottom type.

Series 2, 3, 4, & 5 Aluminum - Straight Sections

3" NEMA VE 1 Loading Depth
4" Side Rail Height

Straight Section Part Numbering

Prefix

Example: **24 A 09 - 24 - 144**

Series
- ● **24**
- ● **34**

Material
- ● **A** = Aluminum

***Type**

Ladder-
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-
6" thru 36" wide
- ● **VT** = Vented Trough
- ● **ST** = Non-Ventilated Trough

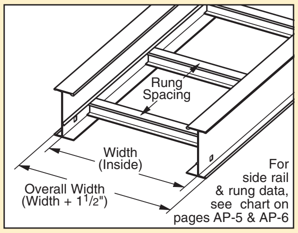
***Width**
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length

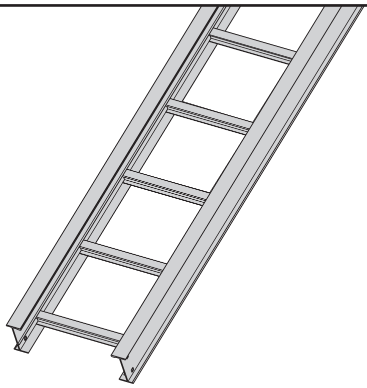
Length	Series
● ① **144** = 12 ft.	24
● ② 120 = 10 ft.	24
● ① **240** = 20 ft.	34
● ② 144 = 12 ft.	34

①Primary Length.
②Secondary Length.

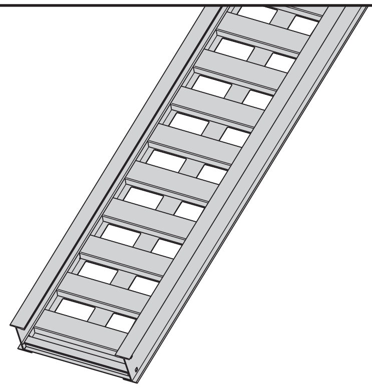
See page CTS-23 for explanation of lengths.



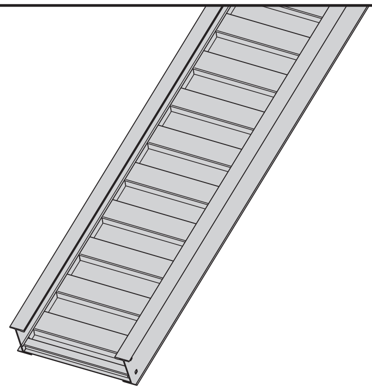
See page AP-1 for additional rung options. *Special sizes available.



Ladder Type
(Specify Rung Spacing)



Ventilated Trough



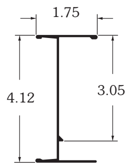
Non-Ventilated Trough

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

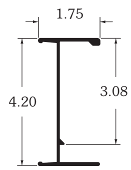
3" NEMA VE 1 Loading Depth
4" Side Rail Height

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply the published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
24		NEMA: 16A, 12C	6	487*	0.001		1.8	725*	0.017	
		CSA: D1-3m	8	284	0.003	Area=1.05 in^2	2.4	422	0.055	Area=6.77 cm^2
			10	181	0.008	Sx=1.34 in^3	3.0	270	0.135	Sx=21.96 cm^3
		UL Cross-Sectional	12	126	0.016	Ix=2.85 in^4	3.7	187	0.279	Ix=118.63 cm^4
		Area:1.00 in^2	14	93	0.030		4.3	138	0.518	
			16	71	0.052		4.9	105	0.883	

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.
* When using 18" rung spacing, load capacity is limited to 394 lbs/ft (586.27 kg/m) for 30" tray width and 325 lbs/ft (483.6 kg/m) for 36" tray width.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
34		NEMA: 20B, 16C	10	320	0.005		3.0	476	0.077	
		CSA: E-6m	12	222	0.009	Area=1.82 in^2	3.7	331	0.160	Area=11.74 cm^2
			14	163	0.017	Sx=2.10 in^3	4.3	243	0.296	Sx=34.41 cm^3
		UL Cross-Sectional	16	125	0.030	Ix=4.98 in^4	4.9	186	0.505	Ix=207.28 cm^4
		Area: 1.50 in^2	18	99	0.047		5.5	147	0.810	
			20	80	0.072		6.1	119	1.234	

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

4" NEMA VE 1 Loading Depth
5" Side Rail Height

Straight Section Part Numbering

Prefix
Example: **25 A 09 - 24 - 144**

Series
- ● **25**
- ● **35**

Material
- ● **A** = Aluminum

***Type**

Ladder-
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-
6" thru 36" wide
- ● **VT** = Vented Trough
- ● **ST** = Non-Ventilated Trough

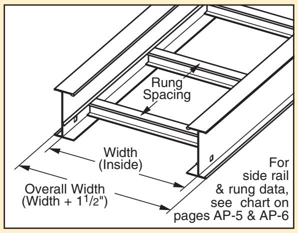
***Width**
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length

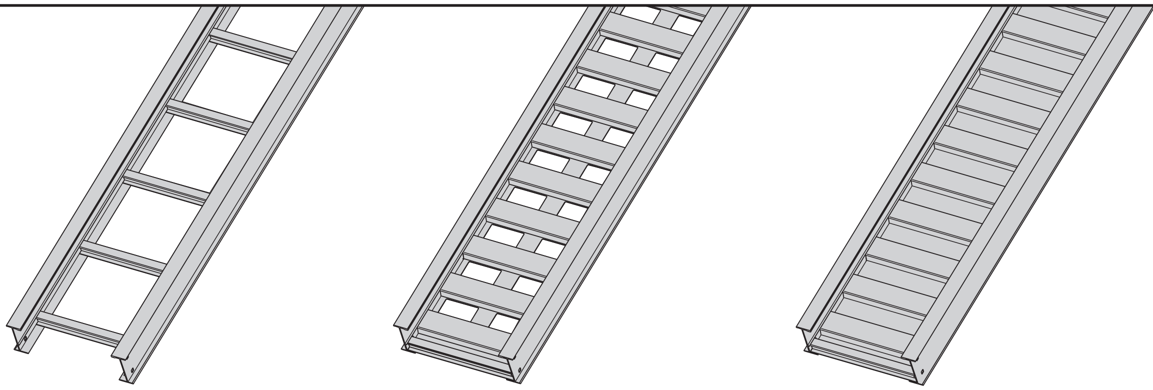
● ① **144** = 12 ft.		25
● ② 240 = 20 ft.		
● ① **240** = 20 ft.		35
● ② 144 = 12 ft.		

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.



See page AP-1 for additional rung options. *Special sizes available.



Ladder Type
(Specify Rung Spacing)

Ventilated Trough

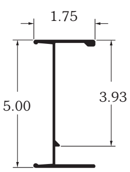
Non-Ventilated Trough

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

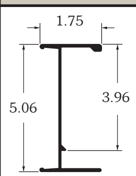
4" NEMA VE 1 Loading Depth
5" Side Rail Height

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
25		NEMA: 20A, 12C	10	200	0.0049		3.0	298	0.083	
		CSA: D1-6m	12	139	0.010	Area=1.24 in^2	3.7	207	0.172	Area=8.00 cm^2
			14	102	0.019	Sx=1.80 in^3	4.3	152	0.319	Sx=29.50 cm^3
		UL Cross-Sectional	16	78	0.032	Ix=4.62 in^4	4.9	116	0.545	Ix=192.30 cm^4
		Area: 1.00 in^2	18	62	0.051		5.5	92	0.873	
			20	50	0.078		6.1	74	1.330	

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
35		NEMA: 20B, 16C	10	310	0.0035		3.0	461	0.060	
		CSA: E-3m	12	215	0.0073	Area=1.67 in^2	3.7	320	0.125	Area=10.77 cm^2
			14	158	0.014	Sx=2.35 in^3	4.3	235	0.232	Sx=38.51 cm^3
		UL Cross-Sectional	16	121	0.023	Ix=6.37 in^4	4.9	180	0.395	Ix=265.14 cm^4
		Area: 1.50 in^2	18	96	0.037		5.5	142	0.633	
			20	77	0.057		6.1	115	0.965	

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

5" NEMA VE 1 Loading Depth
6" Side Rail Height

Straight Section Part Numbering

Prefix
Example: 26 A 09 - 24 - 144

Series
- ● **26**
- ● **36**
- ● **46**
- ● **H46†**

Material
- ● **A** = Aluminum

***Type**

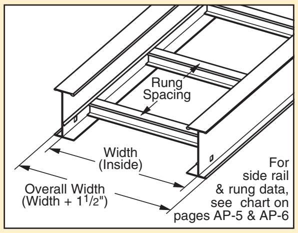
Ladder-
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-
6" thru 36" wide
- ● **VT** = Vented Trough
- ● **ST** = Non-Ventilated Trough

***Width**
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length

● ① **144** = 12 ft.	26	
● ② 240 = 20 ft.		
● ① **240** = 20 ft.	36	
● ② 144 = 12 ft.		
● ① **240** = 20 ft.	46	
● ② 288 = 24 ft.		
● ① **240** = 20 ft.	H46	
● ② 300 = 25 ft.		

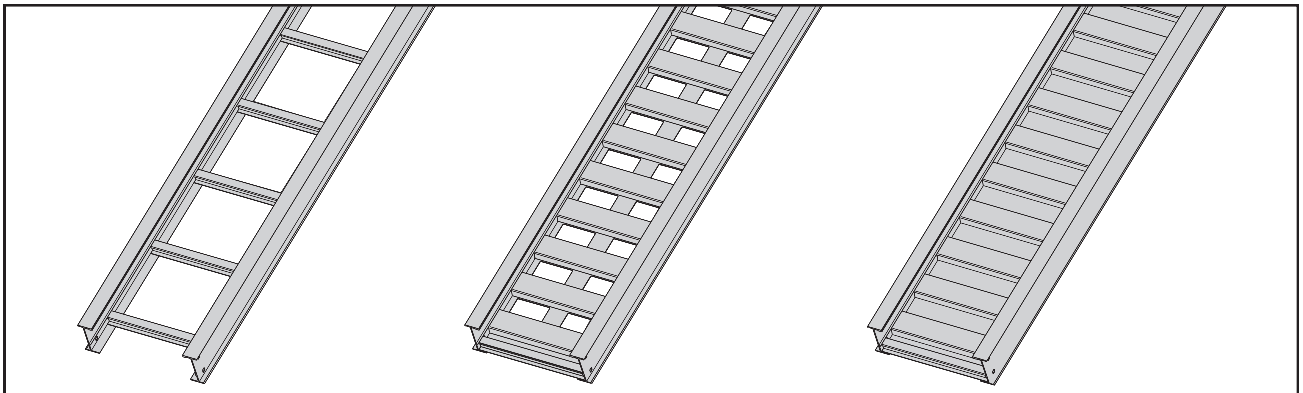


† H46A only available in 9" and 12" rung spacing See page AP-2.

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.

See page AP-1 for additional rung options. *Special sizes available.



Ladder Type (Specify Rung Spacing)

Ventilated Trough

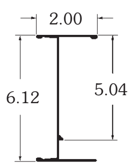
Non-Ventilated Trough

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

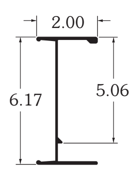
5" NEMA VE 1 Loading Depth
6" Side Rail Height

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support, without collapse, a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply the published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

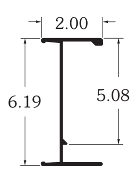
Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
26		NEMA: 20A, 16B CSA: D1-6m UL Cross-Sectional Area: 1.00 in^2	10 12 14 16 18 20	204 142 104 80 63 51	0.0028 0.006 0.011 0.019 0.030 0.045	Area=1.41 in^2 Sx=2.53 in^3 Ix=7.915 in^4	3.0 3.7 4.3 4.9 5.5 6.1	304 211 155 119 94 76	0.049 0.101 0.186 0.318 0.509 0.776	Area=9.10 cm^2 Sx=41.46 cm^3 Ix=329.45 cm^4

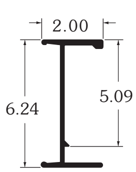
When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
36		NEMA: 20B, 16C CSA: E-6m UL Cross-Sectional Area: 1.50 in^2	12 14 16 18 20 22	233 171 131 104 84 69	0.0043 0.008 0.014 0.022 0.033 0.049	Area=1.81 in^2 Sx=3.36 in^3 Ix=10.85 in^4	3.7 4.3 4.9 5.5 6.1 6.7	347 255 195 154 125 103	0.073 0.136 0.232 0.372 0.566 0.829	Area=11.68 cm^2 Sx=55.06 cm^3 Ix=451.61 cm^4

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
46		NEMA: 20C CSA: E-6m UL Cross-Sectional Area: 1.50 in^2	14 16 18 20 22 24	210 161 127 103 85 72	0.0071 0.012 0.019 0.030 0.043 0.061	Area=2.06 in^2 Sx=3.59 in^3 Ix=12.18 in^4	4.3 4.9 5.5 6.1 6.7 7.3	313 239 189 153 127 106	0.121 0.207 0.331 0.505 0.739 1.046	Area=13.29 cm^2 Sx=58.83 cm^3 Ix=506.97 cm^4

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
H46		NEMA: 20C+ CSA: 131 kg/m 7.6m UL Cross-Sectional Area: 2.00 in^2	16 18 20 22 24 25	261 206 167 138 116 88	0.0085 0.014 0.021 0.030 0.043 0.051	Area=2.95 in^2 Sx=5.33 in^3 Ix=17.30 in^4	4.9 5.5 6.1 6.7 7.3 7.6	388 307 248 205 173 131	0.145 0.233 0.355 0.520 0.737 0.867	Area=19.03 cm^2 Sx=87.34 cm^3 Ix=720.08 cm^4

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

6" NEMA VE 1 Loading Depth
7" Side Rail Height

Straight Section Part Numbering

Prefix

Example: **37 A 09 - 24 - 240**

Series

- ● **37**
- ● **47**
- ● **H47†**
- ● **57†**

Material

- ● **A** = Aluminum

***Type**

Ladder-

- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

- ● **Trough-**
- ● 6" thru 36" wide

VT = Vented Trough
ST = Non-Ventilated Trough

† H47A & 57A only available in 9" and 12" rung spacing. See page AP-2.

***Width**

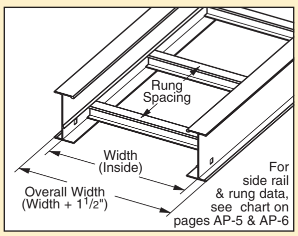
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length

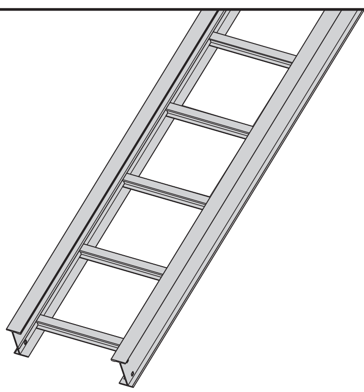
● ① **240** = 20 ft.	37	
● ② 144 = 12 ft.		
● ① **240** = 20 ft.	47	
● ② 288 = 24 ft.		
● ① **240** = 20 ft.	H47	
● ② 300 = 25 ft.		
● ① **360** = 30 ft.	57	
● ② 300 = 25 ft.		

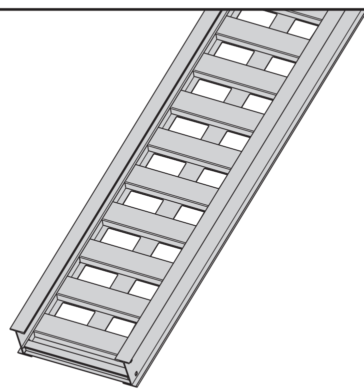
①Primary Length.
②Secondary Length.

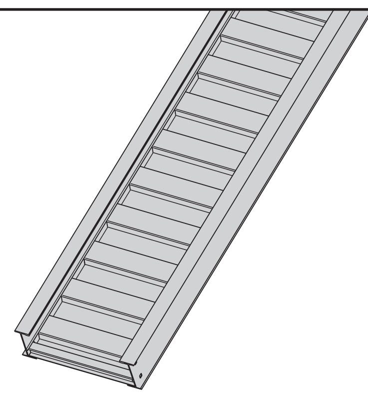
See page CTS-23 for explanation of lengths.



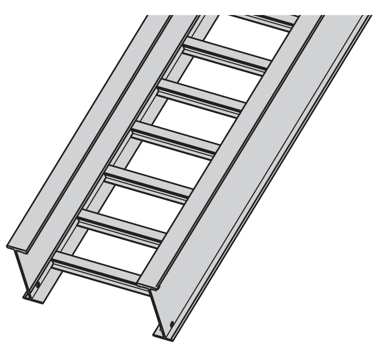
See page AP-1 for additional rung options. *Special sizes available.


Ladder Type
(Specify Rung Spacing)


Ventilated Trough


Non-Ventilated Trough

57A available in
(9" & 12" rung spacing in
12" to 36" widths)

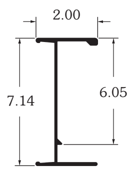


● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

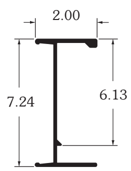
6" NEMA VE 1 Loading Depth
7" Side Rail Height

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply the published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

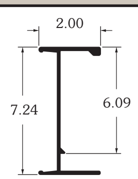
Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
37		NEMA: 20B, 16C CSA: 106 kg/m 6.1m UL Cross-Sectional Area: 1.50 in^2	12 14 16 18 20 22	222 163 125 99 80 66	0.0035 0.0064 0.011 0.017 0.027 0.039	Area=1.81 in^2 Sx=3.77 in^3 Ix=13.50 in^4	3.7 4.3 4.9 5.5 6.1 6.7	331 243 186 147 119 98	0.059 0.109 0.186 0.299 0.455 0.666	Area=11.68 cm^2 Sx=61.78 cm^3 Ix=561.91 cm^4

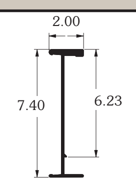
When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
47		NEMA: 20C CSA: 142 kg/m 6.1m UL Cross-Sectional Area: 2.00 in^2	14 16 18 20 22 24	204 156 123 100 83 69	0.0048 0.0082 0.0132 0.0201 0.0295 0.0418	Area=2.38 in^2 Sx=4.94 in^3 Ix=17.88 in^4	4.3 4.9 5.5 6.1 6.7 7.3	304 233 184 149 123 103	0.083 0.141 0.225 0.344 0.503 0.713	Area=15.35 cm^2 Sx=80.95 cm^3 Ix=744.22 cm^4

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
H47		NEMA: 20C+ CSA: 241 kg/m 6.1m UL Cross-Sectional Area: 2.00 in^2	16 18 20 22 24 25	233 184 149 123 103 95	0.0064 0.010 0.016 0.023 0.033 0.038	Area=3.04 in^2 Sx=6.10 in^3 Ix=22.91 in^4	4.9 5.5 6.1 6.7 7.3 7.6	346 274 222 183 154 142	0.110 0.176 0.268 0.393 0.556 0.655	Area=19.61 cm^2 Sx=99.96 cm^3 Ix=953.59 cm^4

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
57		NEMA: 20C+ CSA: 152 kg/m 9.1m UL Cross-Sectional Area: 2.00 in^2	20 22 24 26 28 30	232 192 161 136 117 102	0.011 0.016 0.023 0.031 0.042 0.055	Area=4.22 in^2 Sx=7.73 in^3 Ix=32.86 in^4	6.1 6.7 7.3 7.9 8.5 9.1	345 285 240 202 174 152	0.187 0.274 0.388 0.534 0.718 0.947	Area=27.23 cm^2 Sx=126.67 cm^3 Ix=1367.74 cm^4

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

6" NEMA VE 1 Loading Depth
8" Side Rail Height

Straight Section Part Numbering

Prefix

Example: **S8 A 09 - 24 - 240**

Series
- ● **S8**

Material
- ● **A** = Aluminum

***Type**

Ladder-
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

***Width**
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

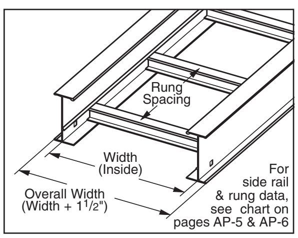
Length
- ● ① **360** = 30 ft.
- ● ② 300 = 25 ft.

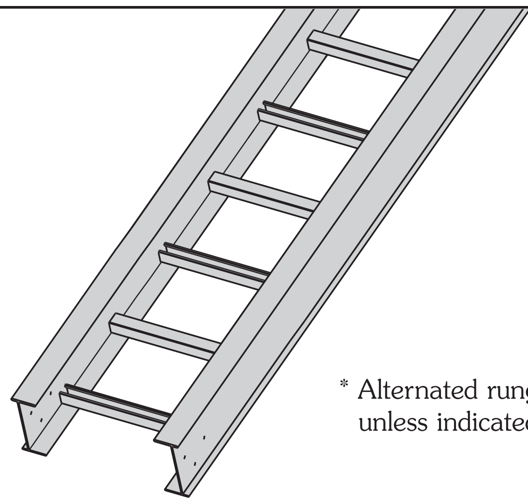
S8

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.

See page AP-1 for additional rung options. *Special sizes available.





* Alternated rung unless indicated.

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply the published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
S8A	3.00, 8.00, 6.175	NEMA: 20C+ CSA: 240 kg/m 9.1m UL Cross-Sectional Area: 2.00 in^2	20 22 24 26 28 30	363 300 252 215 185 161	0.007 0.010 0.013 0.019 0.025 0.033	Area=5.50 in^2 Sx=15.39 in^3 Ix=55.35 in^4	6.1 6.7 7.3 7.9 8.5 9.1	540 446 375 320 276 240	0.111 0.163 0.230 0.317 0.427 0.562	Area=35.48 cm^2 Sx=252.20 cm^3 Ix=2303.84 cm^4

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

The following is a list of accessories and fittings that can be provided with S8A tray. For more information on these items, contact the Engineering Department at Cooper B-Line.

Fittings ●

Horizontal Bends
30° Bends with 24”, 36”, or 48” radius
45° Bends with 24”, 36”, or 48” radius
60° Bends with 24”, 36”, or 48” radius
90° Bends with 24”, 36”, or 48” radius

Horizontal Tees
With 24”, 36”, or 48” radius

Vertical Outside Bends
30° Bends with 24”, 36”, or 48” radius
45° Bends with 24”, 36”, or 48” radius
60° Bends with 24”, 36”, or 48” radius
90° Bends with 24”, 36”, or 48” radius

Vertical Inside Bends
30° Bends with 24”, 36”, or 48” radius
45° Bends with 24”, 36”, or 48” radius
60° Bends with 24”, 36”, or 48” radius
90° Bends with 24”, 36”, or 48” radius

Reducing Fittings

Accessories ●

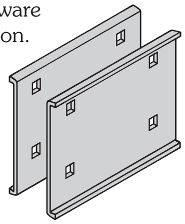
Splice Plate - 9A-1008
Expansion Splice Plate - 9A-1018
Horizontal Adjustable Splice Plate - 9A-1038
Vertical Adjustable Splice Plate - 9A-1028
Hold Down Clamps - 9ZN-1281, 9G-1281, 9A-1281
Guides - S9ZN-1202, S9G-1202
Step Down Splice Plate - 9A-1050, 9A-1078
Other Accessories Include:
Offset Splice Plates
Blind Ends

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Aluminum - Accessories

Wedge Lock Splice Plates
(Excluding H46, H47 & 57 Series)

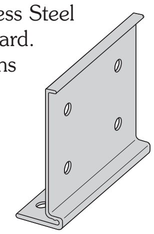
- Standard 4-hole pattern (except 9A-1007).
- Furnished in pairs, with hardware.
- One pair including hardware provided with each section.
- Boxed in pairs with hardware.
- For field installation drill 13/32" hole.



Catalog No.	Height in.	Height mm
● 9A-1004	4	101
● 9A-1005	5	127
● 9A-1006	6	152
● 9A-1007	7	178

H46A, H47A and 57A Mid-Span Splice

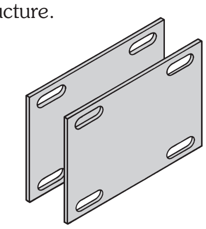
- Standard for H46A, H47A and 57A straight sections.
- Six bolt design 1/2" Stainless Steel Type 316 hardware standard.
- Available on ladder bottoms only. 09 and 12" rung spacing.



Tray Series	Catalog No.
H46A	● 9A-6006
H47A, 57A	● 9A-6007

Expansion Splice Plates

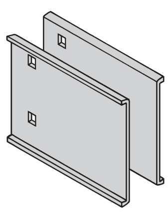
- Expansion plates allow for one inch expansion or contraction of the cable tray, or where expansion joints occur in the supporting structure.
- Furnished in pairs with hardware.
- **Bonding Jumpers are required on each siderail. Order Separately.**



Catalog No.	Height in.	Height mm
● 9A-1014	4	101
● 9A-1015	5	127
● 9A-1016	6	152
● 9A-1017	7	178

Universal Splice Plates

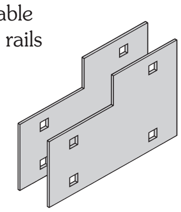
- Used to splice to existing cable tray systems.
- Furnished in pairs with hardware.



Catalog No.	Height in.	Height mm
● 9A-1004-1/2	4	101
● 9A-1005-1/2	5	127
● 9A-1006-1/2	6	152
● 9A-1007-1/2	7	178

Step Down Splice Plates

- These splice plates are offered for connecting cable tray sections having side rails of different heights.
- Furnished in pairs with hardware.

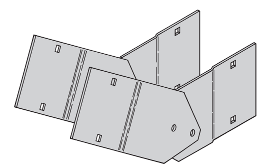


Catalog No.	Height in.	Height mm
● 9A-1045	5 to 4	127 to 101
● 9A-1046	6 to 4	152 to 101
● 9A-1060	6 to 5	152 to 127
● 9A-1047	7 to 4	178 to 101
● 9A-1061	7 to 5	178 to 127
● 9A-1062	7 to 6	178 to 152

Vertical Adjustable Splice Plates

- These plates provide for changes in elevation that do not conform to standard vertical fittings.
- Furnished in pairs with hardware.
- **Bonding Jumper not required.**

Requires supports within 24" on both sides, per NEMA VE 2.

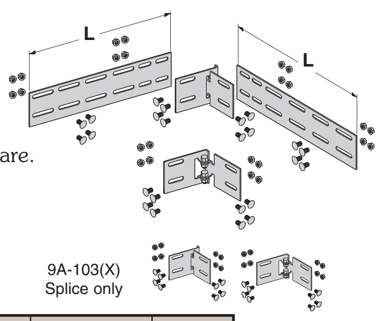


Catalog No.	Height in.	Height mm
● 9A-1024	4	101
● 9A-1025	5	127
● 9A-1026	6	152
● 9A-1027	7	178

Horizontal Adjustable Splice Plates

- Offered to adjust a cable tray run for changes in direction in a horizontal plane that do not conform to standard horizontal fittings.
- Furnished in pairs with hardware.
- New design bonding jumpers **not** required.
- (X) Insert 4, 5, 6 or 7 for side rail height.

9A-103(X)-12 or 9A-103(X)-36
One pair splice plates with extensions.



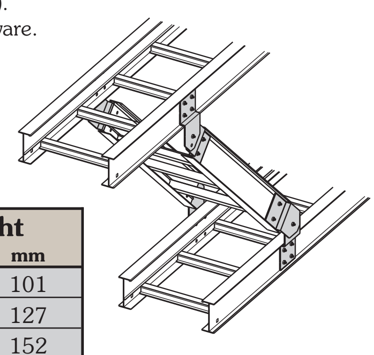
9A-103(X)
Splice only

Catalog No.	Cable Tray End Cut	Tray Width	'L'
● 9A-103(X)	Mitered	Thru 36"	N/A
● 9A-103(X)-12	Not mitered	Thru 12"	16"
● 9A-103(X)-36	Not mitered	Thru 36"	41"

Requires supports within 24" on both sides, per NEMA VE 2.

Branch Pivot Connectors

- Branch from existing cable tray runs at any point.
- Pivot to any required angle.
- UL Classified for grounding (bonding jumper not required).
- Furnished in pairs with hardware.



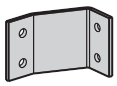
Catalog No.	Height in.	Height mm
● 9A-2044	4	101
● 9A-2045	5	127
● 9A-2046	6	152
● 9A-2047	7	178

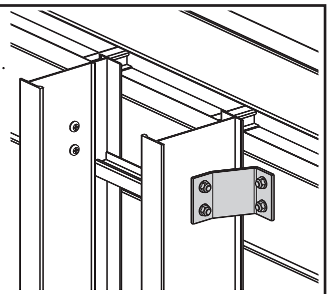
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Aluminum - Accessories

Cross Connector Bracket

- For field connecting crossing section.
- Furnished in pairs with 3/8" hardware.

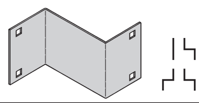




Catalog No.	● 9A-1240

Offset Reducing Splice Plate

- This plate is used for joining cable trays having different widths. When used in pairs they form a straight reduction; when used singly with a standard splice plate, they form an offset reduction.
- Furnished as one plate with hardware.
- (‡) Insert reduction



Catalog No.	Height in.	Height mm
● 9A-1064-(‡)	4	101
● 9A-1065-(‡)	5	127
● 9A-1066-(‡)	6	152
● 9A-1067-(‡)	7	178

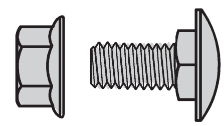
Tray Hardware

For field installation drill 13/32" hole.

Standard Tray Hardware

Catalog No. ● **SNCB 3/8" x 3/4" Znplt** Square Neck Carriage Bolt ASTM A307 Grade A

Catalog No. ● **SFHN 3/8"-16 Znplt** Serrated Flange Hex Nut ASTM A563 Grade A



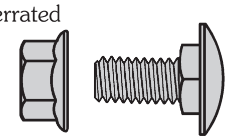
Finish: Zinc Plated ASTM B633, SC1

Optional Tray Hardware

Catalog No. ● **SNCB 3/8" x 3/4" SS6** Square Neck Carriage Bolt AISI 316 Stainless Steel

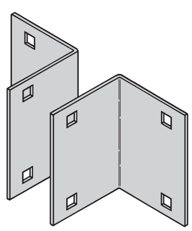
Catalog No. ● **SFHN 3/8"-16 SS6** Serrated Flange Hex Nut AISI 316 Stainless Steel

To order optional 316 Stainless Steel hardware add SS6 suffix to part number
Example: 9A-1004SS6



Tray to Box Splice Plates

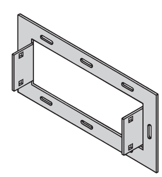
- Used to attach the end of a cable tray run to a distribution box or control panel.
- Furnished in pairs with hardware.



Catalog No.	Height in.	Height mm
● 9A-1054	4	101
● 9A-1055	5	127
● 9A-1056	6	152
● 9A-1057	7	178

Frame Type Box Connector

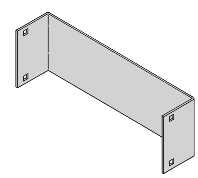
- Designed to attach the end of a cable tray run to a distribution cabinet or control center to help reinforce the box at the point of entry.
- Furnished with tray connection hardware.
- (‡) Insert tray width



Catalog No.	Height in.	Height mm
● 9A-1074-(‡)	4	101
● 9A-1075-(‡)	5	127
● 9A-1076-(‡)	6	152
● 9A-1077-(‡)	7	178

Blind End

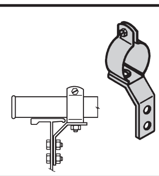
- This plate forms a closure for a dead end cable tray.
- Furnished as one plate with hardware.
- (‡) Insert tray width



Catalog No.	Height in.	Height mm
● 9A-1084-(‡)	4	101
● 9A-1085-(‡)	5	127
● 9A-1086-(‡)	6	152
● 9A-1087-(‡)	7	178

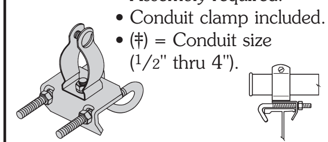
Conduit to Cable Tray Adaptors

- Assembly required.
- Mounting hardware included.
- Conduit clamps provided.
- (‡) = Conduit size (1/2" thru 4").



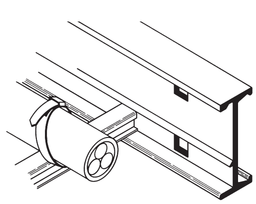
Catalog No.	● 9ZN-1150-(‡)

- Assembly required.
- Conduit clamp included.
- (‡) = Conduit size (1/2" thru 4").



Catalog No.	● 9ZN-1155-(‡)

Cable Tie (Ladder Tray)



Nylon ties provide easy attachment of cable to ladder rungs; maximum cable O.D. is 3" (76mm).

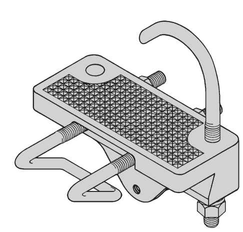
Overall Length 15"

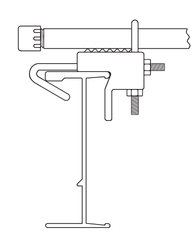
Catalog No.	● 99-2125-15

Refer to Section CF Cable Fixing

Conduit to Cable Tray Adaptor

- For easy attachment of conduit terminating at a cable tray.
- Use on aluminum or steel cable trays.





Aluminum I-Beam

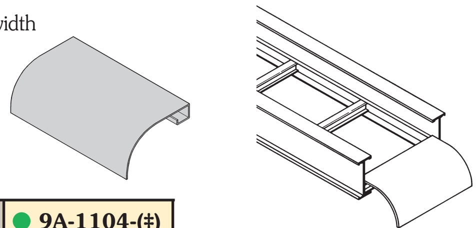
Catalog No.	Conduit Size in.	Conduit Size mm
● 9G-1158-1/2, 3/4	1/2, 3/4	15, 20
● 9G-1158-1, 1 1/4	1, 1 1/4	25, 32
● 9G-1158-1 1/2, 2	1 1/2, 2	40, 50
● 9G-1158-2 1/2, 3	2 1/2, 3	65, 80
● 9G-1158-3 1/2, 4	3 1/2, 4	90, 100

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Aluminum - Accessories

Ladder Drop-Out

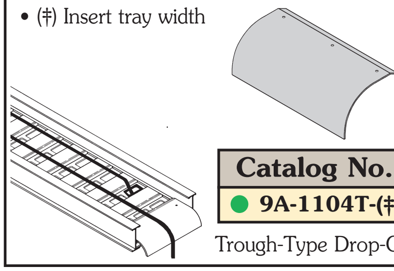
- Specially-designed Ladder Drop-Outs provide a rounded surface with 4" (101 mm) radius to protect cable as it exits from the cable tray, preventing damage to insulation. The drop-out will attach to any desired rung.
- (‡) Insert tray width



Catalog No.	● 9A-1104-(‡)

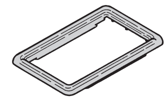
Trough Drop-Out & Drop-Out Bushing

- These devices provide a rounded surface to protect cable as it exits from the trough-type cable tray.
- Hardware is included for attachment of the trough bottom drop-out.
- (‡) Insert tray width



Catalog No.
● 9A-1104T-(‡)

Trough-Type Drop-Out



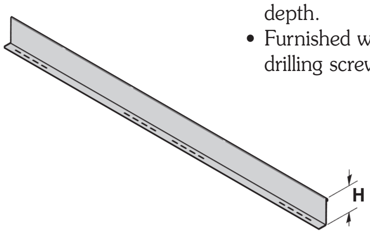
Catalog No.
● 99-1124

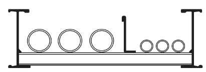
Snap-In Plastic Bushing

Barriers

Straight Section

- Standard length: 120" (3 m) 144" (12 ft.).
- Order catalog number based on loading depth.
- Furnished with four #10 x ½" plated self-drilling screws and a 99-9982 splice.



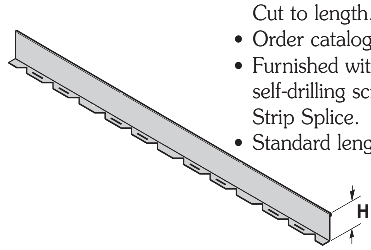


Catalog No.	Side Rail Height in.	Side Rail Height mm	Loading Depth 'H' in.	Loading Depth 'H' mm
● 73A-Length	4	101	3	76
● 74A-Length	5	127	4	101
● 75A-Length	6	152	5	127
● 76A-Length	7	178	6	152

Length = 144 for 12' or 120 for 10'

Horizontal Bend

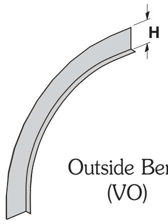
- Horizontal Bend Barriers are flexible in order to conform to any horizontal fitting radius. Cut to length.
- Order catalog number based on loading depth.
- Furnished with three #10 x 1/2" zinc plated self-drilling screws and a 99-9982 Barrier Strip Splice.
- Standard length is 72" (6 ft.), sold individually.



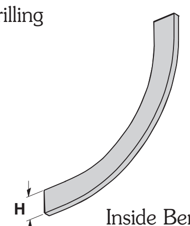
Catalog No.	Side Rail Height in.	Side Rail Height mm	Loading Depth 'H' in.	Loading Depth 'H' mm
● 73A-90HBFL	4	101	3	76
● 74A-90HBFL	5	127	4	101
● 75A-90HBFL	6	152	5	127
● 76A-90HBFL	7	178	6	152

Vertical Bend Barriers

- Vertical Bend Barriers are preformed to conform to a specific vertical fitting.
- Furnished with three #10 x ½" plated self-drilling screws and a 99-9982 Barrier Strip Splice.
- (*) Insert 30, 45, 60 or 90 for degrees
- (†) Insert 12, 24, 36 or 48 for radius



Outside Bend (VO)

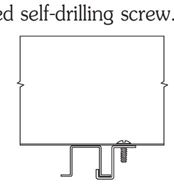


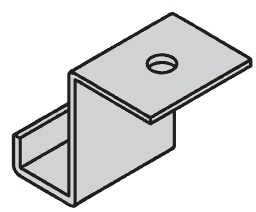
Inside Bend (VI)

Inside Bend Catalog No.	Outside Bend Catalog No.	Side Rail Height in.	Side Rail Height mm	Loading Depth 'H' in.	Loading Depth 'H' mm
● 73A-(*)VI(†)	● 73A-(*)VO(†)	4	101	3	76
● 74A-(*)VI(†)	● 74A-(*)VO(†)	5	127	4	101
● 75A-(*)VI(†)	● 75A-(*)VO(†)	6	152	5	127
● 76A-(*)VI(†)	● 76A-(*)VO(†)	7	178	6	152

Barrier Strip Clip

- Zinc plated steel barrier clip fastens to either aluminum or steel ladder rung.
- Furnished with one #10 x ½" zinc plated self-drilling screw.

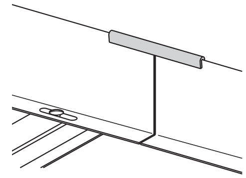


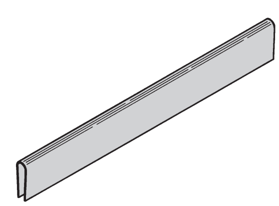


Catalog No.	● 9ZN-9002

Barrier Strip Splice

- Plastic splice holds adjoining barrier strips in straight alignment.



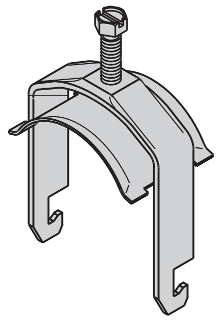


Catalog No.	● 99-9982

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

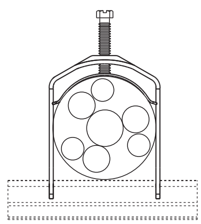
Stainless Steel Cable Clamp "P"

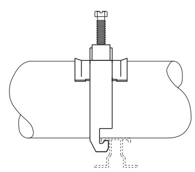
- Fits with series 2, 3, & 4 rungs.
- Attaches to rung at any point.
- 14 gauge Type 316 stainless steel material to minimize corrosion and induction heating.
- Plated steel and aluminum also available.



Refer to Section CF Cable Fixing

Catalog No.	Cable Size in.	Cable Size mm
● **BP081SS**	.250 - .840	6.4 - 21.3
● **BP110SS**	.810 - 1.100	20.6 - 28.0
● **BP135SS**	.850 - 1.350	21.6 - 34.8
● **BP175SS**	1.250 - 1.750	31.8 - 44.5
● **BP205SS**	1.550 - 2.050	39.4 - 52.1
● **BP250SS**	2.000 - 2.500	50.8 - 63.5
● **BP300SS**	2.500 - 3.000	63.5 - 76.2
● **BP325SS**	2.750 - 3.250	69.9 - 82.6
● **BP375SS**	3.250 - 3.750	82.6 - 95.3
● **BP425SS**	3.750 - 4.250	95.3 - 108.0
● **BP475SS**	4.250 - 4.750	108.0 - 120.7

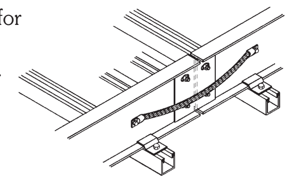




Bonding Jumper

Use at each expansion splice and where the cable tray is not mechanically/electrically continuous to ground.
Sold individually.

- Hardware included.
- See table 392.7(B)(2) on page CTS-9 for amperage ratings required to match the UL cross-sectional area of the tray.
- See tray loading chart for UL cross-sectional area.
- Bonding jumper is 16" long.

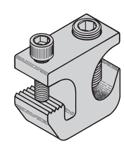


Catalog No.	Cross-Sectional Area	Ampacity
● **99-N1**	0.40 Square inches	600
● **99-40**	1.5 Square inches	1600
● **99-1620**	2.0 Square inches	2000

Grounding Clamp

Cooper B-Line Cable Tray is UL® classified as to its suitability as an equipment grounding conductor. If a separate conductor for additional grounding capability is desired, Cooper B-Line offers this clamp for bolting the conductor at least once to each cable tray section.

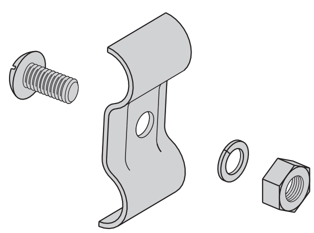
- Accepts #6 AWG to 250 MCM.



Catalog No.	Material
● **9A-2130**	Tin Plated Aluminum

Ground Clamp

- Mechanically attaches grounding cables to cable tray.
- Hardware included.
- (*) Insert **ZN** or **SS4**

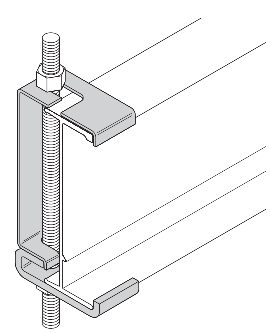


Catalog No.	Cable Size
9(*)-2351	#1 thru 2/0
9(*)-2352	3/0 thru 250 MCM

Hanger Rod Clamp

- For 1/2" ATR.
- Furnished in pairs.
- Order ATR and hex nuts separately.
- Two-piece "J"-hanger design.
- 1500 lbs./pair capacity safety factor 3.
- (*) Insert **ZN** or **G**

Catalog No.	Rail Height in.	Rail Height mm
9(*)-5324	4	101
9(*)-5325	5	127
9(*)-5326	6	152
9(*)-5327	7	178

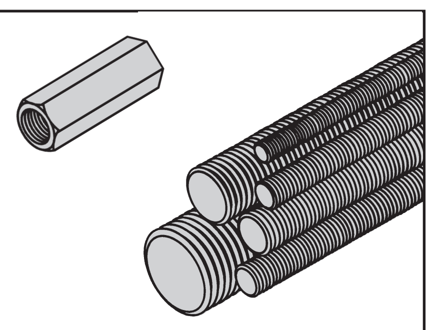


Threaded Rod (ATR) & Rod Coupling

Size	Loading lbs	Catalog No.	Available Lengths	Coupling Cat. No.
3/8"-16	730	● **ATR 3/8" x Length**	36", 72", 120", 144"	● **B655-3/8**
1/2"-13	1350	● **ATR 1/2" x Length**	36", 72", 120", 144"	● **B655-1/2**

All dimensions in shaded areas are millimeters unless otherwise specified.

Loading based on safety factor 5.
Standard Finish: Zinc plated
See B-Line Strut Systems Catalog for other sizes and finishes.

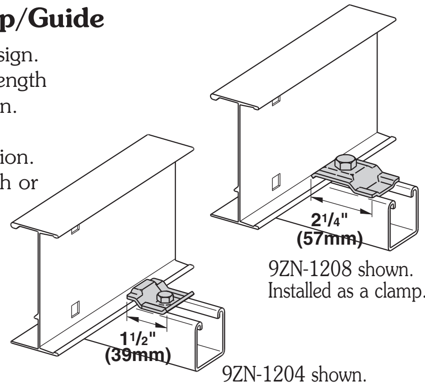


● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Aluminum - *Accessories*

Cable Tray Clamp/Guide

- Features a no-twist design.
- Has four times the strength of the traditional design.
- Each side is labeled to ensure proper installation.
- Furnished in pairs, with or without hardware.



9ZN-1208 shown. Installed as a clamp.

9ZN-1204 shown. Installed as a guide.

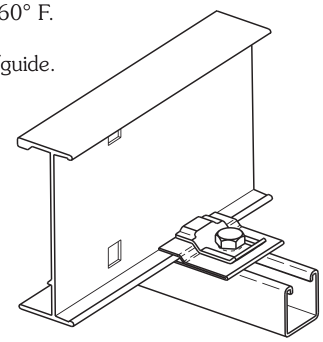
Patent # RE35479

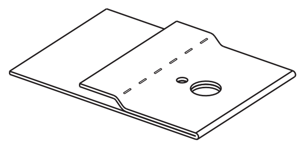
Note: For heavy duty or vertical applications see 9(*)-1241 or 9(*)-1242 page AT-20

Catalog No.		Overall Length		Hardware Size	Finish
Without Hardware	With Hardware	in.	mm		
● 9ZN-1204	● 9ZN-1204NB	1 1/2	38	1/4"	Znplt
● 9ZN-1208	● 9ZN-1208NB	2 1/4	57	3/8"	Znplt
● 9A-1205	--	2 1/4	57	1/2"	Alum.
● 9G-1205	--	2 1/4	57	1/2"	HDGAF
● 9SS6-1205	--	2 1/4	57	1/2"	316SS
● 9ZN-1205	--	2 1/4	57	1/2"	Znplt

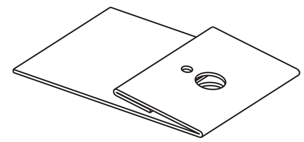
Isolator Pad

- Use as a friction reducer and/or as a dissimilar metal isolator barrier.
- UV resistant HDPE.
- Temperature range: -100 to 160° F.
- Designed to use with 9(*)-1205 or 9(*)-1208 clamp/guide.





Isolation pad shown as when used with a guide.

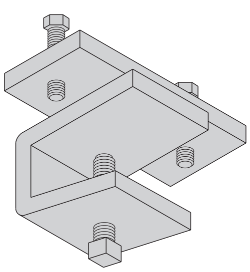


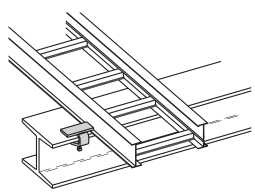
Isolation pad shown with top flange doubled under for clamp application.

Catalog No.	● 99-PE34

Cable Tray Clamp

- Hold-down clamps for single or double cable tray runs.
- No drilling of support I-beam or channel is required.
- Sold in pieces
  - two clamps are required per tray.
- Maximum beam flange thickness 1 1/8" (28.58 mm).

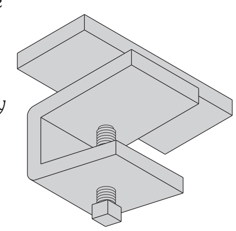




Catalog No.	Finish
● 9ZN-1249HD	Znplt
● 9G-1249HD	HDGAF

Cable Tray Guide

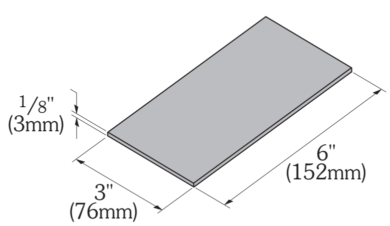
- Expansion guide for single or double cable tray runs.
- Guide allows for longitudinal movement of the cable tray.
- No field drilling of support I-beam or channel is required.
- Guides are required on both sides of cable tray to prevent lateral movement - can be placed on either the inside or outside flange of cable tray.
- Guides are sold in pieces - two guides are required per tray.
- Maximum flange thickness 1 1/8" (28.58 mm).



Catalog No.	Finish
● 9ZN-1249	Znplt
● 9G-1249	HDGAF

Nylon Pad

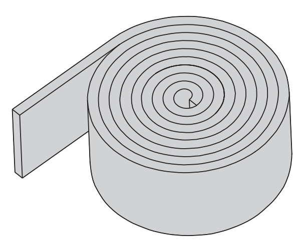
- Use for friction reduction.
- Hardness: Shore D80.
- Low friction coefficient.
- UV resistant (black).
- Excellent weatherability.
- UL - 94HB.



Catalog No.	● 99-NY36

Neoprene Roll

- Use for material isolation.
- 1/8" x 2" x 20' roll.
- Hardness: Shore A60.
- Good weatherability.



Catalog No.	● 99-NP240

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

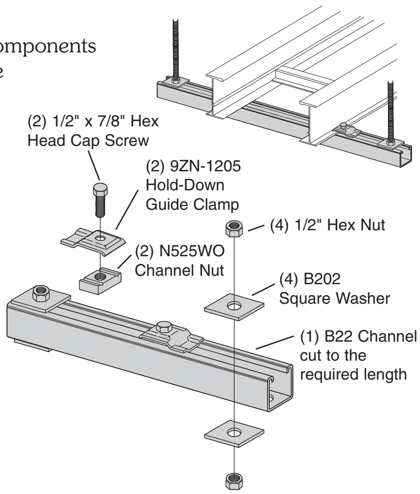
Trapeze Support Kit

Cooper B-Line's trapeze kits provide the components required for a single trapeze support in one package. These kits are available in pre-galvanized steel with zinc-plated hardware or hot dip galvanized steel with 316 stainless steel hardware.

The SH channel provides the convenience of pre-punched slots, which eliminate the need for field drilling.

The illustrated hardware is sealed in a plastic bag and boxed with the channel, which is pre-cut to the appropriate length as shown in the chart.

Designed for use with 1/2" threaded rod. Order rod separately.



Catalog No.	Tray Width in.	Tray Width mm	Channel Length in.	Channel Length mm	Uniform Load lbs	Uniform Load kN
● 9P-5506-22SH(†)	6	152	16	406	1600	7.11
● 9P-5509-22SH(†)	9	229	18	457	1250	5.56
● 9P-5512-22SH(†)	12	305	22	559	1125	5.00
● 9P-5518-22SH(†)	18	457	28	711	865	3.85
● 9P-5524-22SH(†)	24	610	34	864	700	3.11
● 9P-5530-22SH(†)	30	762	40	1016	590	2.62
● 9P-5536-22SH(†)	36	914	46	1168	510	2.27
● 9P-5542-22SH(†)	42	1067	52	1321	450	2.00

• (†) Insert 3/8 for 3/8" threaded rod hardware.

Safety factor of 3.0 on all loads.

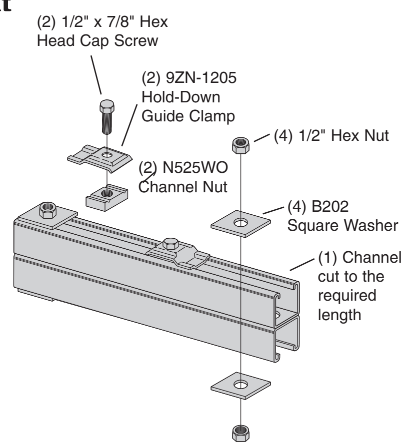
Heavy Duty Trapeze Support Kit

Cooper B-Line's trapeze kits provide the components required for a single trapeze support in one package. These kits are available in Dura-Green® epoxy coated steel with zinc-plated hardware or hot dip galvanized steel with 316 stainless steel hardware.

The SH channel provides the convenience of pre-punched slots, which eliminates the need for field drilling.

The illustrated hardware is sealed in a plastic bag and boxed with the channel, which is pre-cut to the appropriate length as shown in the chart.

Designed for use with 1/2" threaded rod. Order rod separately.

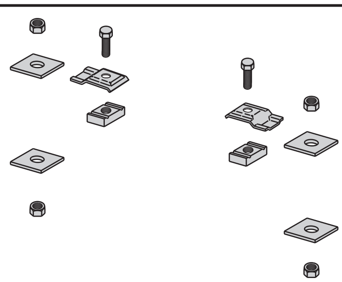


Catalog No.	Tray Width in.	Tray Width mm	Channel Length in.	Channel Length mm	Uniform Load lbs	Uniform Load kN
9(*)-5506-22SHA	6	152	16	406	1350	6.01
9(*)-5509-22SHA	9	229	18	457	1350	6.01
9(*)-5512-22SHA	12	305	22	559	1350	6.01
9(*)-5518-22SHA	18	457	28	711	1350	6.01
9(*)-5524-22SHA	24	610	34	864	1350	6.01
9(*)-5530-22SHA	30	762	40	1016	1350	6.01
9(*)-5536-22SHA	36	914	46	1168	1350	6.01
9(*)-5542-22SHA	42	1067	52	1321	1350	6.01

• (*) Insert GRN or G

Safety factor of 3.0 on all loads.

Trapeze Hardware Kit



Catalog No.	● 9ZN-5500-1/2	● 9G-5500-1/2
In plastic bag	1 pr. 9ZN-1205 2 HHC Screw 1/2 x 7/8 ZN 2 N525 WO ZN 4 B202 ZN 1/2" sq washer 4 HN 1/2 ZN	1 pr. 9G-1205 2 HHC Screw 1/2 x 7/8 SS6 2 N525 WO SS6 4 B202 HDG 1/2" sq washer 4 HN 1/2 SS6

Rooftop Support Bases with B22 Channel

Designed as a superior rooftop support for cable tray,

UV resistant and approved for most roofing material or other flat surfaces.

Can be used with any of Cooper B-Line's cable tray clamps and guides.

Ultimate Load Capacity:
1,000 lbs. (uniform load)

Catalog No.	Height x Width x Length
● CB10-28	5 5/8" x 6" x 28.0"
● CB10-36	5 5/8" x 6" x 36.0"
● CB10-42	5 5/8" x 6" x 42.0"
● CB10-50	5 5/8" x 6" x 50.0"
● CB10-60	5 5/8" x 6" x 60.0"

LEEDS credit available, base made from 100% recycled material.

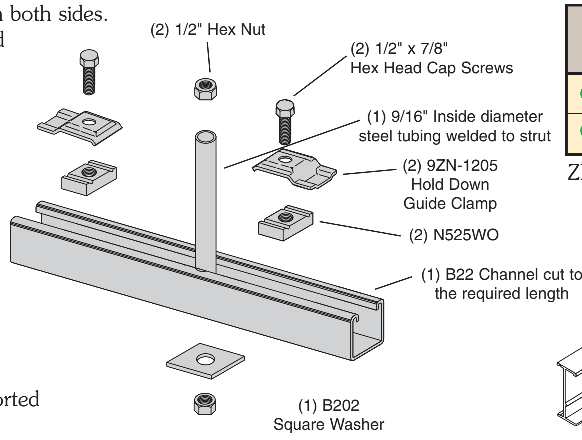
General Note: Consult roofing manufacturer or engineer for roof load capacity. The weakest point may be the insulation board beneath the rubber membrane.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Aluminum - Accessories

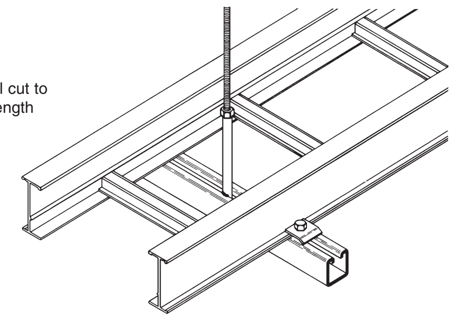
Center Hung Tray Support

- Cooper B-Line's unique Center Hung Cable Tray Support allows cable to be laid-in from both sides.
- Eliminates costly cable pulling and field cutting of cable tray supports. Labor costs are dramatically reduced.
- Required hardware and threaded rod material for trapeze assemblies are reduced by 50%.
- Designed for use with 1/2" threaded rod. (Order rod separately)
- Use with all aluminum and steel cable trays through 24" width.
- Load capacity is 700 lbs. per support. Safety factor of 3.0. Eccentric loading is not to exceed a 60% vs. 40% load differential.
- The maximum recommended unsupported span length is 144"/12 ft. (3.66 m).
- Hardware shown is furnished.

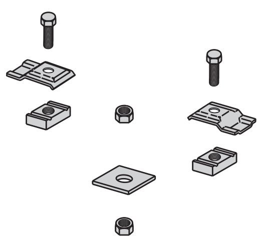


Catalog No.	Tray Width	Channel Length
● **9ZN-5212**	6", 9", 12"	18"
● **9ZN-5224**	18", 24"	30"

ZN = Zinc Plated

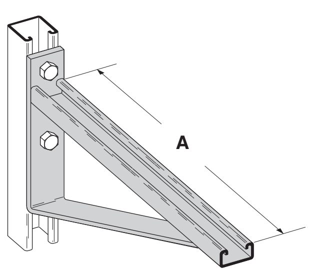


Center Hung Support Hardware Kit



Catalog No.	● 9ZN-5200
In plastic bag	1 pr. 9ZN-1205 2 HHC Screw 1/2 x 7/8 ZN 2 N525 WO ZN 1 B202 ZN 1/2" sq washer 2 HN 1/2 ZN

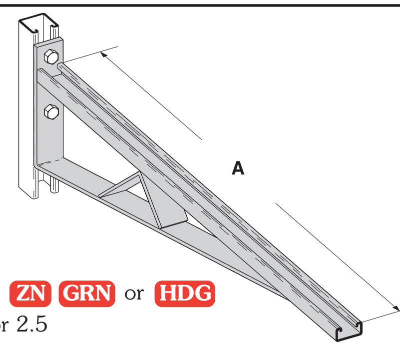
Bracket



Finishes available: ZN GRN or HDG
Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B494-12	1580	7.02	6 & 9	152 & 229	12	305
B494-18	1000	4.45	12	305	18	457
B494-24	996	4.43	18	457	24	610

Bracket

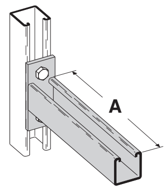


Finishes available: ZN GRN or HDG
Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B494-30	924	4.11	24	610	30	762
B494-36	864	3.84	30	762	36	914
B494-42	580	2.58	36	914	42	1067
B494-48	500	2.22	42	1067	48	1219

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

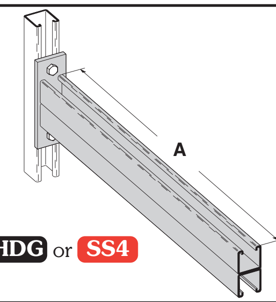
Cantilever Bracket



Finishes available: ZN GRN HDG SS4 or SS6
Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B409-12	960	4.27	6 & 9	152 & 229	12	305
B409-18	640	2.84	12	305	18	457
B409-24	480	2.13	18	457	24	610

Cantilever Bracket



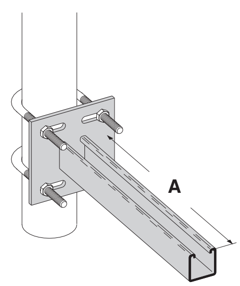
Finishes available: ZN GRN HDG or SS4
Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B297-12	1660	7.38	6 & 9	152 & 229	12	305
B297-18	1100	4.89	12	305	18	457
B297-24	835	3.71	18	457	24	610
B297-30	665	2.95	24	610	30	762
B297-36	550	2.44	30	762	36	914
B297-42	465	2.06	36	914	42	1067

Underfloor Support (U-Bolts not included)

U-Bolt Size	Fits Pipe O.D.
B501-3/4	.841 - 1.050
B501-1	1.051 - 1.315
B501-1 1/4	1.316 - 1.660
B501-1 1/2	1.661 - 1.900
B501-2	1.901 - 2.375
B501-2 1/2	2.376 - 2.875

- Order properly sized U-Bolts separately.

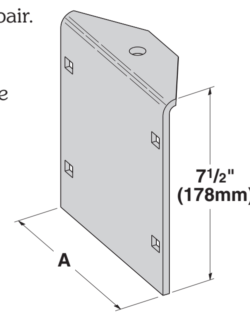


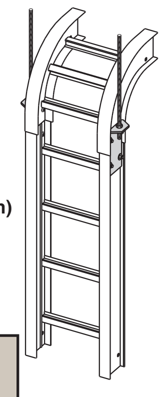
Finish available: ZN
Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B409UF-12	800	3.55	6 & 9	152 & 229	12	305
B409UF-21	450	2.00	12 & 18	305 & 457	21	533

Vertical Hanger Splice Plates

- Design load is 1500 lbs/pair. Safety Factor of 2.5
- Furnished in pairs.
- Shipped without hardware (use splice hardware).

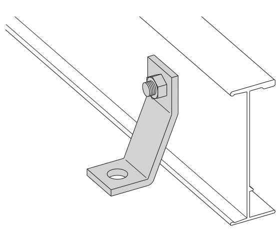




Catalog No.	Outside Cable Tray Ht.	'A' in.	'A' mm
● 9A-1224	4"	3.84	97.54
● 9A-1225	5"	4.73	120.14
● 9A-1226	6"	5.84	148.34
● 9A-1227	7"	6.84	173.74

Heavy Duty Hold Down Bracket

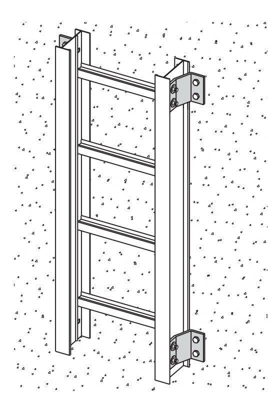
- Design load is 2000 lbs/pair.
- Two bolt design.
- Sold in pairs.
- 3/8" cable tray attachment hardware provided.
- 1/2" support attachment hardware **not** provided.
- (*) Insert ZN SS4 or SS6

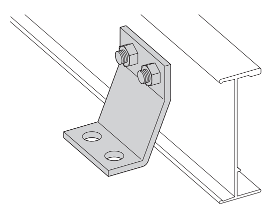


Catalog No.	9(*)-1241

Heavy Duty Hold-Down Bracket

- Design load is 4000 lbs/pair.
- Four bolt design.
- Sold in pairs.
- 3/8" cable tray attachment hardware provided
- 1/2" support attachment hardware **not** provided.
- (*) Insert ZN SS4 or SS6





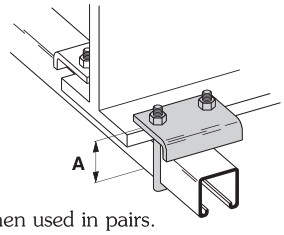
Catalog No.	9(*)-1242

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Aluminum - Accessories

Beam Clamp

- Finishes available: ZN or HDG
- Sold in pieces.

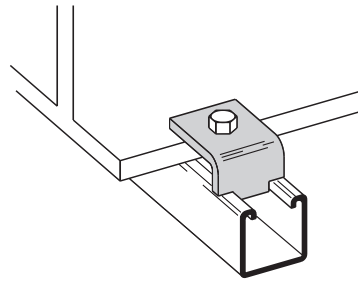


Design load when used in pairs.
Safety Load Factor 5.0

Catalog	Design Load* lbs	kN	'A' in.	mm
B441-22	1200	5.34	3 3/8	86
B441-22A	1200	5.34	5	127

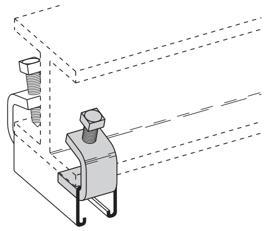
Beam Clamp B355

- Finishes available: ZN GRN HDG or SS4
- Sold in pieces.
- Design load is 1200 lbs. when used in pairs.
- Safety Load Factor 5.0
- Order HHCS and Channel Nuts separately.



Beam Clamp

- Finishes available: ZN GRN or HDG
- Sold in pieces.

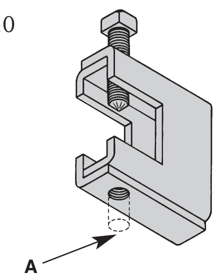


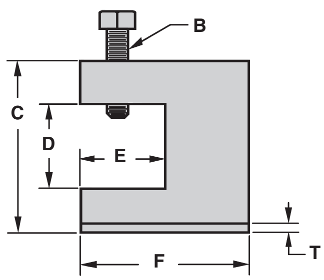
Design load when used in pairs.
Safety Load Factor 5.0

Cat. No.	B212-1/4		B212-3/8	
Design Load *	600 lbs.	2.67 kN	1000 lbs.	4.45 kN
Max. Flange Thick	3/4"	19 mm	1 1/8"	28.6 mm
Mat'l. Thickness	1/4"	6.3 mm	3/8"	9.5 mm

B305 Thru B308 & B321 Series Beam Clamps

- Finishes available: ZN or HDG
- Setscrew included.
- Safety Load Factor 5.0

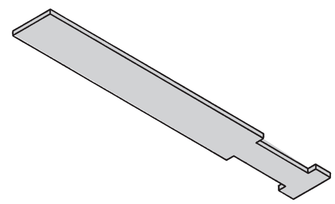




Cat. No.	Rod Size A	B	C	D	E	F	T	Design Load lbs	kN
B305	3/8"-16	3/8"-16	2 5/16"	7/8"	1 1/8"	2 1/2"	11 Ga.	600	2.67
B306	3/8"-16	1/2"-13	2 7/16"	7/8"	1 1/8"	2 1/2"	7 Ga.	1100	4.90
B307	1/2"-13	1/2"-13	2 7/16"	7/8"	1 1/8"	2 1/2"	7 Ga.	1100	4.90
B308	1/2"-13	1/2"-13	2 9/16"	7/8"	1 1/8"	2 1/2"	1/4"	1500	6.68
B321-1	3/8"-16	1/2"-13	3 9/16"	1 11/16"	1 5/8"	3 1/4"	1/4"	1300	5.79
B321-2	1/2"-13	1/2"-13	3 9/16"	1 11/16"	1 5/8"	3 1/4"	1/4"	1400	6.23

B312 Anchor Strap

- Finish available: ZN
- For a maximum beam thickness of 3/4".
- For thicker beams, step up one flange width size.

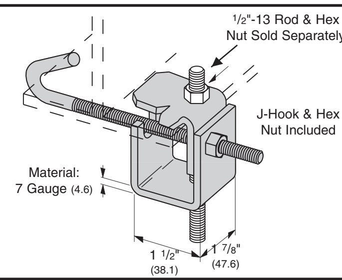


Cat. No.	Flange Width
B312-6	Up to 6"
B312-9	6" - 9"
B312-12	9" - 12"

Beam Clamp

Catalog No.	For Flange Width in.	mm	Wt./C lbs	kg
B750-J4	3"- 6"	76.2 - 152.4	109	49.4
B750-J6	5"- 9"	127.0 - 288.6	124	56.2
B750-J9	8"- 12"	203.2 - 304.8	135	61.2
B750-J12	11"- 15"	279.4 - 381.0	147	66.7

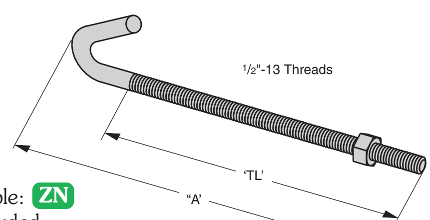
- Finish available: ZN
- Design Load 500 lbs. (2.22 kN)
- Safety Load Factor 5.0
- Recommended torque: 'J'-Hook Nut 125 In.-Lbs. (14.1 kN/m)
- Maximum flange thickness of 3/4"



Beam Clamp

Catalog No.	'A' in.	mm	Thread Length 'TL' in.	mm	Wt./C lbs	kg
B700-J4	8 1/2"	215.9	5"	127.0	44	19.9
B700-J6	11 1/2"	292.1	6"	152.4	53	24.0
B700-J9	12 1/4"	368.3	6"	152.4	63	28.6
B700-J12	17 1/2"	444.5	6"	152.4	78	35.4

- Finish available: ZN
- Hex Nut included.



● Green = Fastest shipped items (normally 3 to 5 working days)
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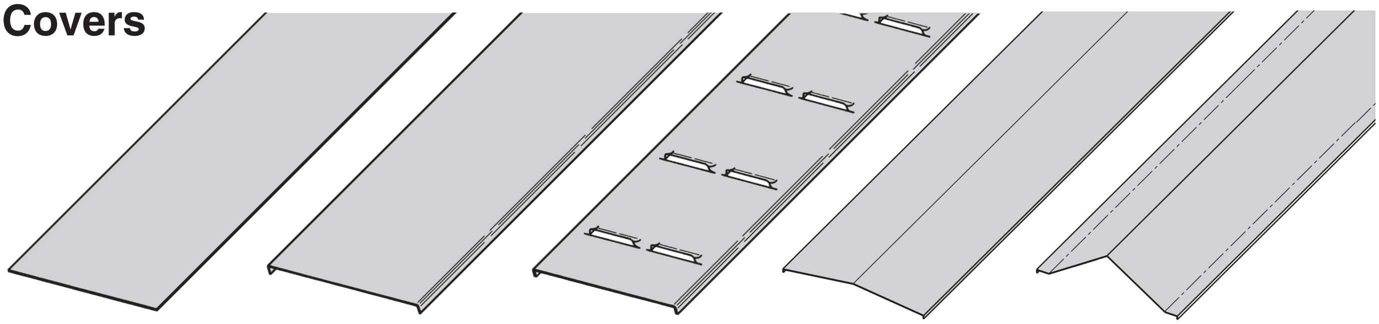
● Red = Normally long lead-time items (15 working days minimum)

Covers



Solid Non-Flanged | Solid Flanged | Ventilated Flanged | Peaked Flanged | 2 to 3 Pitch Peaked Flanged (See page AP-3)

A full range of covers is available for straight sections and fittings.

Solid covers should be used when maximum enclosure of the cable is desired and no accumulation of heat is expected. **Ventilated covers** provide an overhead cable shield, yet allow heat to escape.

Cooper B-Line recommends that covers be placed on vertical cable tray runs to a height of 6 ft. (1.83 m) to 8 ft. (2.44 m) above the floor to isolate both cables and personnel. **Flanged covers** have a 1/2 in. (13 mm) flange. Cover clamps are not included with the cover and must be ordered separately. All **peaked covers** are flanged. Standard peaked covers have 1/2" peak. Special purpose peaked covers, having a 2 to 3 pitch, provide additional slope and material thickness. The 2 to 3 pitch fitting covers are of multiple piece, welded construction.

Aluminum Cover Part Numbering

Prefix

Example: **80 7 A 40 - 24 - 144**

Cover Type	Detail	Material	Material Thickness	Tray Width	Item Description
● 80 = Solid	● 6 = Non-Flanged (80 & 81 type only)	● A = Aluminum	● 40 = .040 Aluminum All except 2 to 3 pitch	● 06 = 6"	For Straight Section Cover:
● 81 = Ventilated	● 7 = Flange			● 09 = 9"	● 144 = 12 ft. (3.66 m)
● 82 = Peaked				● 12 = 12"	● 120 = 10 ft. (3.05 m)
				● 18 = 18"	● 72 = 6 ft. (1.83 m)
				● 24 = 24"	● 60 = 5 ft. (1.52 m)
				● 30 = 30"	For fitting covers: Insert suffix of fitting to be covered.
				● 36 = 36"	See example below.

Covers 30" and 36" wide have reinforcing ridges.

Examples of Catalog Numbers for Fitting Covers:

Horizontal Bend Cover

Prefix / Suffix

80 7 A 40 - 18 - 90 HB 24

- 24: Radius
- HB: Fitting
- 90: Angle
- 18: Width
- 40: Material Thickness
- A: Material
- 7: Detail
- 80: Cover Type

Vertical Bend Cover

Prefix / Suffix

80 7 A 40 - 24 - 90 VO 24 - 4*

- 4: Side Rail* Height
- 24: Radius
- VO: Fitting
- 90: Angle
- 24: Width
- 40: Material Thickness
- A: Material
- 7: Detail
- 80: Cover Type

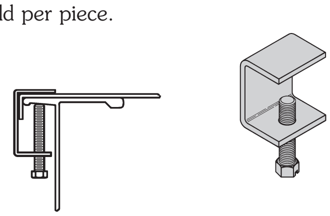
* Required for VO fittings only

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Aluminum - *Accessories*

Standard Cover Clamp

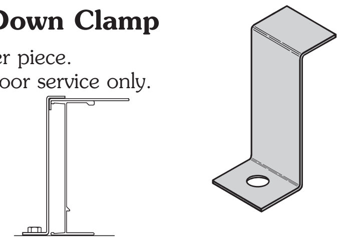
- For indoor service only.
- Setscrew included.
- Sold per piece.



Tray Type	Side Rail Height	Catalog No.
Aluminum	All Sizes	● 9ZN-9012
		● 9A-9012

Combination Cover and Hold Down Clamp

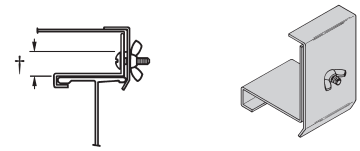
- Sold per piece.
- For indoor service only.



Tray Type	Side Rail Height in.	mm	Catalog No.
Aluminum	4	101	● 9P-9043
	5	127	● 9P-9053
	6	152	● 9P-9063
	7	178	● 9P-9073

Raised Cover Clamp

- For indoor service only.
- For use with flanged covers only.

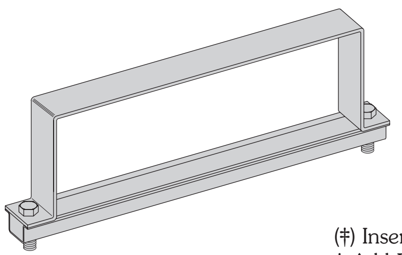


† Specify gap of 1", 2", 3" or 4".

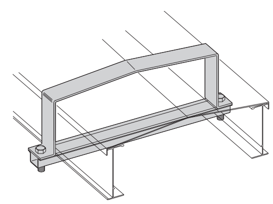
Tray Type	Side Rail Height	Catalog No.
Aluminum	4" & 5" Deep	● 9ZN-9112-†
	6" & 7" Deep	● 9ZN-9113-†

Heavy Duty Cover Clamp

- Recommended for outdoor service.



Peaked Cover Clamp



(‡) Insert tray width
† Add P to Catalog No. for peaked cover clamp.

Side Rail Height in.	mm	Catalog No.
4	101	● 9A-(‡)-9044†
5	127	● 9A-(‡)-9054†
6	152	● 9A-(‡)-9064†
7	178	● 9A-(‡)-9074†

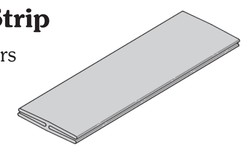
Quantity of Standard Cover Clamps Required

Straight Section 60" or 72" ....4 pcs.
Straight Section 120" or 144" ....6 pcs.
Horizontal/Vertical Bends...............4 pcs.
Tees...6 pcs.
Crosses ....8 pcs.

Note: When using the Heavy Duty Cover Clamp, only one-half the number of clamps stated above is required.

Cover Joint Strip

- Used to join covers
- Plastic
- (‡) Insert tray width



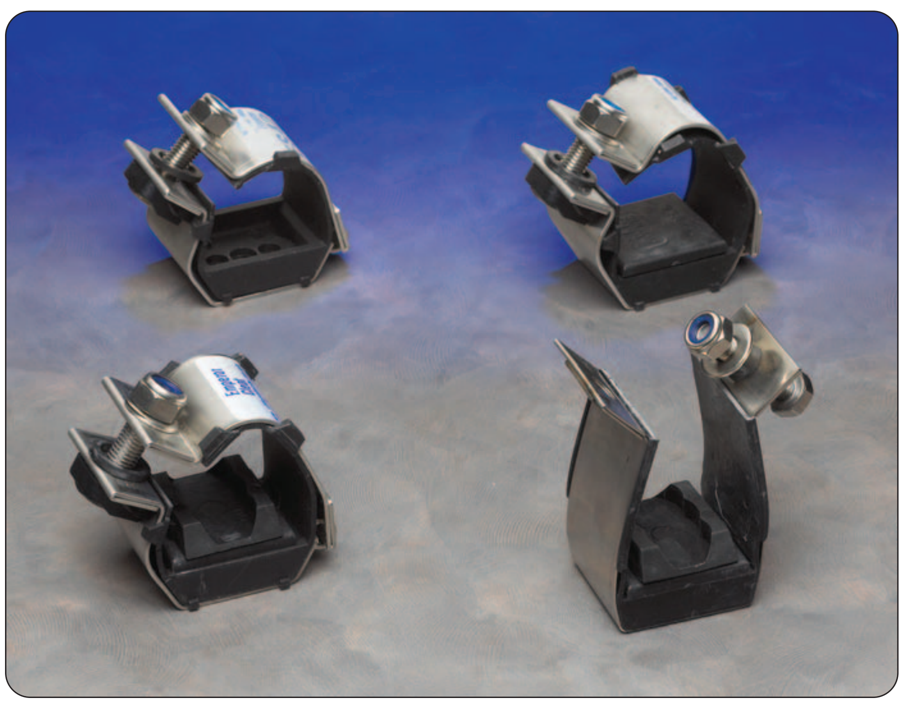
Catalog No.	● 99-9980-(‡)

Cable Cleats

(see pages CF-1 thru CF-6)

Emperor Trefoil Cable Cleats

Vulcan Cable Cleats



● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, cable tray systems shall be as manufactured by Cooper B-Line, Inc.

Section 2- Cable Tray Sections and Components

2.01 General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features. Cable tray shall be installed according to the latest revision of NEMA VE 2.

2.02 Materials and Finish: Straight section and fitting side rails and rungs shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052.

2.03 Ladder Cable Trays shall consist of two longitudinal members (side rails) with transverse members (rungs) welded to the side rails. Rungs shall be spaced [6] [9] [12] inches on center. Rung spacing in radiused fittings shall be industry standard 9" and measured at the center of the tray's width. Each rung must be capable of supporting a 200 lb. concentrated load at the center of the cable tray over and above the cable load with a safety factor of 1.5.

2.04 Ventilated Trough Cable Trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails or rungs spaced 4" on center. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/4$" and shall be spaced on 6" centers. To provide ventilation in the tray, the valleys of the corrugated bottom shall have $2^1/4$" x 4" rectangular holes punched along the width of the bottom.

2.05 Non-Ventilated Bottom Trough Cable Trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails or a solid sheet over rungs. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/4$" and shall be spaced on 6" centers.

2.06 Cable tray loading depth shall be [3] [4] [5] [6] inches per NEMA VE 1.

2.07 Straight sections shall have side rails fabricated as I-beams. Straight sections shall be supplied in standard [12 foot] [24 foot] [10 foot (3 m)] [20 foot (6 m)] lengths.

2.08 Cable tray widths shall be [6] [9] [12] [18] [24] [30] [36] inches or as shown on drawings.

2.09 Splice plates shall be the Wedge-Lock design with 4 nuts and bolts per plate. The resistance of fixed splice connections between an adjacent section of tray shall not exceed 0.00033 ohm.

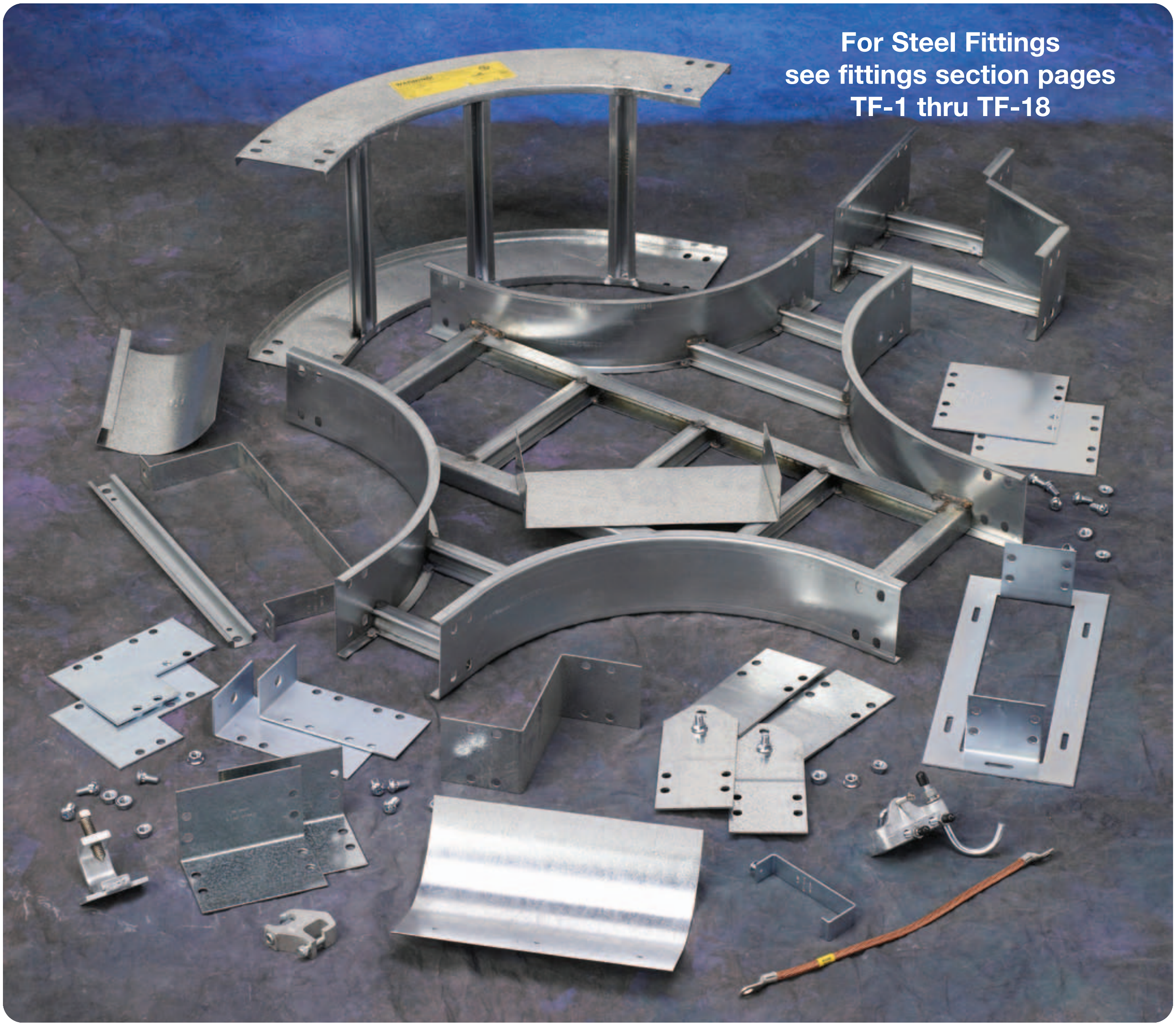
2.10 All fittings must have a minimum radius of [12] [24] [36] [48] inches.

Section 3- Loading Capacities and Testing

3.01 Cable tray shall be capable of carrying a uniformly distributed load of ______ lbs./ft. on a _______ ft. support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1 5.2. In addition to the uniformly distributed load the cable tray shall support 200 lbs. concentrated load at mid-point of span. Load and safety factors specified are applicable to both the side rails and rung capacities. Cable tray shall be made to manufacturing tolerances as specified by NEMA.

3.02 Upon request, manufacturer shall provide test reports in accordance with the latest revision of NEMA VE 1 or CSA C22.2 No. 126.

Series 2, 3, 4, & 5 Steel



For Steel Fittings
see fittings section pages
TF-1 thru TF-18

How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- Green = Fastest shipped items (normally 3 to 5 working days)
- Black = Normal lead-time items (normally 5 to 10 working days)
- Red = Normally long lead-time items (15 working days minimum)

Example: (from page ST-5)	**258G** ● (red)	**12** ● (green)	**-**	**24** ● (green)	**-**	**144** ● (green)	**Part will typically ship in 15 days minimum, because of the 258G material.**
Lead time(days)	3-5	3-5		3-5		3-5	

Changing the part number from 258G to 258P will change the coding to black for all sections of the tray to be 5-10 working days, instead of the original 15 days minimum.

Series 2, 3, 4, & 5 Steel - Straight Sections

3" NEMA VE 1 Loading Depth
4" Side Rail Height

Straight Section Part Numbering

Prefix

Example: 248 P 09 - 24 - 144

Series
- ● **248**
- ● **346**
- ● **444**

Material
- ● **P** = Pre-Galvanized
- ● **G** = HDGAF

***Type**

Ladder-
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-
6" thru 36" wide
- ● **VT** = Vented Trough
- ● **ST** = Non-Ventilated Trough

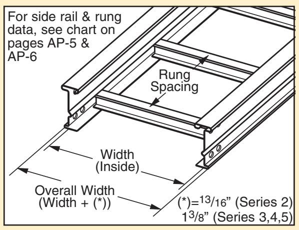
***Width**
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length

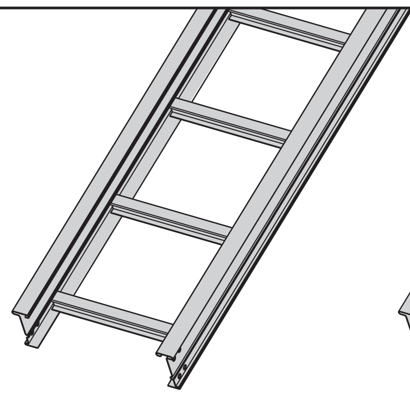
Length	Series
● ① **144** = 12 ft. ● ② 120 = 10 ft.	248
● ① **240** = 20 ft. ● ② 144 = 12 ft.	346
● ① **240** = 20 ft. ● ② 288 = 24 ft.	444

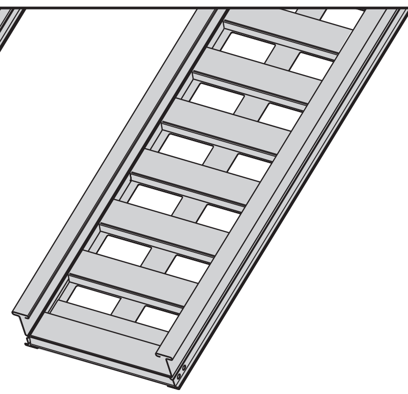
①Primary Length.
②Secondary Length.

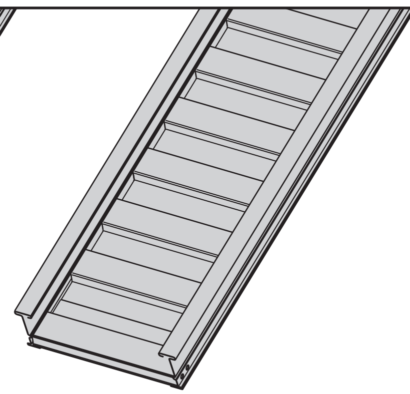
See page CTS-23 for explanation of lengths.



See page AP-1 for additional rung options. *Special sizes available.


Ladder Type
(Specify Rung Spacing)


Ventilated Trough

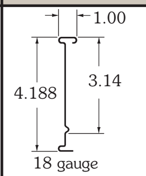

Non-Ventilated Trough

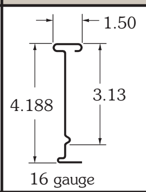
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

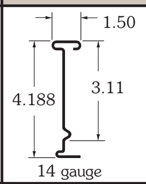
3" NEMA VE 1 Loading Depth
4" Side Rail Height

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply publish load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
248		NEMA: 16A, 12C	6	412*	0.0007		1.8	613*	0.012	
		CSA: D1-3m	8	232	0.0022	Area=0.62 in^2	2.4	345	0.038	Area=4.00 cm^2
			10	148	0.0054	Sx=0.64 in^3	3.0	221	0.093	Sx=10.49 cm^3
		UL Cross-Sectional	12	103	0.011	Ix=1.43 in^4	3.7	153	0.192	Ix=59.52 cm^4
		Area: 0.40 in^2	14	76	0.021		4.3	113	0.356	
			16	58	0.036		4.9	86	0.607	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
346		NEMA: 20A, 16B	10	252	0.0035		3.0	375	0.060	
		CSA: D1-6m	12	175	0.0072	Area=0.89 in^2	3.7	260	0.124	Area=5.74 cm^2
			14	129	0.013	Sx=0.96 in^3	4.3	191	0.229	Sx=15.73 cm^3
		UL Cross-Sectional	16	98	0.023	Ix=2.22 in^4	4.9	146	0.391	Ix=92.40 cm^4
		Area: 0.70 in^2	18	78	0.037		5.5	116	0.626	
			20	63	0.056		6.1	94	0.955	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
444		NEMA: 20B, 16C	12	253	0.0055		3.7	376	0.093	
		CSA: E-3m	16	142	0.017	Area=1.19 in^2	4.9	212	0.295	Area=7.68 cm^2
			18	112	0.028	Sx=1.27 in^3	5.5	167	0.473	Sx=20.81 cm^3
		UL Cross-Sectional	20	91	0.042	Ix=2.94 in^4	6.1	135	0.721	Ix=122.37 cm^4
		Area: 1.00 in^2	22	75	0.062		6.7	112	1.055	
			24	63	0.088		7.3	94	1.495	

*When using 18" rung spacing, load capacity is limited to 394 lbs/ft (586.272 kg/m) for 30" cable tray width and 325 lbs/ft (483.6 kg/m) for 36" cable tray width. When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

Series 2, 3, 4, & 5 Steel - *Straight Sections*

4" NEMA VE 1 Loading Depth
5" Side Rail Height

Straight Section Part Numbering

Prefix

Example: **258 P 09 - 24 - 144**

Series
- ● **258**
- ● **356**
- ● **454**

Material
- ● **P** = Pre-Galvanized
- ● **G** = HDGAF

***Type**

Ladder-
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-
6" thru 36" wide
- ● **VT** = Vented Trough
- ● **ST** = Non-Ventilated Trough

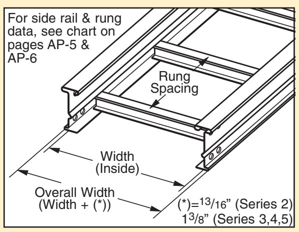
***Width**
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length

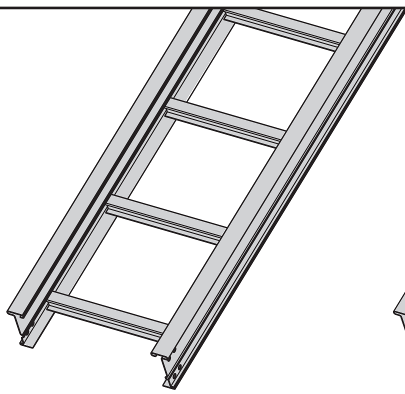
● ① **144** = 12 ft.	258
● ② 120 = 10 ft.	
● ① **240** = 20 ft.	356
● ② 144 = 12 ft.	
● ① **240** = 20 ft.	454
● ② 288 = 24 ft.	

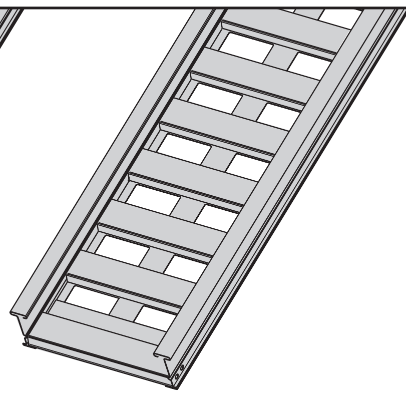
①Primary Length.
②Secondary Length.

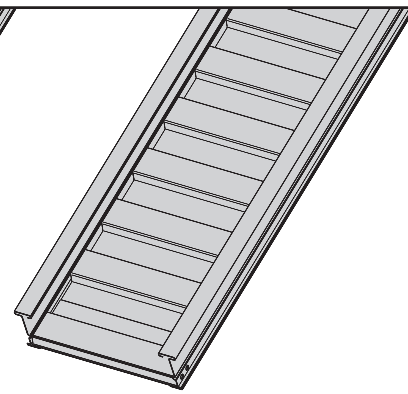
See page CTS-23 for explanation of lengths.



See page AP-1 for additional rung options. *Special sizes available.


Ladder Type
(Specify Rung Spacing)


Ventilated Trough

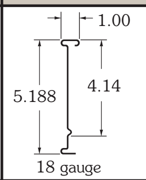

Non-Ventilated Trough

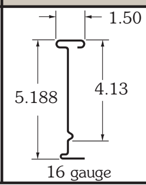
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

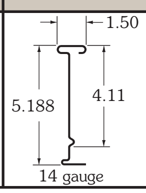
4" NEMA VE 1 Loading Depth
5" Side Rail Height

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
258		NEMA: 16A, 12C CSA: D1-3m UL Cross-Sectional Area: 0.40 in^2	6	436*	0.0004	Area=0.71 in^2 Sx=0.89 in^3 Ix=2.44 in^4	1.8	649*	0.007	Area=4.58 cm^2 Sx=14.58 cm^3 Ix=101.56 cm^4
			8	245	0.0013		2.4	365	0.022	
			10	157	0.0032		3.0	234	0.054	
			12	109	0.0066		3.7	162	0.113	
			14	80	0.012		4.3	119	0.209	
			16	61	0.021		4.9	91	0.356	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
356		NEMA: 20A, 16C CSA: D1-6m UL Cross-Sectional Area: 0.70 in^2	10	276	0.0021	Area=1.00 in^2 Sx=1.31 in^3 Ix=3.73 in^4	3.0	411	0.036	Area=6.45 cm^2 Sx=21.47 cm^3 Ix=155.25 cm^4
			12	192	0.0043		3.7	285	0.074	
			14	141	0.0080		4.3	210	0.136	
			16	108	0.014		4.9	160	0.233	
			18	85	0.022		5.5	127	0.373	
			20	69	0.033		6.1	103	0.568	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
454		NEMA: 20C CSA: E-6m UL Cross-Sectional Area: 1.00 in^2	12	294	0.0032	Area=1.34 in^2 Sx=1.75 in^3 Ix=4.96 in^4	3.7	438	0.055	Area=8.65 cm^2 Sx=28.68 cm^3 Ix=206.45 cm^4
			16	166	0.010		4.9	246	0.175	
			18	131	0.016		5.5	195	0.280	
			20	106	0.025		6.1	158	0.427	
			22	88	0.037		6.7	130	0.625	
			24	74	0.052		7.3	110	0.886	

* When using 18" rung spacing, load capacity is limited to 394 lbs/ft (586.272 kg/m) for 30" cable tray width and 325 lbs/ft (483.6 kg/m) for 36" cable tray width. When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

COOPER B-Line

5" NEMA VE 1 Loading Depth
6" Side Rail Height

Straight Section Part Numbering

Prefix

Example: **268 P 09 - 24 - 144**

Series

- ● **268**
- ● **366**
- ● **464**

Material

- ● **P** = Pre-Galvanized
- ● **G** = HDGAF

***Type**

Ladder-

- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-

6" thru 36" wide

- ● **VT** = Vented Trough
- ● **ST** = Non-Ventilated Trough

***Width**

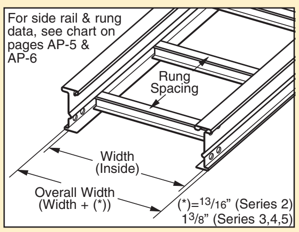
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length

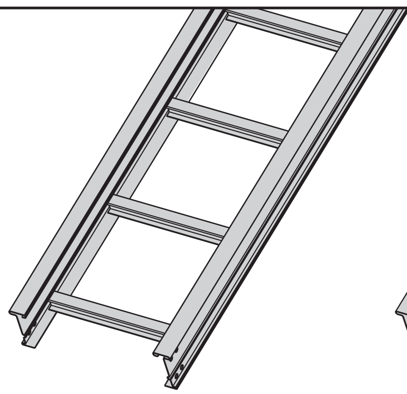
Length	Series
● ① **144** = 12 ft.	268
● ② 120 = 10 ft.	268
● ① **240** = 20 ft.	366
● ② 144 = 12 ft.	366
● ① **240** = 20 ft.	464
● ② 288 = 24 ft.	464

①Primary Length.
②Secondary Length.

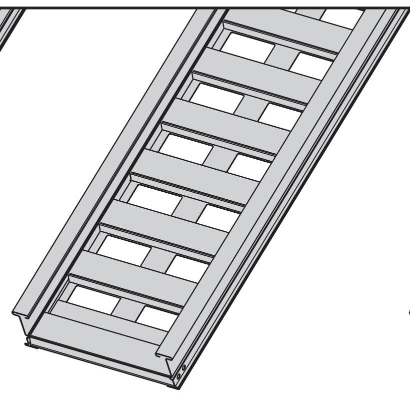
See page CTS-23 for explanation of lengths.



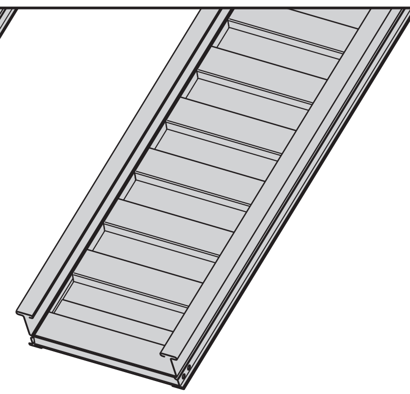
See page AP-1 for additional rung options. *Special sizes available.



Ladder Type
(Specify Rung Spacing)



Ventilated Trough



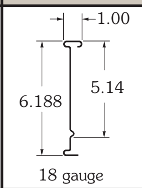
Non-Ventilated Trough

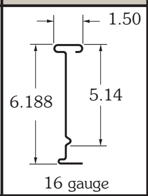
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

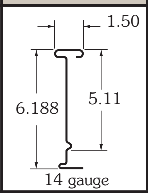
5" NEMA VE 1 Loading Depth
6" Side Rail Height

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
268		NEMA: 16A, 12C CSA: D1-3m UL Cross-Sectional Area: 0.70 in^2	6	440*	0.0003	Area=0.80 in^2 Sx=1.18 in^3 Ix=3.81 in^4	1.8	655*	0.005	Area=5.16 cm^2 Sx=19.34 cm^3 Ix=158.58 cm^4
			8	248	0.0008		2.4	368	0.014	
			10	158	0.0020		3.0	236	0.035	
			12	110	0.0042		3.7	164	0.072	
			14	81	0.0078		4.3	120	0.134	
			16	62	0.013		4.9	92	0.228	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
366		NEMA: 20B, 16C CSA: E-6m UL Cross-Sectional Area: 1.00 in^2	10	300	0.0014	Area=1.11 in^2 Sx=1.71 in^3 Ix=5.74 in^4	3.0	446	0.023	Area=7.16 cm^2 Sx=28.02 cm^3 Ix=238.92 cm^4
			12	208	0.0028		3.7	310	0.048	
			14	153	0.0052		4.3	228	0.089	
			16	117	0.0089		4.9	174	0.151	
			18	93	0.014		5.5	138	0.242	
			20	75	0.022		6.1	112	0.369	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
464		NEMA: 20C CSA: E-6m UL Cross-Sectional Area: 1.00 in^2	12	342*	0.002	Area=1.49 in^2 Sx=2.28 in^3 Ix=7.65 in^4	3.7	508*	0.036	Area=9.61 cm^2 Sx=37.36 cm^3 Ix=318.42 cm^4
			16	192	0.007		4.9	286	0.113	
			18	152	0.011		5.5	226	0.182	
			20	123	0.016		6.1	183	0.277	
			22	102	0.024		6.7	151	0.406	
			24	85	0.034		7.3	127	0.574	

* When using 18" rung spacing, load capacity is limited to 394 lbs/ft (586.272 kg/m) for 30" cable tray width and 325 lbs/ft (483.6 kg/m) for 36" cable tray width. When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

6" NEMA VE 1 Loading Depth
7" Side Rail Height

Straight Section Part Numbering

Prefix

Example: **378 P 09 - 24 - 240**

Series

- ● **378**
- ● **476**
- ● **574**

Material

- ● **P** = Pre-Galvanized
- ● **G** = HDGAF

***Type**

Ladder-

- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-

6" thru 36" wide

- ● **VT** = Vented Trough
- ● **ST** = Non-Ventilated Trough

***Width**

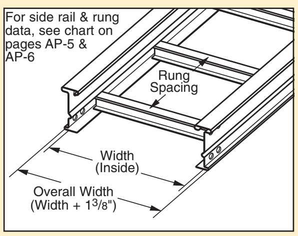
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length

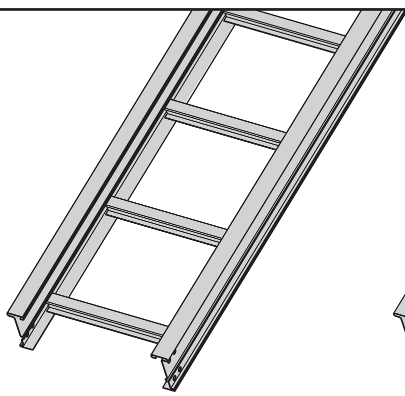
Length	Series
● ① **144** = 12 ft. ● ② 240 = 20 ft.	378
● ① **240** = 20 ft. ● ② 288 = 24 ft.	476
● ① **240** = 20 ft. ● ② 288 = 24 ft.	574

①Primary Length.
②Secondary Length.

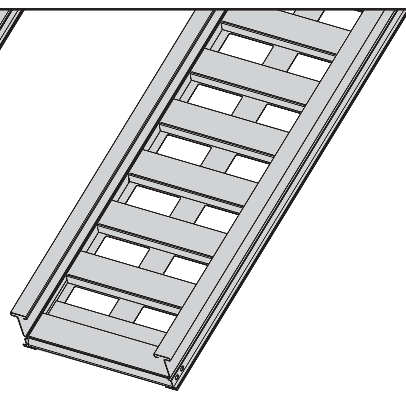
See page CTS-23 for explanation of lengths.



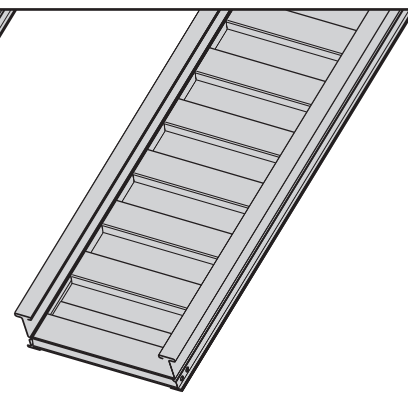
See page AP-1 for additional rung options. *Special sizes available.



Ladder Type
(Specify Rung Spacing)



Ventilated Trough



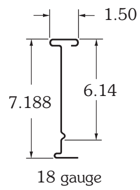
Non-Ventilated Trough

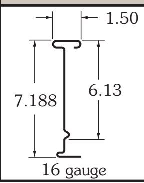
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

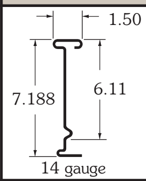
6" NEMA VE 1 Loading Depth
7" Side Rail Height

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray with rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable tray being installed.

Individual rungs will support without collapse a 200 lb. (90.7 kg) concentrated load applied at the mid-span of the rung, over and above the NEMA rated cable load with a 1.5 safety factor for highlighted NEMA spans and loads. See table on page A-6 for rung capacities.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
378		NEMA: 20A, 16B CSA: D1-3m UL Cross-Sectional Area: 0.70 in^2	8	319	0.0006	Area=1.01 in^2 Sx=1.77 in^3 Ix=6.90 in^4	2.4	474	0.009	Area=6.52 cm^2 Sx=29.01 cm^3 Ix=287.20 cm^4
			10	204	0.0014		3.0	304	0.023	
			12	142	0.0028		3.7	211	0.048	
			14	104	0.0052		4.3	155	0.089	
			16	80	0.0089		4.9	119	0.151	
			18	63	0.014		5.5	94	0.242	
			20	51	0.022		6.1	76	0.369	

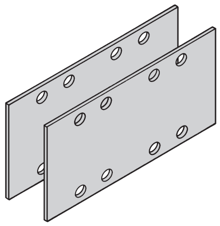
B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
476		NEMA: 20B, 16C CSA: D1-6m UL Cross-Sectional Area: 1.00 in^2	12	214	0.0019	Area=1.22 in^2 Sx=2.14 in^3 Ix=8.30 in^4	3.7	318	0.033	Area=7.87 cm^2 Sx=35.07 cm^3 Ix=345.47 cm^4
			16	120	0.0061		4.9	179	0.105	
			18	95	0.010		5.5	141	0.168	
			20	77	0.015		6.1	115	0.255	
			22	64	0.022		6.7	95	0.374	
			24	53	0.031		7.3	80	0.529	

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
574		NEMA: 20C CSA: E-6m UL Cross-Sectional Area: 1.50 in^2	12	325	0.0014	Area=1.64 in^2 Sx=2.87 in^3 Ix=11.10 in^4	3.7	484	0.025	Area=10.58 cm^2 Sx=47.03 cm^3 Ix=462.02 cm^4
			16	203	0.0046		4.9	302	0.078	
			18	160	0.0073		5.5	239	0.125	
			20	130	0.011		6.1	193	0.191	
			22	107	0.016		6.7	160	0.280	
			24	90	0.023		7.3	134	0.396	

When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus.

Splice Plates

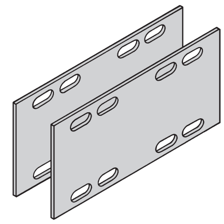
- Standard 8-hole pattern for all steel splice plates.
- Furnished in pairs with hardware.
- One pair including hardware provided with straight section.
- Boxed in pairs with hardware.
- (*) Insert ZN or G



Catalog No.	Height in.	Height mm
9(*)-8004	4	101
9(*)-8005	5	127
9(*)-8006	6	152
9(*)-8007	7	178

Expansion Splice Plates

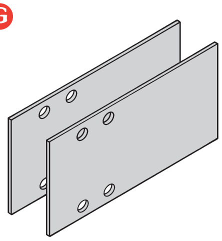
- Expansion plates allow for one inch expansion or contraction of the cable tray, or where expansion joints occur in the support structure.
- Furnished in pairs with hardware.
- **Bonding Jumpers are require on each siderail. Order Separately.**
- (*) Insert ZN or G



Catalog No.	Height in.	Height mm
9(*)-8014	4	101
9(*)-8015	5	127
9(*)-8016	6	152
9(*)-8017	7	178

Universal Splice Plates

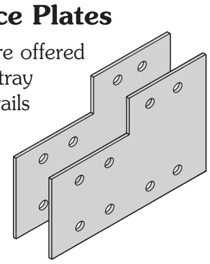
- Used to splice to existing cable tray systems.
- Furnished in pairs with hardware.
- (*) Insert ZN or G



Catalog No.	Height in.	Height mm
9(*)-8004-1/2	4	101
9(*)-8005-1/2	5	127
9(*)-8006-1/2	6	152
9(*)-8007-1/2	7	178

Step Down Splice Plates

- These splice plates are offered for connecting cable tray sections having side rails of different heights.
- Furnished in pairs with hardware.
- (*) Insert ZN or G

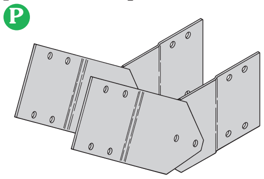


Catalog No.	Height in.	Height mm
9(*)-8045	5 to 4	127 to 101
9(*)-8046	6 to 4	152 to 101
9(*)-8060	6 to 5	152 to 127
9(*)-8047	7 to 4	178 to 101
9(*)-8061	7 to 5	178 to 127
9(*)-8062	7 to 6	178 to 152

Vertical Adjustable Splice Plates

- These plates provide for changes in elevation that do not conform to standard vertical fittings.
- Furnished in pairs with hardware.
- **Bonding Jumpers not required.**
- (*) Insert G or P

Requires supports within 24" on both sides, per NEMA VE 2.

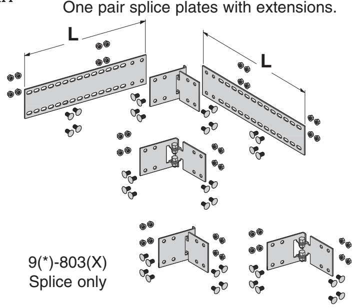


Catalog No.	Height in.	Height mm
9(*)-8024	4	101
9(*)-8025	5	127
9(*)-8026	6	152
9(*)-8027	7	178

Horizontal Adjustable Splice Plates

- Offered to adjust a cable tray run for changes in direction in a horizontal plane that do not conform to standard horizontal fittings.
- Furnished in pairs with hardware.
- New design bonding jumpers **not** required.
- (*) Insert ZN or G
- (X) Insert 4, 5, 6 or 7 for side rail height.

9(*)-803(X)-12 or 9(*)-803(X)-36
One pair splice plates with extensions.

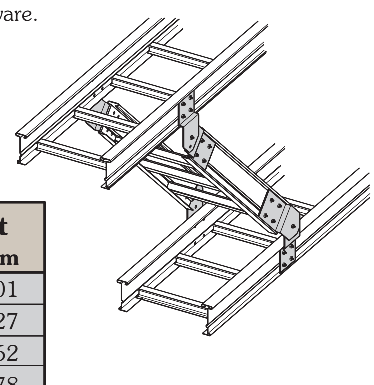


Catalog No.	Cable Tray End Cut	Tray Width	'L'
9(*)-803(X)	Mitered	Thru 36"	N/A
9(*)-803(X)-12	Not mitered	Thru 12"	16"
9(*)-803(X)-36	Not mitered	Thru 36"	41"

Requires supports within 24" on both sides, per NEMA VE 2.

Branch Pivot Connectors

- Branch from existing cable tray runs at any point.
- Pivot to any required angle.
- UL Classified for grounding (bonding jumper not required).
- Furnished in pairs with hardware.
- (*) Insert ZN or G

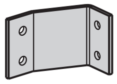


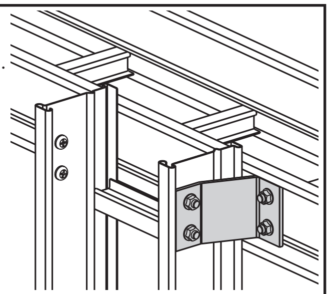
Catalog No.	Height in.	Height mm
9(*)-8244	4	101
9(*)-8245	5	127
9(*)-8246	6	152
9(*)-8247	7	178

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cross Connector Bracket

- For field connecting crossing section.
- Furnished in pairs with 3/8" hardware.
- (*) Insert ZN or G

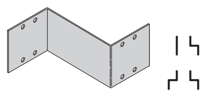




Catalog No.	9(*)-1240

Offset Reducing Splice Plate

- This plate is used for joining cable trays having different widths. When used in pairs they form a straight reduction; when used singly with a standard splice plate, they form an offset reduction.
- Furnished as one plate with hardware.
- (ǂ) Insert reduction
- (*) Insert G or P



Catalog No.	Height in.	Height mm
9(*)-8064-(ǂ)	4	101
9(*)-8065-(ǂ)	5	127
9(*)-8066-(ǂ)	6	152
9(*)-8067-(ǂ)	7	178

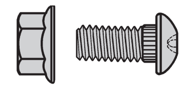
Tray Hardware

Pre-Galvanized Tray Hardware

Catalog No. ZN **RNCB 3/8"-16 x 3/4" Znplt** Ribbed Neck Carriage Bolt ASTM A307 Grade A

Catalog No. ZN **SFHN 3/8"-16 Znplt** Serrated Flange Hex Nut ASTM A563 Grade A

Finish: Zinc Plated ASTM B633, SC1



Hot Dip Galvanized Tray Hardware

Standard: **Catalog No.** CZ **RNCB 3/8"-16 x 3/4" CZ** Ribbed Neck Carriage Bolt ASTM F1136-88 Grade 3 Chromium Zinc

Catalog No. CZ **SFHN 3/8"-16 CZ** Serrated Flange Hex Nut ASTM F1136-88 Grade A Chromium Zinc

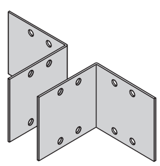
Optional: **Catalog No.** SS6 **RNCB 3/8"-16 x 3/4" SS6** AISI 316 Stainless Steel

Catalog No. SS6 **SFHN 3/8"-16 SS6** AISI 316 Stainless Steel

Example: 9G-8004SS6

Tray to Box Splice Plates

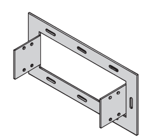
- Used to attach the end of a cable tray run to a distribution box or control panel.
- Furnished in pairs with hardware.
- (*) Insert G or P



Catalog No.	Height in.	Height mm
9(*)-8054	4	101
9(*)-8055	5	127
9(*)-8056	6	152
9(*)-8057	7	178

Frame Type Box Connector

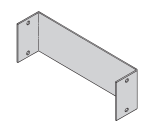
- Designed to attach the end of a cable tray run to a distribution cabinet or control center to help reinforce the box at the point of entry.
- Furnished with tray connection hardware.
- (*) Insert ZN or G
- (ǂ) Insert tray width



Catalog No.	Height in.	Height mm
9(*)-8074-(ǂ)	4	101
9(*)-8075-(ǂ)	5	127
9(*)-8076-(ǂ)	6	152
9(*)-8077-(ǂ)	7	178

Blind End

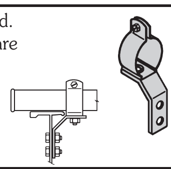
- This plate forms a closure for a dead end cable tray.
- Furnished as one plate with hardware.
- (*) Insert G or P
- (ǂ) Insert tray width



Catalog No.	Height in.	Height mm
9(*)-8084-(ǂ)	4	101
9(*)-8085-(ǂ)	5	127
9(*)-8086-(ǂ)	6	152
9(*)-8087-(ǂ)	7	178

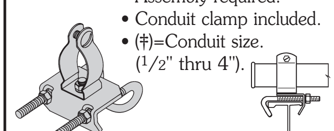
Conduit to Tray Adaptors

- Assembly required.
- Mounting hardware included.
- Conduit clamps provided.
- (ǂ)=Conduit size (1/2" thru 4").



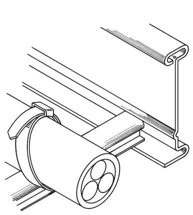
Catalog No.	● 9ZN-1150-(ǂ)

- Assembly required.
- Conduit clamp included.
- (ǂ)=Conduit size. (1/2" thru 4").



Catalog No.	● 9ZN-1155-(ǂ)

Cable Tie (Ladder Tray)



Nylon ties provide easy attachment of cable to ladder rungs; maximum cable O.D. of 3" (76mm).

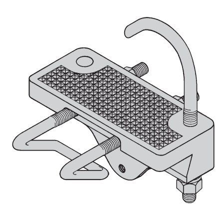
Overall Length 15"

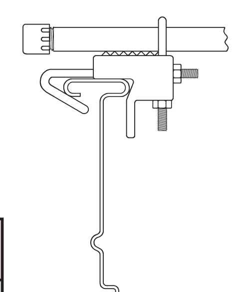
Catalog No.	● 99-2125-15

Refer to Section CF Cable Fixing

Conduit to Tray Adaptor

- For easy attachment of conduit terminating at a cable tray.
- Use on aluminum or steel cable trays.





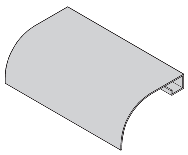
Steel I-Beam

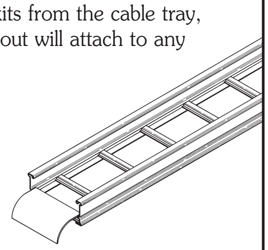
Catalog No.	Conduit Size in.	Conduit Size mm
● 9G-1158-1/2, 3/4	1/2, 3/4	15, 20
● 9G-1158-1, 1 1/4	1, 1 1/4	25, 32
● 9G-1158-1 1/2, 2	1 1/2, 2	40, 50
● 9G-1158-2 1/2, 3	2 1/2, 3	65, 80
● 9G-1158-3 1/2, 4	3 1/2, 4	90, 100

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Ladder Drop-Out

- Specially-designed Ladder Drop-Outs provide a rounded surface with 4" (101 mm) radius to protect cable as it exits from the cable tray, preventing damage to insulation. The drop-out will attach to any desired rung.
- (*) Insert P or G
- (‡) Insert tray width

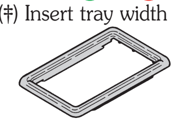


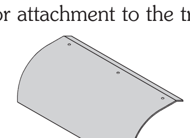


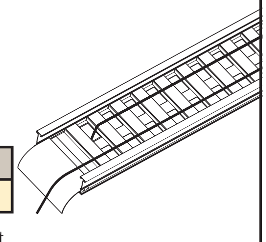
Catalog No. 9(*)-1104-(‡)

Trough Drop-Out & Drop-Out Bushing

- These devices provide a rounded surface to protect cable as it exits from the trough-type cable tray.
- Hardware is included for attachment to the trough bottom.
- (*) Insert P or G
- (‡) Insert tray width





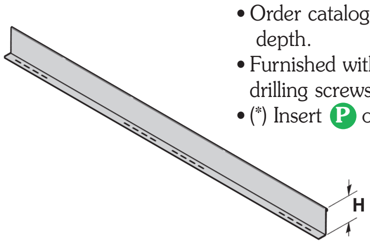


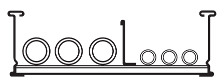
Catalog No.	Catalog No.
99-1124	9(*)-1104T-(‡)
Snap-In Plastic Bushing	Trough-Type Drop-Out

Barriers

Straight Section

- Standard length: 120" (3 m) 144" (12 ft.).
- Order catalog number based on loading depth.
- Furnished with four #10 x 1/2" plated self-drilling screws and a 99-9982 splice.
- (*) Insert P or G



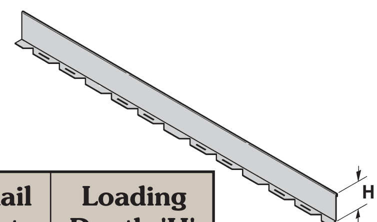


Catalog No.	Side Rail Height		Loading Depth 'H'	
	in.	mm	in.	mm
73(*)-Length	4	101	3	76
74(*)-Length	5	127	4	101
75(*)-Length	6	152	5	127
76(*)-Length	7	178	6	152

Length = 144 for 12' or 120 for 10'

Horizontal Bend

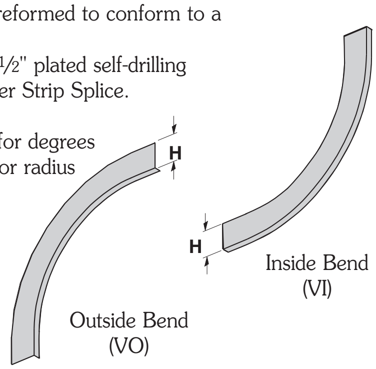
- Horizontal Bend Barriers are flexible in order to conform to any horizontal fitting radius. Cut to length.
- Order catalog number based on loading depth.
- Furnished with three #10 x 1/2" zinc plated self-drilling screws and a 99-9982 Barrier Strip Splice.
- Standard length is 72" (6 ft.), sold individually.
- (*) Insert P or G



Catalog No.	Side Rail Height		Loading Depth 'H'	
	in.	mm	in.	mm
73(*)-90HBFL	4	101	3	76
74(*)-90HBFL	5	127	4	101
75(*)-90HBFL	6	152	5	127
76(*)-90HBFL	7	178	6	152

Vertical Bend Barriers

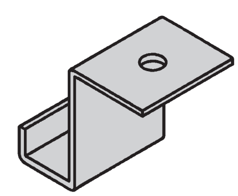
- Vertical Bend Barriers are preformed to conform to a specific vertical fitting.
- Furnished with three #10 x 1/2" plated self-drilling screws and a 99-9982 Barrier Strip Splice.
- (*) Insert P or G
- (**) Insert 30, 45, 60 or 90 for degrees
- (†) Insert 12, 24, 36 or 48 for radius

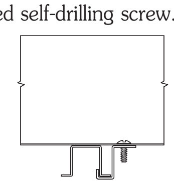


Inside Bend Catalog No.	Outside Bend Catalog No.	Side Rail Height		Loading Depth 'H'	
		in.	mm	in.	mm
73(*)-(**)VI(†)	73(*)-(**)VO(†)	4	101	3	76
74(*)-(**)VI(†)	74(*)-(**)VO(†)	5	127	4	101
75(*)-(**)VI(†)	75(*)-(**)VO(†)	6	152	5	127
76(*)-(**)VI(†)	76(*)-(**)VO(†)	7	178	6	152

Barrier Strip Clip

- Zinc plated steel barrier clip fastens to either aluminum or steel ladder rung.
- Furnished with one #10 x 1/2" zinc plated self-drilling screw.

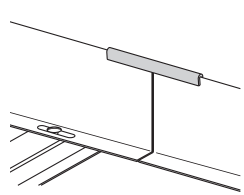


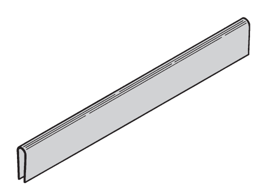


Catalog No. ● 9ZN-9002

Barrier Strip Splice

- Plastic splice holds adjoining barrier strips in straight alignment.



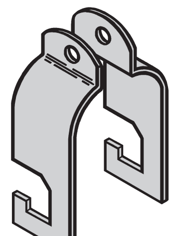


Catalog No. ● 99-9982

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

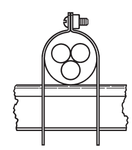
Stainless Steel Cable Clamp

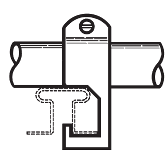
- Fits with series 2, 3, 4 & 5 standard steel rungs.
- Shipped flat. Field form around the cable at the time of installation.



Catalog No.	Cable Size in.	Cable Size mm
● 9SS4-4050	0.50 - 0.75	13 - 19
● 9SS4-4075	0.75 - 1.00	19 - 25
● 9SS4-4100	1.00 - 1.25	25 - 32
● 9SS4-4125	1.25 - 1.50	32 - 38
● 9SS4-4150	1.50 - 1.75	38 - 45
● 9SS4-4175	1.75 - 2.00	45 - 51
● 9SS4-4200	2.00 - 2.25	51 - 57
● 9SS4-4225	2.25 - 2.50	57 - 64
● 9SS4-4250	2.50 - 2.75	64 - 70
● 9SS4-4275	2.75 - 3.00	70 - 76
● 9SS4-4300	3.00 - 3.25	76 - 82
● 9SS4-4325	3.25 - 3.50	82 - 89
● 9SS4-4350	3.50 - 3.75	89 - 95
● 9SS4-4375	3.75 - 4.00	95 - 102
● 9SS4-4400	4.00 - 4.25	100 - 106
● 9SS4-4425	4.25 - 4.50	106 - 113
● 9SS4-4450	4.50 - 4.75	113 - 121
● 9SS4-4475	4.75 - 5.00	121 - 125

Refer to Section CF Cable Fixing

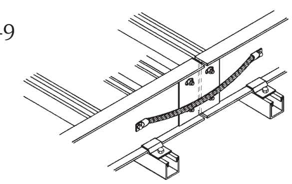




Bonding Jumper

Use at each expansion splice and where the cable tray is not mechanically/electrically continuous to ground.
Sold individually.

- Hardware included.
- See table 392.7(B)(2) on page CTS-9 for amperage ratings required to match the UL cross-sectional area of the tray.
- See tray loading chart for UL cross-sectional area.
- Bonding jumper is 16" long.

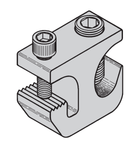


Catalog No.	Cross-Sectional Area	Ampacity
● 99-N1	1.5 Square inches	600

Grounding Clamp

Cooper B-Line Cable Tray is UL® classified as to its suitability as an equipment grounding conductor. If a separate conductor for additional grounding capability is desired, B-Line offers this clamp for bolting the conductor at least once to each cable tray section.

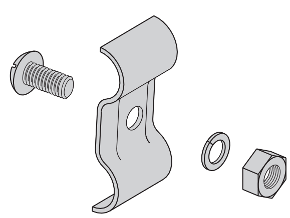
- Accepts #6 AWG to 250 MCM.



Item	Material	Catalog No.
Grounding Clamp	Tin Plated Aluminum	● 9A-2130

Ground Clamp

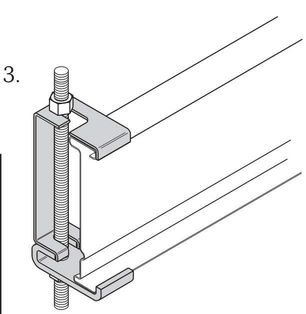
- Mechanically attaches grounding cables to cable tray.
- Hardware included.
- (*) Insert **ZN** or **SS4**



Catalog No.	Cable Size
9(*)-2351	#1 thru 2/0
9(*)-2352	3/0 thru 250 MCM

Hanger Rod Clamp

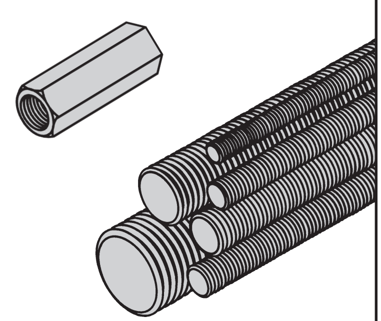
- For 1/2" ATR.
- Furnished in pairs.
- Order ATR and hex nuts separately.
- Two-piece "J"-hanger design.
- (*) Insert **ZN** or **G**
- 1500 lbs./pair capacity safety factor 3.



Catalog No.	Rail Height in.	Rail Height mm
9(*)-5324	4	101
9(*)-5325	5	127
9(*)-5326	6	152
9(*)-5327	7	178

Threaded Rod (ATR) & Rod Coupling

Size	Loading lbs	Catalog No.	Available Lengths	Coupling Cat. No.
3/8-16	730	● ATR 3/8 x Length	36", 72", 120", 144"	● B655-3/8
1/2-13	1350	● ATR 1/2 x Length	36", 72", 120", 144"	● B655-1/2



Loading based on safety factor 5.

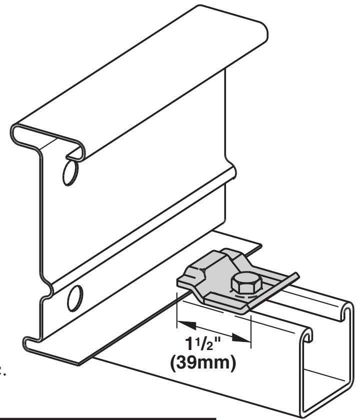
Standard Finish: Zinc Plated.

See B-Line Strut Systems Catalog for other sizes and finishes.

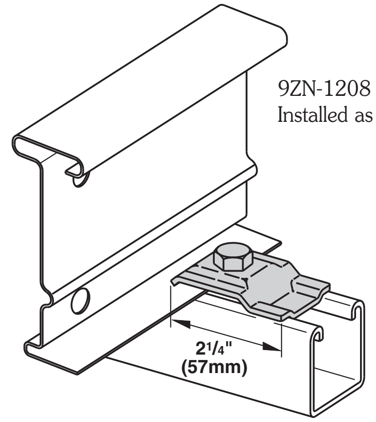
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cable Tray Clamp/Guide

- Features a no-twist design.
- Has four times the strength of the traditional design.
- Each side is labeled to ensure proper installation.
- Furnished in pairs, with or without hardware.



9ZN-1204 shown.
Installed as a guide.



9ZN-1208 shown.
Installed as a clamp.

Catalog No.		Overall Length		Hardware Size	Finish
Without Hardware	With Hardware	in.	mm		
● 9ZN-1204	● 9ZN-1204NB	1 1/2	38	1/4"	Znplt
● 9ZN-1208	● 9ZN-1208NB	2 1/4	57	3/8"	Znplt
● 9A-1205	--	2 1/4	57	1/2"	Alum.
● 9G-1205	--	2 1/4	57	1/2"	HDGAF
● 9SS6-1205	--	2 1/4	57	1/2"	316SS
● 9ZN-1205	--	2 1/4	57	1/2"	Znplt

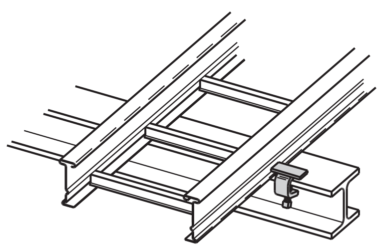
Patent # RE35479

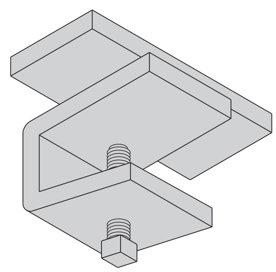
Note: For heavy duty or vertical applications see 9(*)-1241 or 9(*)-1242 page ST-18.

When installing this device as an expansion guide on the outside flange of *Steel Side Rail*, use the Catalog No. **B202** Square Washer in order to properly elevate the guide.

Cable Tray Guide

- Expansion guide for single or double cable tray runs.
- Guide allows for longitudinal movement of the cable tray.
- No field drilling of support I-beam or channel is required.
- Guides are required on both sides of cable tray to prevent lateral movement - can be placed on either the inside or outside flange of cable tray.
- Guides are sold in pieces - two guides are required per tray.
- Maximum flange thickness 1 1/8" (28.58 mm).

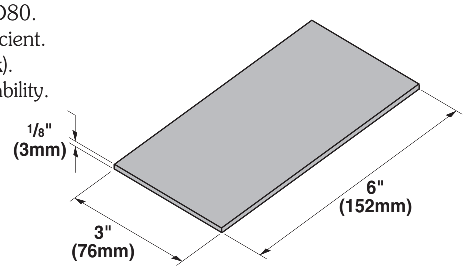




Catalog No.	Finish
● 9ZN-1249	Zinc Plated
● 9G-1249	HDGAF

Nylon Pad

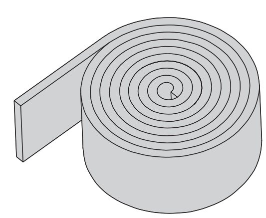
- Use for friction reduction.
- Hardness: Shore D80.
- Low friction coefficient.
- UV resistant (black).
- Excellent weatherability.
- UL-94HB.



Catalog No.	● 99-NY36

Neoprene Roll

- Used for material isolation.
- 1/8" x 2" x 20' roll.
- Hardness: Shore A60.
- Good weatherability.



Catalog No.	● 99-NP240

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● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

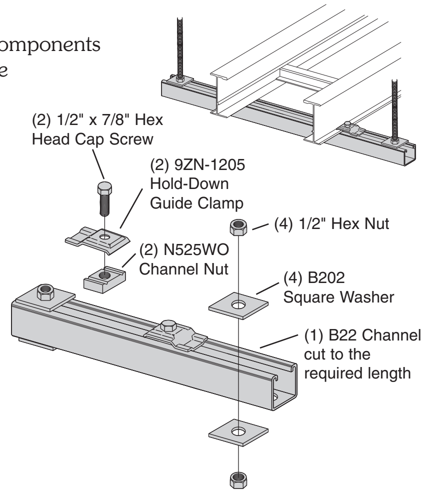
Trapeze Support Kit

Cooper B-Line's trapeze kits provide the components required for a single trapeze support in one package. These kits are available in pre-galvanized steel with zinc-plated hardware or hot dip galvanized steel with 316 stainless steel hardware.

The SH channel provides the convenience of pre-punched slots, which eliminate the need for field drilling.

The illustrated hardware is sealed in a plastic bag and boxed with the channel, which is pre-cut to the appropriate length as shown in the chart.

Designed for use with 1/2" threaded rod. Order rod separately.



Catalog No.	Tray Width in.	Tray Width mm	Channel Length in.	Channel Length mm	Uniform Load lbs	Uniform Load kN
● 9P-5506-22SH(†)	6	152	16	406	1600	7.11
● 9P-5509-22SH(†)	9	229	18	457	1250	5.56
● 9P-5512-22SH(†)	12	305	22	559	1125	5.00
● 9P-5518-22SH(†)	18	457	28	711	865	3.85
● 9P-5524-22SH(†)	24	610	34	864	700	3.11
● 9P-5530-22SH(†)	30	762	40	1016	590	2.62
● 9P-5536-22SH(†)	36	914	46	1168	510	2.27
● 9P-5542-22SH(†)	42	1067	52	1321	450	2.00

• (†) Insert 3/8 for 3/8" threaded rod hardware.

Safety factor of 3.0 on all loads.

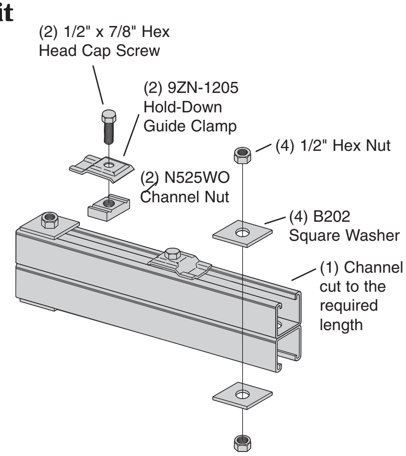
Heavy Duty Trapeze Support Kit

Cooper B-Line's trapeze kits provide the components required for a single trapeze support in one package. These kits are available in Dura-Green® epoxy coated steel with zinc-plated hardware or hot dip galvanized steel with 316 stainless steel hardware.

The SH channel provides the convenience of pre-punched slots, which eliminates the need for field drilling.

The illustrated hardware is sealed in a plastic bag and boxed with the channel, which is pre-cut to the appropriate length as shown in the chart.

Designed for use with 1/2" threaded rod. Order rod separately.

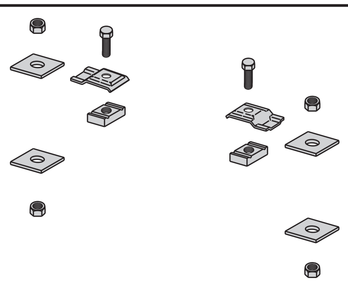


Catalog No.	Tray Width in.	Tray Width mm	Channel Length in.	Channel Length mm	Uniform Load lbs	Uniform Load kN
9(*)-5506-22SHA	6	152	16	406	1350	6.01
9(*)-5509-22SHA	9	229	18	457	1350	6.01
9(*)-5512-22SHA	12	305	22	559	1350	6.01
9(*)-5518-22SHA	18	457	28	711	1350	6.01
9(*)-5524-22SHA	24	610	34	864	1350	6.01
9(*)-5530-22SHA	30	762	40	1016	1350	6.01
9(*)-5536-22SHA	36	914	46	1168	1350	6.01
9(*)-5542-22SHA	42	1067	52	1321	1350	6.01

• (*) Insert GRN or G

Safety factor of 3.0 on all loads.

Trapeze Hardware Kit



Catalog No.	● 9ZN-5500-1/2	● 9G-5500-1/2
In plastic bag	1 pr. 9ZN-1205 2 HHC Screw 1/2 x 7/8 ZN 2 N525 WO ZN 4 B202 ZN 1/2" sq washer 4 HN 1/2 ZN	1 pr. 9G-1205 2 HHC Screw 1/2 x 7/8 SS6 2 N525 WO SS6 4 B202 HDG 1/2" sq washer 4 HN 1/2 SS6

Rooftop Support Bases with B22 Channel

Designed as a superior rooftop support for cable tray,

UV resistant and approved for most roofing material or other flat surfaces.

Can be used with any of Cooper B-Line's cable tray clamps and guides.

Ultimate Load Capacity:
1,000 lbs. (uniform load)

Catalog No.	Height x Width x Length
● CB10-28	5 5/8" x 6" x 28.0"
● CB10-36	5 5/8" x 6" x 36.0"
● CB10-42	5 5/8" x 6" x 42.0"
● CB10-50	5 5/8" x 6" x 50.0"
● CB10-60	5 5/8" x 6" x 60.0"

LEEDS credit available, base made from 100% recycled material.

General Note: Consult roofing manufacturer or engineer for roof load capacity. The weakest point may be the insulation board beneath the rubber membrane.

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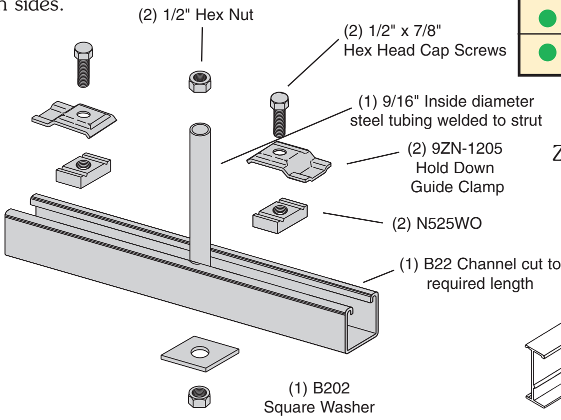
● Red = Normally long lead-time items (15 working days minimum)

Series 2, 3, 4, & 5 Steel - Accessories

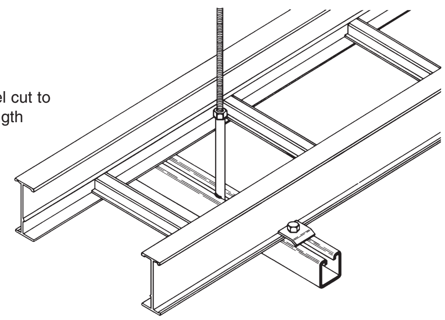
Center Hung Cable Tray Support

- Cooper B-Line's unique Center Hung Cable Tray Support allows cable to be laid-in from both sides.
- Eliminates costly cable pulling and field cutting of cable tray supports. Labor costs are dramatically reduced.
- Required hardware and threaded rod material for trapeze assemblies are reduced by 50%.
- Designed for use with 1/2" threaded rod. (Order rod separately)
- Use with all aluminum and steel cable trays through 24" width.
- Load capacity is 700 lbs. per support. Safety factor of 3.0. Eccentric loading is not to exceed a 60% vs. 40% load differential.
- The maximum recommended unsupported span length is 144"/12 ft. (3.66 m).
- Hardware shown is furnished.

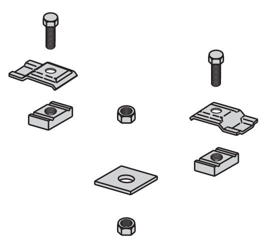


Catalog No.	Tray Width	Channel Length
● 9ZN-5212	6", 9", 12"	18"
● 9ZN-5224	18", 24"	30"

ZN = Zinc Plated

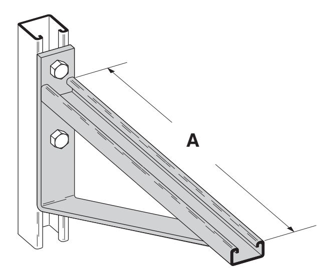


Center Hung Support Hardware Kit



Catalog No.	● 9ZN-5200
In plastic bag	1 pr. 9ZN-1205 2 HHC Screw 1/2 x 7/8 ZN 2 N525 WO ZN 1 B202 ZN 1/2" sq washer 2 HN 1/2 ZN

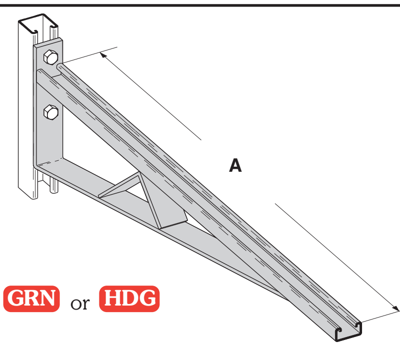
Bracket



Finishes available: ZN GRN or HDG
Safety Load Factor 2.5

Catalog No.	Uniform Load		Tray Width		'A'	
	lbs	kN	in.	mm	in.	mm
B494-12	1580	7.02	6 & 9	152 & 229	12	305
B494-18	1000	4.45	12	305	18	457
B494-24	996	4.43	18	457	24	610

Bracket



Finishes available: ZN GRN or HDG
Safety Load Factor 2.5

Catalog No.	Uniform Load		Tray Width		'A'	
	lbs	kN	in.	mm	in.	mm
B494-30	924	4.11	24	610	30	762
B494-36	864	3.84	30	762	36	914
B494-42	580	2.58	36	914	42	1067
B494-48	500	2.22	42	1067	48	1219

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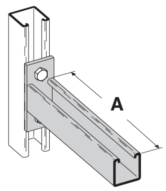
● Red = Normally long lead-time items (15 working days minimum)

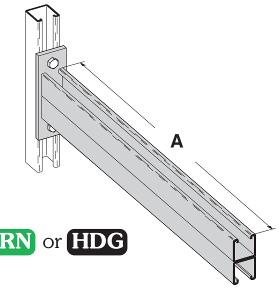
Cantilever Bracket



Finishes available: ZN GRN or HDG
Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B409-12	960	4.27	6 & 9	152 & 229	12	305
B409-18	640	2.84	12	305	18	457
B409-24	480	2.13	18	457	24	610

Cantilever Bracket



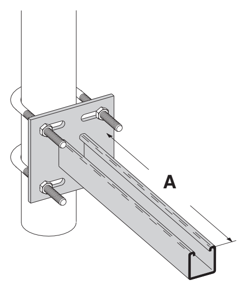
Finishes available: ZN GRN or HDG
Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B297-12	1660	7.37	6 & 9	152 & 229	12	305
B297-18	1100	4.88	12	305	18	457
B297-24	835	3.71	18	457	24	610
B297-30	625	2.78	24	610	30	762
B297-36	550	2.44	30	762	36	914
B297-42	465	2.06	36	914	42	1067

Underfloor Support (U-Bolts not included)

U-Bolt Size	Fits Pipe O.D.
B501-3/4	.841 - 1.050
B501-1	1.051 - 1.315
B501-1 1/4	1.316 - 1.660
B501-1 1/2	1.661 - 1.900
B501-2	1.901 - 2.375
B501-2 1/2	2.376 - 2.875

- Order properly sized U-Bolts separately.

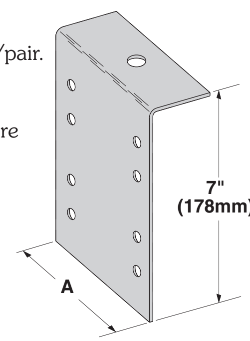


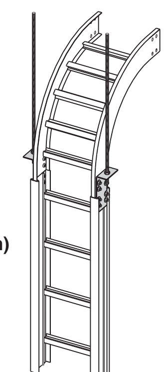
Finish available: ZN
Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
● **B409UF-12**	800	3.55	6 & 9	152 & 229	12	305
● **B409UF-21**	450	2.00	12 & 18	305 & 457	21	533

Vertical Hanger Splice Plates

- (*) Insert ZN or G
- Design load is 1500 lbs/pair. Safety Factor of 2.5
- Furnished in pairs.
- Shipped without hardware (use splice hardware).

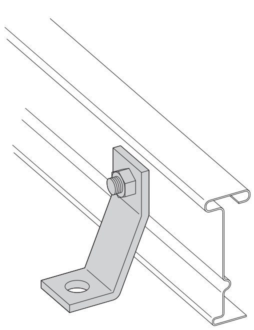




Catalog No.	Outside Cable Tray Ht.	'A' in.	'A' mm
9(*)-8224	4"	2.84	85.34
9(*)-8225	5"	3.73	110.74
9(*)-8226	6"	4.84	136.14
9(*)-8227	7"	5.84	161.54

Heavy Duty Hold-Down Bracket

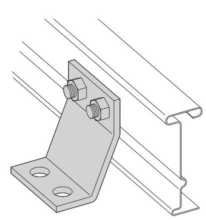
- Design load is 2000 lbs/pair.
- Two bolt design.
- Sold in pairs.
- 3/8" cable tray attachment hardware provided.
- 1/2" support attachment hardware **not** provided.
- (*) Insert ZN or G

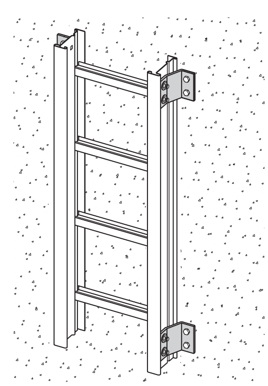


Catalog No.	9(*)-1241

Heavy Duty Hold-Down Bracket

- Design load is 4000 lbs/pair.
- Four bolt design.
- Sold in pairs.
- 3/8" cable tray attachment hardware provided
- 1/2" support attachment hardware **not** provided.
- (*) Insert ZN or G





Catalog No.	9(*)-1242

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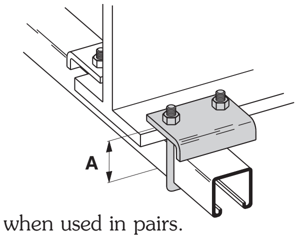
Series 2, 3, 4, & 5 Steel - Accessories

Beam Clamp

- Finishes available: ZN or HDG
- Sold in pieces.

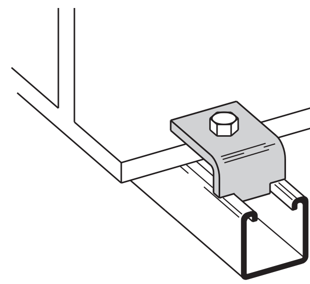


Design load when used in pairs.
Safety Load Factor 5.0

Catalog	Design Load*		'A'	
	lbs	kN	in.	mm
B441-22	1200	5.34	3 3/8	86
B441-22A	1200	5.34	5	127

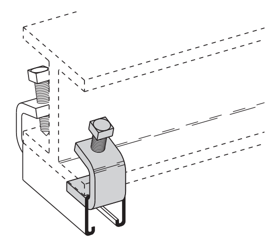
Beam Clamp B355

- Finishes available: ZN GRN HDG or SS4
- Sold in pieces.
- Design load is 1200 lbs. when used in pairs.
- Safety Load Factor 5.0
- Order HHCS and Channel Nuts separately.



Beam Clamp

- Finishes available: ZN GRN or HDG
- Sold in pieces.

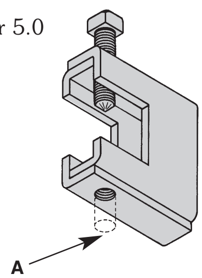


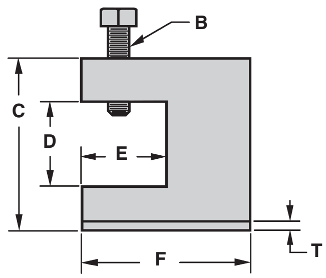
Design load when used in pairs.
Safety Load Factor 5.0

Cat. No.	B212-1/4		B212-3/8	
Design Load *	600 lbs.	2.67 kN	1000 lbs.	4.45 kN
Max. Flange Thick	3/4"	19 mm	1 1/8"	28.6 mm
Mat'l. Thickness	1/4"	6.3 mm	3/8"	9.5 mm

B305 Thru B308 & B321 Series Beam Clamps

- Finishes available: ZN or HDG
- Setscrew included.
- Safety Load Factor 5.0

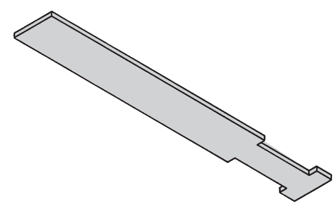




Cat. No.	Rod Size A	B	C	D	E	F	T	Design Load lbs	Design Load kN
B305	3/8"-16	3/8"-16	2 5/16"	7/8"	1 1/8"	2 1/2"	11 Ga.	600	2.67
B306	3/8"-16	1/2"-13	2 7/16"	7/8"	1 1/8"	2 1/2"	7 Ga.	1100	4.90
B307	1/2"-13	1/2"-13	2 7/16"	7/8"	1 1/8"	2 1/2"	7 Ga.	1100	4.90
B308	1/2"-13	1/2"-13	2 9/16"	7/8"	1 1/8"	2 1/2"	1/4"	1500	6.68
B321-1	3/8"-16	1/2"-13	3 9/16"	1 11/16"	1 5/8"	3 1/4"	1/4"	1300	5.79
B321-2	1/2"-13	1/2"-13	3 9/16"	1 11/16"	1 5/8"	3 1/4"	1/4"	1400	6.23

B312 Anchor Strap

- Finish available: ZN
- For a maximum beam thickness of 3/4".
- For thicker beams, step up one flange width size.

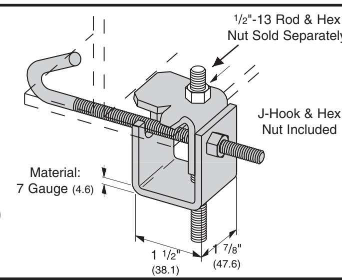


Cat. No.	Flange Width
B312-6	Up to 6"
B312-9	6" - 9"
B312-12	9" - 12"

Beam Clamp

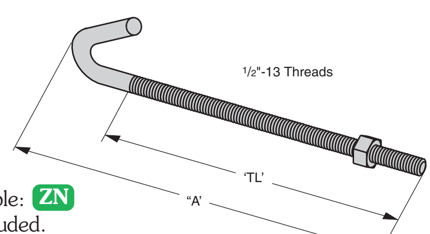
Catalog No.	For Flange Width		Wt./C	
	in.	mm	lbs	kg
B750-J4	3"- 6"	76.2 - 152.4	109	49.4
B750-J6	5"- 9"	127.0 - 288.6	124	56.2
B750-J9	8"- 12"	203.2 - 304.8	135	61.2
B750-J12	11"- 15"	279.4 - 381.0	147	66.7

- Finish available: ZN
- Design Load 500 lbs. (2.22 kN)
- Safety Load Factor 5.0
- Recommended torque: 'J-Hook Nut 125 In.-Lbs. (14.1 kN/m)
- Maximum flange thickness of 3/4"



Beam Clamp

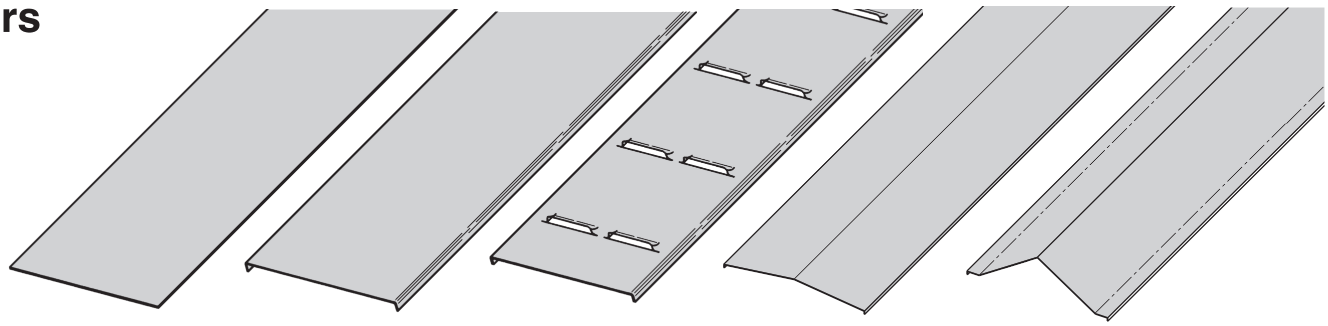
Catalog No.	'A'		Thread Length 'TL'		Wt./C	
	in.	mm	in.	mm	lbs	kg
B700-J4	8 1/2"	215.9	5"	127.0	44	19.9
B700-J6	11 1/2"	292.1	6"	152.4	53	24.0
B700-J9	12 1/4"	368.3	6"	152.4	63	28.6
B700-J12	17 1/2"	444.5	6"	152.4	78	35.4



- Finish available: ZN
- Hex Nut included.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Covers



Solid Non-Flanged · Solid Flanged · Ventilated Flanged · Peaked Flanged · 2 to 3 Pitch Peaked Flanged (See page AP-3)

A full range of covers is available for straight sections and fittings.

Solid covers should be used when maximum enclosure of the cable is desired and no accumulation of heat is expected. **Ventilated covers** provide an overhead cable shield yet allow heat to escape.

Cooper B-Line recommends that covers be placed on vertical cable tray runs to a height of 6 ft. (1.83 m) to 8 ft. (2.44 m) above the floor to isolate both cables and personnel. **Flanged covers** have a 1/2 in. (13 mm) flange. Cover clamps are not included with the cover and must be ordered separately. All **peaked covers** are flanged. Standard peaked covers have 1/2" peak. Special purpose peaked covers, having a 2 to 3 pitch, provide additional slope and material thickness. The 2 to 3 pitch fitting covers are of multiple piece, welded construction.

Steel Cover Part Numbering

Prefix

Example: **80 2 P 20 - 24 - 144**

Cover Type
- ● 80 = Solid
- ● 81 = Ventilated
- ● 82 = Peaked

Detail
- ● 2= Flanged Steel (248, 258, 268 straight sections and all fittings)
- ● 3= Flanged Steel (All straight sections except 248, 258, 268)
- ● 4= Non-Flanged Steel (80 & 81 type only)

Material
- ● P= Pre-Galvanized (Not available in Type 83)
- ● G= HDGAF

Material Thickness
- ● 20 = 20 Pre-Galv
- ● 18 = 18 HDGAF

Tray Width
- ● 06 = 6"
- ● 09 = 9"
- ● 12 = 12"
- ● 18 = 18"
- ● 24 = 24"
- ● 30 = 30"
- ● 36 = 36"

Item Description

For Straight Section Covers:

Pre-Galvanized Only:
- ● 144 = 12 ft. (3.66 m)
- ● 120 = 10 ft. (3.05 m)

Pre-Galvanized & HDGAF
- ● 72 = 6 ft. (1.83 m)
- ● 60 = 5 ft. (1.52 m)

For fitting covers: Insert suffix of fitting to be covered. See example below.

Covers 30" and 36" wide have reinforcing ridges.

Examples of Catalog Numbers for Fitting Covers:

Horizontal Bend Cover

Prefix — Suffix

80 2 P 20 - 18 - 90 HB 24

Radius
Fitting
Angle
Width
Material Thickness
Material
Detail
Cover Type

Vertical Bend Cover

Prefix — Suffix

80 2 G 18 - 24 - 90 VO 24 - 4*

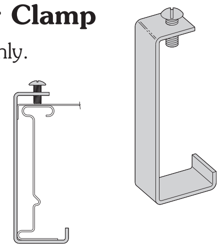
Side Rail* Height
Radius
Fitting
Angle
Width
Material Thickness
Material
Detail
Cover Type

* Required for VO fittings only

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Standard Cover Clamp

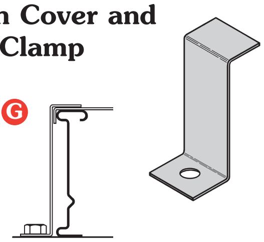
- For indoor service only.
- Sold per piece.
- (*) Insert ZN or G



Tray Type	Side Rail Height in.	Side Rail Height mm	Catalog No.
Steel	4	101	9(*)-9014
	5	127	9(*)-9015
	6	152	9(*)-9016
	7	178	9(*)-9017

Combination Cover and Hold-Down Clamp

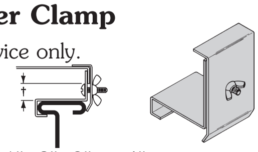
- Sold per piece.
- (*) Insert P or G
- For indoor service only.



Tray Type	Side Rail Height in.	Side Rail Height mm	Catalog No.
Steel	4	101	9(*)-9043
	5	127	9(*)-9053
	6	152	9(*)-9063
	7	178	9(*)-9073

Raised Cover Clamp

- For indoor service only.
- For use with flanged covers only.



† Specify gap of 1", 2", 3" or 4".

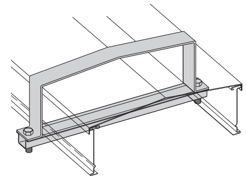
Tray Type	Catalog No.
Series 2 Steel Straight Section	● 9ZN-9114-†
Series 3 & 4 Steel Straight Section	● 9ZN-9115-†
All Steel Fittings (Also Series 1 Steel Straight Sections)	● 9ZN-910†

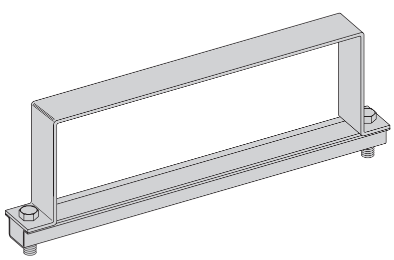
Heavy Duty Cover Clamp

- Recommended for outdoor service.
- (*) Insert P or G

(ǂ) Insert tray width
† Add P to Catalog No. for 1/2" peaked cover clamp.

Peaked Cover Clamp





Side Rail Height in.	Side Rail Height mm	Catalog No.
4	101	9(*)-(ǂ)-9044†
5	127	9(*)-(ǂ)-9054†
6	152	9(*)-(ǂ)-9064†
7	178	9(*)-(ǂ)-9074†

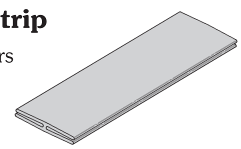
Quantity of Standard Cover Clamps Required

Straight Section 60" or 72" ....4 pcs.
Straight Section 120" or 144" ....6 pcs.
Horizontal/Vertical Bends................4 pcs.
Tees...6 pcs.
Crosses ....8 pcs.

Note: When using the Heavy Duty Cover Clamp, only one-half the number of clamps stated above is required.

Cover Joint Strip

- Used to join covers
- Plastic
- (ǂ) Insert tray width



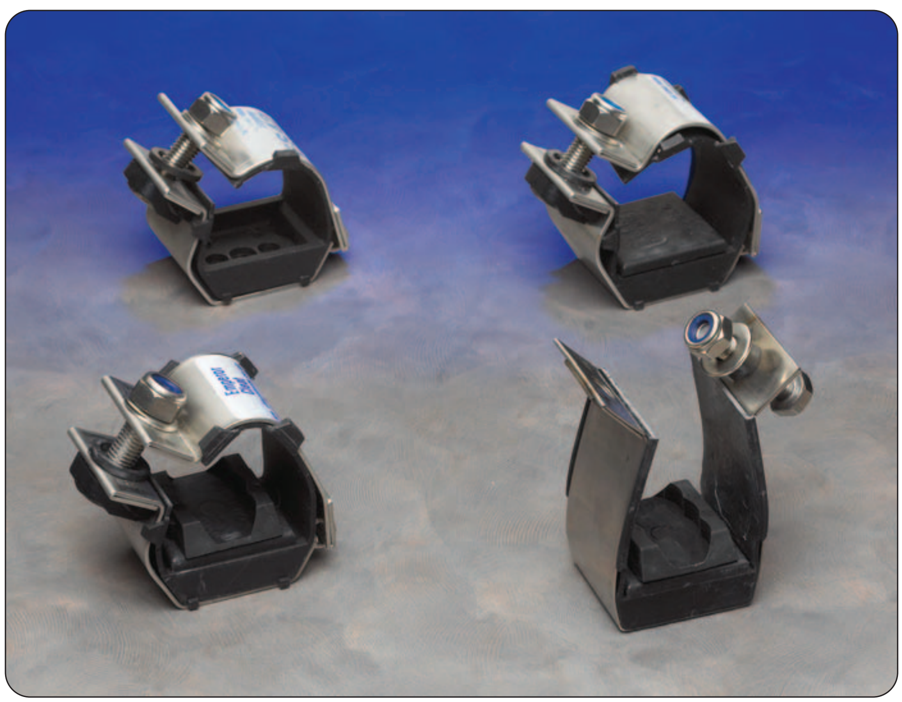
Catalog No.	● 99-9980-(ǂ)

Cable Cleats

(see pages CF-1 thru CF-6)

Emperor Trefoil Cable Cleats

Vulcan Cable Cleats



● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, cable tray systems shall be as manufactured by Cooper B-Line, Inc.

Section 2- Cable Tray Sections and Components

2.01 General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features. Cable tray shall be installed according to the latest revision of NEMA VE 2.

2.02 Pre-Galvanized Steel: Straight sections, fitting side rails, rungs, and covers shall be made from structural quality steel meeting the minimum mechanical properties and mill galvanized in accordance with ASTM A653 SS, Grade 33, coating designation G90. Hardware finish shall be electrogalvanized zinc per ASTM B633.

2.03 Hot Dip Galvanized Steel: All side rails, covers, splice plates, and rungs shall be made from structural quality steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 for 14 gauge and heavier, ASTM A1008, Grade 33 Type 2 for 16 gauge and lighter, and shall be hot dip galvanized after fabrication in accordance with ASTM A123. Mill galvanized covers are not acceptable for hot dip galvanized cable tray. Hardware finish shall be chromium zinc per ASTM F-1136-88.

2.04 Ladder Cable Trays shall consist of two longitudinal members (side rails) with transverse members (rungs) welded to the side rails. Rungs shall be spaced [6] [9] [12] inches on center. Rung spacing in radiused fittings shall be industry standard 9" and measured at the center of the tray's width. No portion of the rungs shall protrude below the bottom plane of the side rails. Each rung must be capable of supporting a 200 lb. concentrated load at the center of the cable tray over and above the cable load with a safety factor of 1.5.

2.05 Ventilated Trough Cable Trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails or rungs spaced 4" on center. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/4$" and shall be spaced on 6" centers. To provide ventilation in the tray, the valleys of the corrugated bottom shall have $2^1/4$" x 4" rectangular holes punched along the width of the bottom.

2.06 Non-Ventilated Bottom Trough Cable Trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails or a solid sheet over rungs. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/4$" and shall be spaced on 6" centers.

2.07 Cable tray loading depth shall be [3] [4] [5] [6] inches per NEMA VE 1.

2.08 Straight sections shall have side rails fabricated as I-beams. Straight sections shall be supplied in standard [12 foot] [24 foot] [10 foot (3 m)] [20 foot (6 m)] lengths.

2.09 Cable tray widths shall be [6] [9] [12] [18] [24] [30] [36] inches or as shown on drawings.

2.10 Splice plates shall be manufactured of high strength steel, meeting the minimum mechanical properties of ASTM A1011 HSLAS, Grade 50, Class 1 and be secured with 8 nuts and bolts per plate. The resistance of fixed splice connections between an adjacent section of tray shall not exceed 0.00033 ohm.

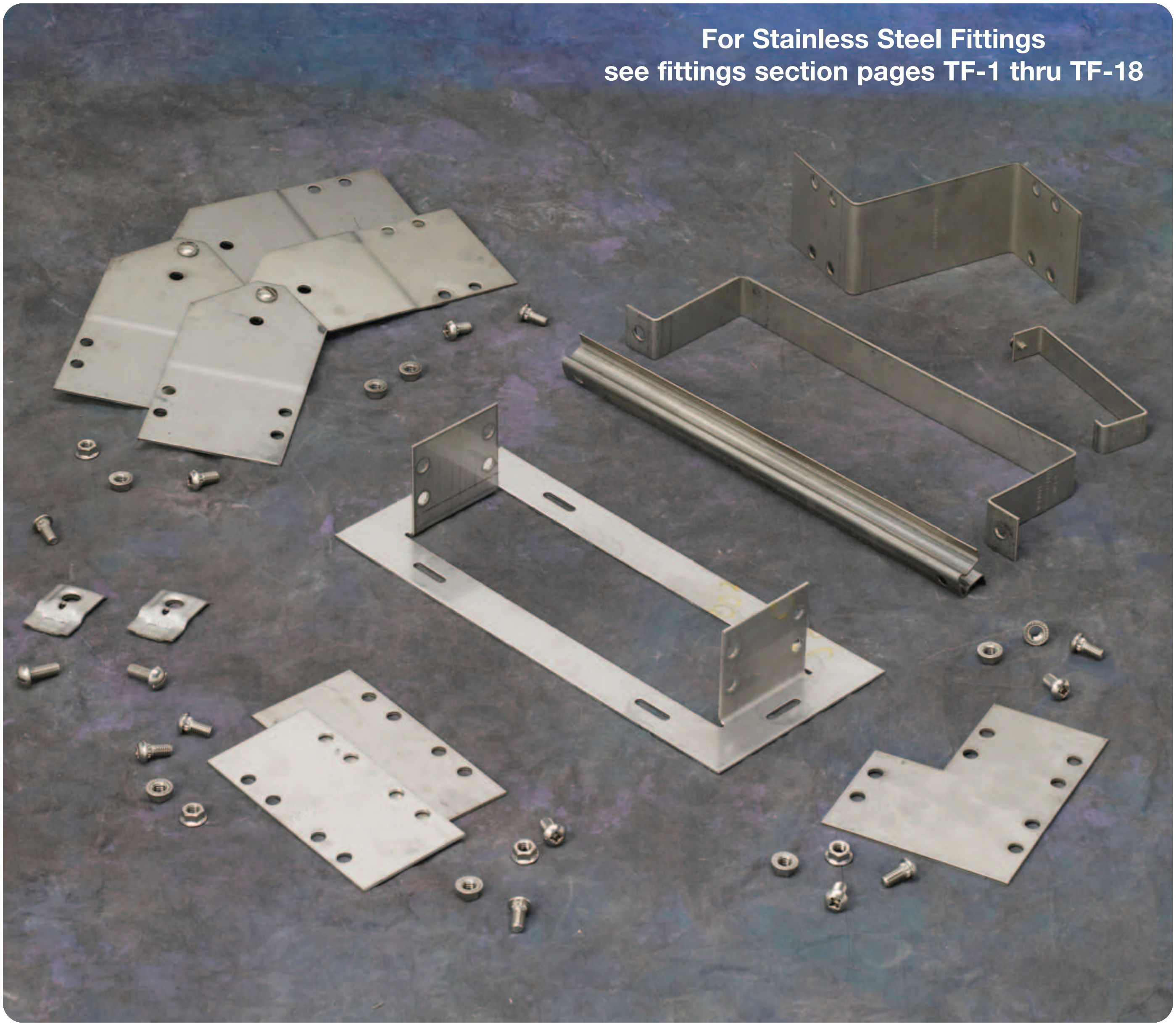
2.11 All fittings must have a minimum radius of [12] [24] [36] [48] inches.

Section 3- Loading Capacities and Testing

3.01 Cable tray shall be capable of carrying a uniformly distributed load of ______ lbs./ft. on a _______ ft. support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1 5.2. In addition to the uniformly distributed load the cable tray shall support 200 lbs. concentrated load at mid-point of span. Load and safety factors specified are applicable to both the side rails and rung capacities. Cable tray shall be made to manufacturing tolerances as specified by NEMA.

3.02 Upon request, manufacturer shall provide test reports in accordance with the latest revision of NEMA VE 1 or CSA C22.2 No. 126.

Series 3 & 4 Stainless Steel



How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- Green = Fastest shipped items (normally 3 to 5 working days)
- Black = Normal lead-time items (normally 5 to 10 working days)
- Red = Normally long lead-time items (15 working days minimum)

Example: (from page SST-3) **348SS4 09 - 12 - 144** ● ● ● ● **Part will typically ship in 15 days minimum.**

Changing the part number will not change the lead time of the original 15 days minimum.

COOPER B-Line

Series 3 & 4 Stainless Steel - Straight Sections

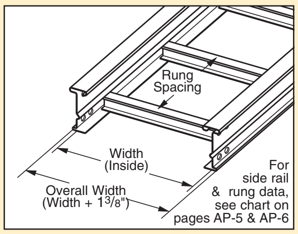
3" NEMA VE 1 Loading Depth
4" Side Rail Height

Straight Section Part Numbering

Prefix
Example: **348 SS6 09 - 24 - 240**

Series
- ● **348**

Material
- ● **SS4** = 304 Stainless Steel
- ● **SS6** = 316 Stainless Steel



***Type**

Ladder-
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-
6" and Wider
- ● **04** = Vented Bottom
- ● **SB** = Non-Ventilated

***Width**
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

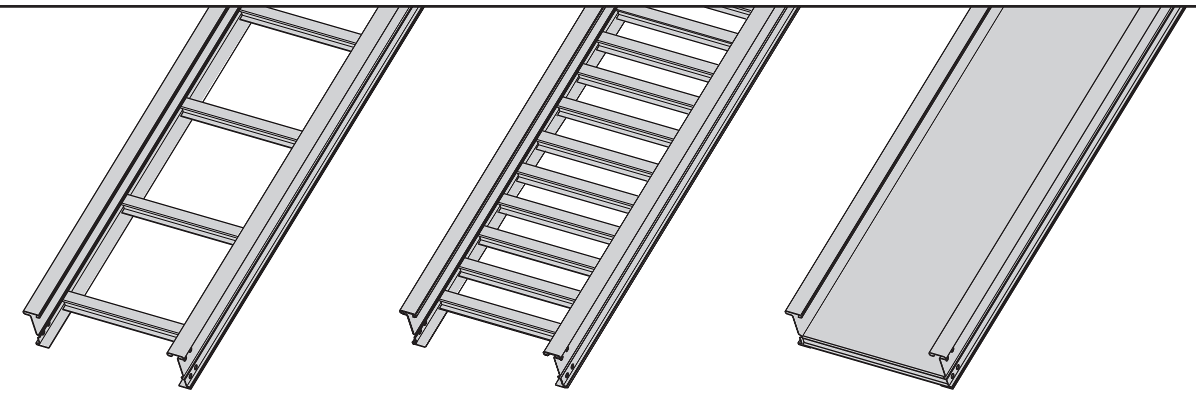
Length
- ● ① **144** = 12 ft. 348
- ● ② 120 = 10 ft.

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.

Passivation available see page CTS-2.

See page AP-1 for additional rung options. *Special sizes available.



Ladder Type (Specify Rung Spacing) — Vented Bottom — Non-Ventilated

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable being installed.

B-Line Series	Side Rail Dimensions	NEMA, CSA Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
348 SS†	1.50; 3.13; 4.19; 18 gauge	NEMA: 16A, 12C CSA: C1-3m UL Cross-Sectional Area: 0.40 in²	10 12 14 16 18 20	180 125 92 70 56 45	0.0042 0.009 0.016 0.027 0.044 0.067	Area=0.74 in² Sx=0.79 in³ Ix=1.85 in⁴	3.0 3.7 4.3 4.9 5.5 6.1	268 186 137 105 83 67	0.072 0.148 0.275 0.469 0.752 1.145	Area=4.77 cm² Sx=12.95 cm³ Ix=77.00 cm⁴

When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus. † Insert 4 for 304 stainless steel or 6 for 316 stainless steel.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

4" NEMA VE 1 Loading Depth
5" Side Rail Height

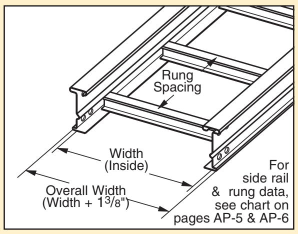
Straight Section Part Numbering

Prefix

Example: **358 SS6 09 - 24 - 240**

Series
- ● **358**

Material
- ● **SS4** = 304 Stainless Steel
- ● **SS6** = 316 Stainless Steel



***Type**

Ladder-
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-
6" and Wider
- ● **04** = Vented Bottom
- ● **SB** = Non-Ventilated

***Width**
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

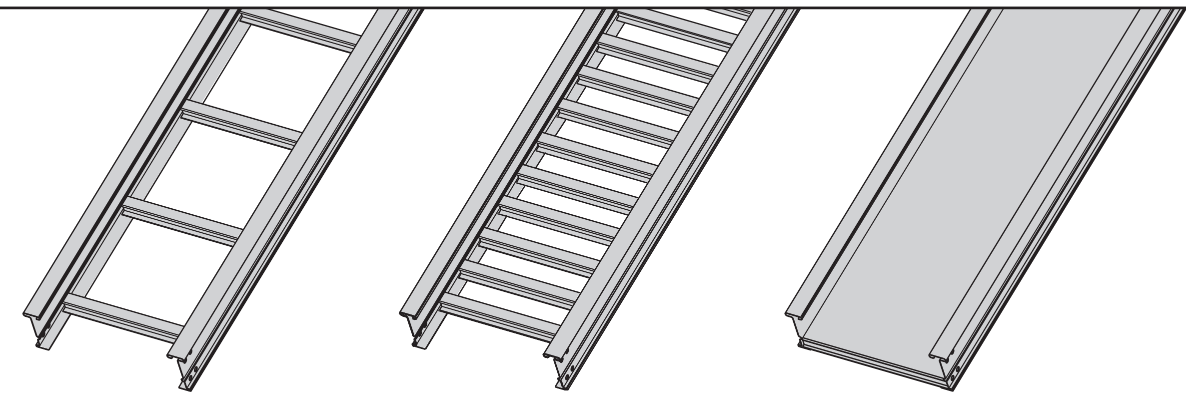
Length
- ● ① **144** = 12 ft. 358
- ● ② 240 = 20 ft.

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.

Passivation available see page CTS-2.

See page AP-1 for additional rung options. *Special sizes available.

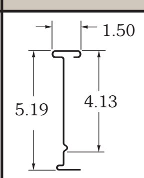


Ladder Type
(Specify Rung Spacing)

Vented Bottom

Non-Ventilated

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable being installed.

B-Line Series	Side Rail Dimensions	NEMA, CSA & UL Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
358 SS†		NEMA: 20A, 16B CSA: 89 kg/m 6.1m UL Cross-Sectional Area: 0.70 in²	10 12 14 16 18 20	248 172 127 97 77 62	0.0025 0.0052 0.010 0.016 0.026 0.040	Area=0.83 in² Sx=1.09 in³ Ix=3.10 in⁴	3.0 3.7 4.3 4.9 5.5 6.1	369 256 188 144 114 92	0.043 0.089 0.164 0.280 0.448 0.684	Area=5.35 cm² Sx=17.86 cm³ Ix=129.03 cm⁴

When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus. † Insert 4 for 304 stainless steel or 6 for 316 stainless steel.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 3 & 4 Stainless Steel - Straight Sections

5" NEMA VE 1 Loading Depth
6" Side Rail Height

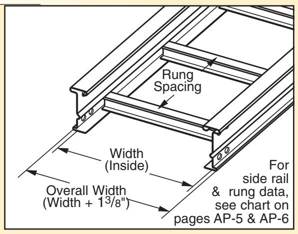
Straight Section Part Numbering

Prefix

Example: **368 SS6 09 - 24 - 240**

Series
- ● **368**
- **464**

Material
- ● **SS4** = 304 Stainless Steel
- ● **SS6** = 316 Stainless Steel



***Type**

Ladder-
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Trough-
6" and Wider
- ● **04** = Vented Bottom
- ● **SB** = Non-Ventilated

***Width**
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

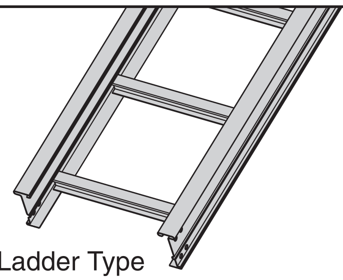
Length
- 368: ● ① **240** = 20 ft.; ● ② 144 = 12 ft.
- 464: ● ① **240** = 20 ft.; ● ② 288 = 24 ft.

①Primary Length.
②Secondary Length.

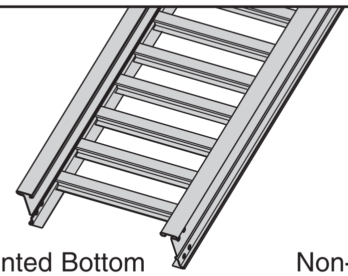
See page CTS-23 for explanation of lengths.

Passivation available see page CTS-2.

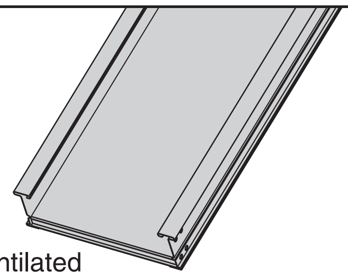
See page AP-1 for additional rung options. *Special sizes available.



Ladder Type
(Specify Rung Spacing)

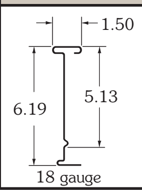


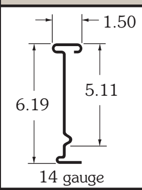
Vented Bottom



Non-Ventilated

Values are based on simple beam tests per NEMA VE 1 on 36" wide cable tray rungs spaced on 12" centers. Cable trays will support without collapse a 200 lb. (90.7 kg) concentrated load over and above published loads. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable being installed.

B-Line Series	Side Rail Dimensions	NEMA, CSA Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
368 SS†		NEMA: 20A, 16B CSA: D1-3m UL Cross-Sectional Area: 0.70 in^2	10 12 14 16 18 20	236 164 120 92 73 59	0.0016 0.0034 0.0062 0.011 0.017 0.026	Area=0.92 in^2 Sx=1.41 in^3 Ix=4.77 in^4	3.0 3.7 4.3 4.9 5.5 6.1	351 244 179 137 108 88	0.028 0.058 0.107 0.182 0.291 0.444	Area=5.94 cm^2 Sx=23.11 cm^3 Ix=198.54 cm^4

B-Line Series	Side Rail Dimensions	NEMA, CSA Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Design Factors for Two Rails	Span meters	Load kg/m	Deflection Multiplier	Design Factors for Two Rails
464 SS†		NEMA: 20C+ CSA: E-6m UL Cross-Sectional Area: 1.00 in^2	12 16 18 20 22 24	342 192 152 123 102 85	0.002 0.007 0.011 0.016 0.024 0.034	Area=1.49 in^2 Sx=2.28 in^3 Ix=7.65 in^4	3.7 4.9 5.5 6.1 6.7 7.3	508 286 226 183 151 127	0.036 0.113 0.182 0.277 0.406 0.574	Area=9.61 cm^2 Sx=37.36 cm^3 Ix=318.42 cm^4

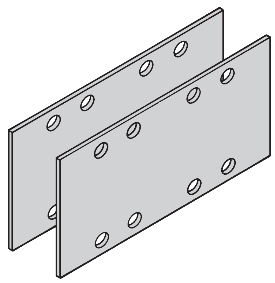
When cable trays are used in continuous spans, the deflection of the cable tray is reduced by as much as 50%. Design factors: Ix = Moment of Inertia, Sx = Section Modulus. † Insert 4 for 304 stainless steel or 6 for 316 stainless steel.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 3 & 4 Stainless Steel - Accessories

Splice Plates

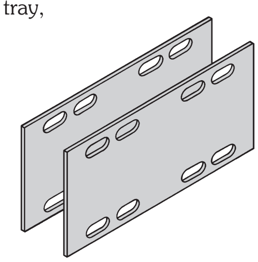
- Standard 8-hole pattern for all stainless steel splice plates.
- Furnished in pairs with hardware.
- One pair including hardware provided with straight section.
- Boxed in pairs with hardware.
- (*) Insert SS4 or SS6



Catalog No.	Height in.	Height mm
9(*)-8004	4	101
9(*)-8005	5	127
9(*)-8006	6	152

Expansion Splice Plates

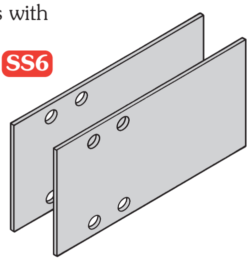
- Expansion plates allow for one inch expansion or contraction of the cable tray, or where expansion joints occur in the support structure.
- Furnished in pairs with hardware.
- **Bonding Jumpers are required. Order Separately.**
- (*) Insert SS4 or SS6



Catalog No.	Height in.	Height mm
9(*)-8014	4	101
9(*)-8015	5	127
9(*)-8016	6	152

Universal Splice Plates

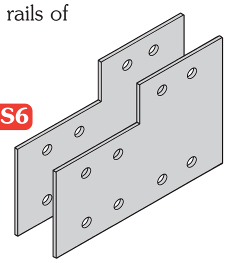
- Used to splice to existing cable tray systems.
- Furnished in pairs with hardware.
- (*) Insert SS4 or SS6



Catalog No.	Height in.	Height mm
9(*)-8004-1/2	4	101
9(*)-8005-1/2	5	127
9(*)-8006-1/2	6	152

Step Down Splice Plates

- These splice plates are offered for connecting cable tray sections having side rails of different heights.
- Furnished in pairs with hardware.
- (*) Insert SS4 or SS6

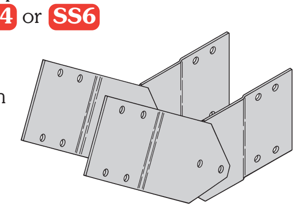


Catalog No.	Height in.	Height mm
9(*)-8045	5 to 4	127 to 101
9(*)-8046	6 to 4	152 to 101
9(*)-8060	6 to 5	152 to 127

Vertical Adjustable Splice Plates

- These plates provide for changes in elevation that do not conform to standard vertical fittings.
- Furnished in pairs with hardware.
- (*) Insert SS4 or SS6

Requires supports within 24" on both sides, per NEMA VE 2.

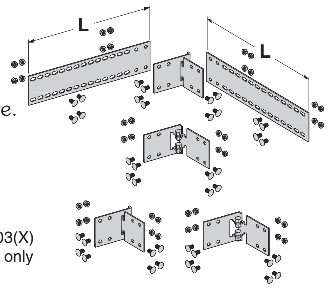


Catalog No.	Height in.	Height mm
9(*)-8024	4	101
9(*)-8025	5	127
9(*)-8026	6	152

Horizontal Adjustable Splice Plates

- Offered to adjust a cable tray run for changes in direction in a horizontal plane that do not conform to standard horizontal fittings.
- Furnished in pairs with hardware.
- New design bonding jumpers **not** required.
- (*) Insert SS4 or SS6
- (X) Insert 4, 5 or 6 for side rail height.

9(*)-803(X)-12 or 9(*)-803(X)-36
One pair splice plates with extensions.



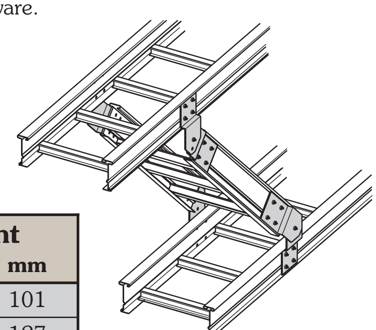
9(*)-803(X)
Splice only

Catalog No.	Cable Tray End Cut	Tray Width	'L'
9(*)-803(X)	Mitered	Thru 36"	N/A
9(*)-803(X)-12	Not Mitered	Thru 12"	16"
9(*)-803(X)-36	Not Mitered	Thru 36"	41"

Requires supports within 24" on both sides, per NEMA VE 2.

Branch Pivot Connectors

- Branch from existing cable tray runs at any point.
- Pivot to any required angle.
- UL Classified for grounding (bonding jumper not required).
- Furnished in pairs with hardware.
- (*) Insert SS4 or SS6



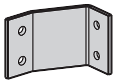
Catalog No.	Height in.	Height mm
9(*)-8244	4	101
9(*)-8245	5	127
9(*)-8246	6	152

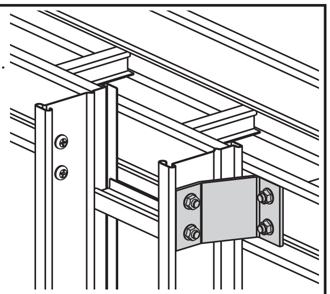
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 3 & 4 Stainless Steel - *Accessories*

Cross Connector Bracket

- For field connecting crossing section.
- Furnished in pairs with 3/8" hardware.
- (*) Insert **SS4** or **SS6**

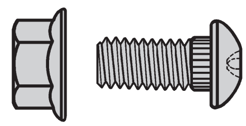




Catalog No.	9(*)-1240

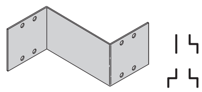
Type 316 Tray Hardware

Catalog No. ● RNCB 3/8"-16 x 3/4" SS6
Ribbed Neck Carriage Bolt, 316 Stainless Steel
Catalog No. ● SFHN 3/8"-16 SS6
Hex Nut , 316 Stainless Steel



Offset Reducing Splice Plate

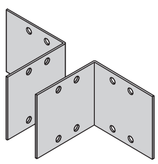
- This plate is used for joining cable trays having different widths. When used in pairs they form a straight reduction; when used singly with a standard splice plate, they form an offset reduction.
- Furnished as one plate with hardware.
- (‡) Insert reduction
- (*) Insert **SS4** or **SS6**



Catalog No.	Height in.	Height mm
9(*)-8064-(‡)	4	101
9(*)-8065-(‡)	5	127
9(*)-8066-(‡)	6	152

Tray to Box Splice Plates

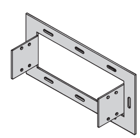
- Used to attach the end of a cable tray run to a distribution box or control panel.
- Furnished in pairs with hardware.
- (*) Insert **SS4** or **SS6**



Catalog No.	Height in.	Height mm
9(*)-8054	4	101
9(*)-8055	5	127
9(*)-8056	6	152

Frame Type Box Connector

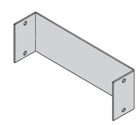
- Designed to attach the end of a cable tray run to a distribution cabinet or control center to help reinforce the box at the point of entry.
- Furnished with cable tray connection hardware.
- (‡) Insert tray width
- (*) Insert **SS4** or **SS6**



Catalog No.	Height in.	Height mm
9(*)-8074-(‡)	4	101
9(*)-8075-(‡)	5	127
9(*)-8076-(‡)	6	152

Blind End

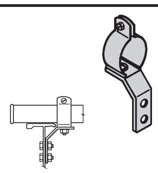
- This plate forms a closure for a dead end cable tray.
- Furnished as one plate with hardware.
- (‡) Insert tray width
- (*) Insert **SS4** or **SS6**



Catalog No.	Height in.	Height mm
9(*)-8084-(‡)	4	101
9(*)-8085-(‡)	5	127
9(*)-8086-(‡)	6	152

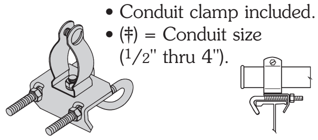
Conduit to Tray Adaptors

- Assembly required.
- Mounting hardware included.
- Conduit clamps provided.
- (‡) = Conduit size (1/2" thru 4").



Catalog No.	● 9SS4-1150-(‡)

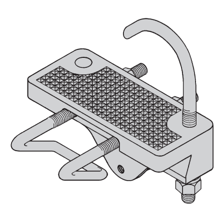
- Assembly required.
- Conduit clamp included.
- (‡) = Conduit size (1/2" thru 4").

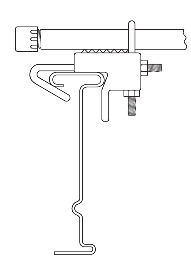


Catalog No.	● 9SS4-1155-(‡)

Conduit to Tray Adaptor

- For easy attachment of conduit terminating at a cable tray.
- Use on aluminum or steel cable trays.

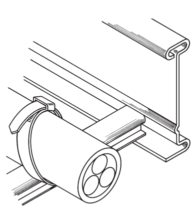




Steel I-Beam

Catalog No.	Conduit Size in.	Conduit Size mm
● 9G-1158-1/2, 3/4	1/2, 3/4	15, 20
● 9G-1158-1, 1 1/4	1, 1 1/4	25, 32
● 9G-1158-1 1/2, 2	1 1/2, 2	40, 50
● 9G-1158-2 1/2, 3	2 1/2, 3	65, 80
● 9G-1158-3 1/2, 4	3 1/2, 4	90, 100

Cable Tie (Ladder Tray)



Nylon ties provide easy attachment cable to ladder rungs; maximum cable O.D. of 3" (76mm).

Overall Length 15"

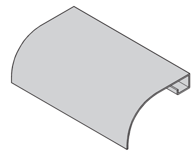
Refer to Section CF Cable Fixing

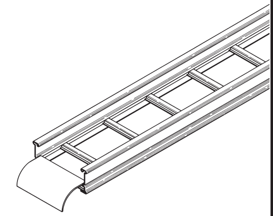
Catalog No.	● 99-2125-15

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Ladder Drop-Out

- Specially-designed Ladder Drop-Outs provide a rounded surface with 4" (101 mm) radius to protect cable as it exits from the cable tray, preventing damage to insulation. The drop-out will attach to any desired rung.
- (‡) Insert tray width
- (*) Insert **SS4** or **SS6**



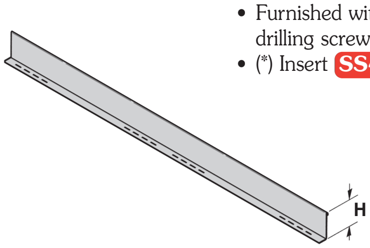


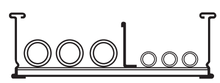
Catalog No.	9(*)-1104-(‡)

Barriers

Straight Section

- Standard length: 120" (3 m) 144" (12 ft.).
- Order catalog number based on loading depth.
- Furnished with four #10 x 1/2" SS4 self-drilling screws and a 99-9982 splice.
- (*) Insert **SS4** or **SS6**



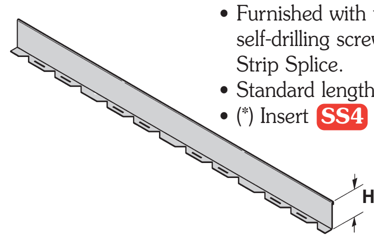


Catalog No.	Side Rail Height in.	Side Rail Height mm	Loading Depth 'H' in.	Loading Depth 'H' mm
73(*)-Length	4	101	3	76
74(*)-Length	5	127	4	101
75(*)-Length	6	152	5	127

Length = 144 for 12' or 120 for 10'

Horizontal Bend

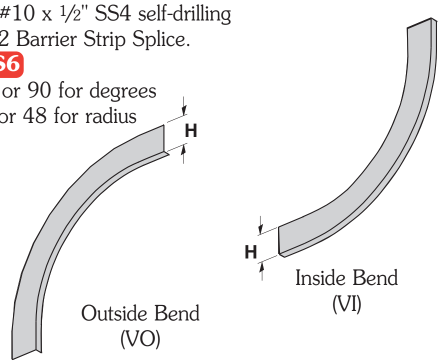
- Horizontal Bend Barriers are flexible in order to conform to any horizontal fitting radius. Cut to length.
- Order catalog number based on loading depth.
- Furnished with three #10 x 1/2" SS4 self-drilling screws and a 99-9982 Barrier Strip Splice.
- Standard length is 72" (6 ft.), sold individually.
- (*) Insert **SS4** or **SS6**



Catalog No.	Side Rail Height in.	Side Rail Height mm	Loading Depth 'H' in.	Loading Depth 'H' mm
73(*)-90HBFL	4	101	3	76
74(*)-90HBFL	5	127	4	101
75(*)-90HBFL	6	152	5	127

Vertical Bend Barriers

- Vertical Bend Barriers are preformed to conform to a specific vertical fitting.
- Furnished with three #10 x ½" SS4 self-drilling screws and a 99-9982 Barrier Strip Splice.
- (*) Insert **SS4** or **SS6**
- (**) Insert 30, 45, 60 or 90 for degrees
- (†) Insert 12, 24, 36 or 48 for radius



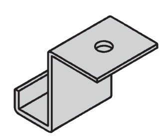
Outside Bend (VO)

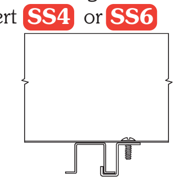
Inside Bend (VI)

Inside Bend Catalog No.	Outside Bend Catalog No.	Side Rail Height in.	Side Rail Height mm	Loading Depth 'H' in.	Loading Depth 'H' mm
73(*)-(**)VI(†)	73(*)-(**)VO(†)	4	101	3	76
74(*)-(**)VI(†)	74(*)-(**)VO(†)	5	127	4	101
75(*)-(**)VI(†)	75(*)-(**)VO(†)	6	152	5	127

Barrier Strip Clip

- Zinc plated steel barrier clip fastens to either aluminum or steel ladder rung.
- Furnished with one #10 x 1/2" SS4 plated self-drilling screw.
- (*) Insert **SS4** or **SS6**

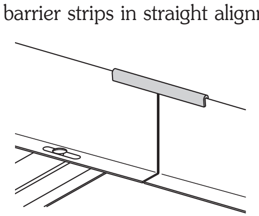


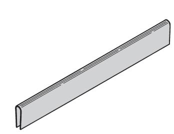


Catalog No.	9(*)-9002

Barrier Strip Splice

- Plastic splice holds adjoining barrier strips in straight alignment.





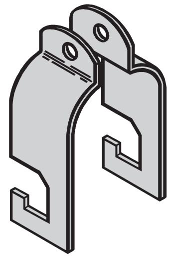
Catalog No.	● 99-9982

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 3 & 4 Stainless Steel - Accessories

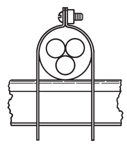
Stainless Steel Cable Clamp

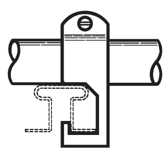
- Fits with series 3 & 4 rungs.
- Shipped flat. Field form around the cable at the time of installation.



Catalog No.	Cable Size in.	Cable Size mm
● 9SS4-4050	0.50 - 0.75	13 - 19
● 9SS4-4075	0.75 - 1.00	19 - 25
● 9SS4-4100	1.00 - 1.25	25 - 32
● 9SS4-4125	1.25 - 1.50	32 - 38
● 9SS4-4150	1.50 - 1.75	38 - 45
● 9SS4-4175	1.75 - 2.00	45 - 51
● 9SS4-4200	2.00 - 2.25	51 - 57
● 9SS4-4225	2.25 - 2.50	57 - 64
● 9SS4-4250	2.50 - 2.75	64 - 70
● 9SS4-4275	2.75 - 3.00	70 - 76
● 9SS4-4300	3.00 - 3.25	76 - 82
● 9SS4-4325	3.25 - 3.50	82 - 89
● 9SS4-4350	3.50 - 3.75	89 - 95
● 9SS4-4375	3.75 - 4.00	95 - 102
● 9SS4-4400	4.00 - 4.25	100 - 106
● 9SS4-4425	4.25 - 4.50	106 - 113
● 9SS4-4450	4.50 - 4.75	113 - 121
● 9SS4-4475	4.75 - 5.00	121 - 125

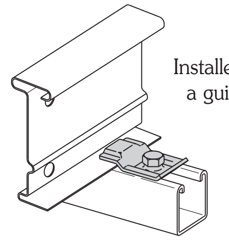
Refer to Section CF Cable Fixing



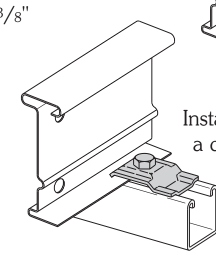


Cable Tray Clamp/Guide

- Features a no-twist design.
- Has four times the strength of the traditional design.
- Each side is labeled to ensure proper installation.
- Available for either $^3/_8$" or $^1/_2$" hardware.
- Furnished in pairs without hardware.



Installed as a guide.



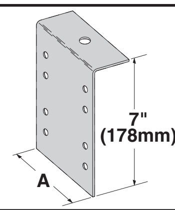
Installed as a clamp.

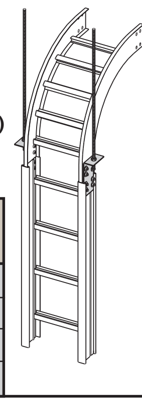
Patent # RE35479

Catalog No.	● 9SS6-1205

Vertical Tray Hanger

- (*) Insert SS4 or SS6
- Design load 1500 lbs/pair. Safety Factor of 2.5
- Furnished in pairs.
- Shipped without hardware (use splice hardware).

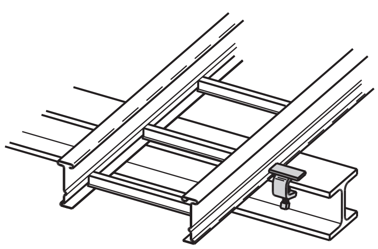


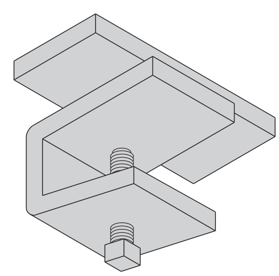


Catalog No.	Outside Cable Tray Ht.	'A' in.	'A' mm
9(*)-8224	4"	3.36	85.34
9(*)-8225	5"	4.36	110.74
9(*)-8226	6"	5.36	136.14
9(*)-8227	7"	6.36	161.54

Cable Tray Guide

- Expansion guide for single or double cable tray runs.
- Guide allows for longitudinal movement of the cable tray.
- No field drilling of support I-beam or channel is required.
- Guides are required on both sides of cable tray to prevent lateral movement - can be placed on either the inside or outside flange of cable tray.
- Guides are sold in pieces - two guides are required per tray.
- Maximum flange thickness $1^1/_8$" (28.58 mm).





Catalog No.	Finish
● 9G-1249	HDGAF

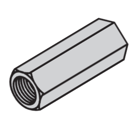
Threaded Rod (ATR) & Rod Coupling

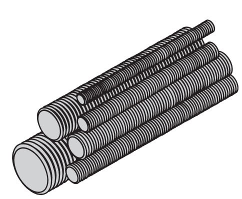
Size	Loading lbs	Catalog No.	Available Lengths	Coupling Cat. No.
$^3/_8$-16	730	● ATR $^3/_8$ x Length	36", 72", 144"	● B655-$^3/_8$
$^1/_2$-13	1350	● ATR $^1/_2$ x Length	36", 72", 144"	● B655-$^1/_2$

Loading based on safety factor 5.

Standard Finish: SS4 or SS6

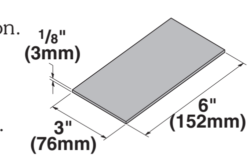
See B-Line Strut Systems Catalog for other sizes and finishes.





Nylon Pad

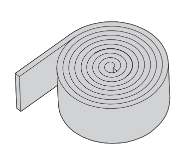
- Use for friction reduction.
- Hardness: Shore D80.
- Low friction coefficient.
- UV resistant (black).
- Excellent weatherability.
- UL - 94HB.



Cat. No.	● 99-NY36

Neoprene Roll

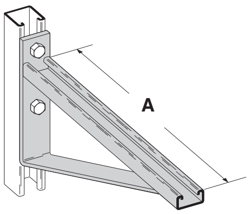
- Use for material isolation.
- $^1/_8$" x 2" x 20' roll.
- Hardness: Shore A60.
- Good weatherability.



Catalog No.	● 99-NP240

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

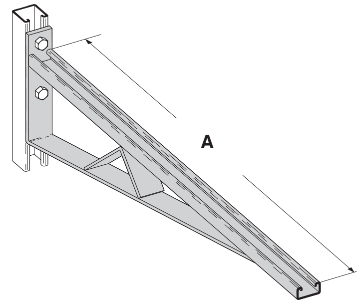
Cantilever Bracket



- (*) Insert SS4 or SS6
- Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B494-12(*)	1580	7.02	6 & 9	152 & 229	12	305
B494-18(*)	1000	4.45	12	305	18	457
B494-24(*)	996	4.43	18	457	24	610

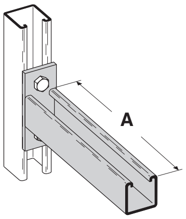
Cantilever Bracket



- (*) Insert SS4 or SS6
- Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B494-30(*)	924	4.11	24	610	30	762
B494-36(*)	864	3.84	30	762	36	914
B494-42(*)	580	2.58	36	914	42	1067
B494-48(*)	500	2.22	42	1067	48	1219

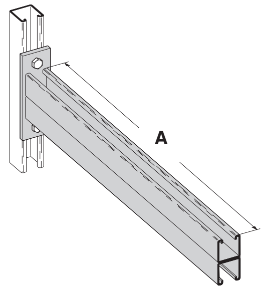
Cantilever Bracket



- (*) Insert SS4 or SS6
- Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B409-12(*)	960	4.27	6 & 9	152 & 229	12	305
B409-18(*)	640	2.84	12	305	18	457
B409-24(*)	480	2.13	18	457	24	610

Cantilever Bracket



- (*) Insert SS4 or SS6
- Safety Load Factor 2.5

Catalog No.	Uniform Load lbs	Uniform Load kN	Tray Width in.	Tray Width mm	'A' in.	'A' mm
B297-12(*)	1660	7.37	6 & 9	152 & 229	12	305
B297-18(*)	1100	4.88	12	305	18	457
B297-24(*)	835	3.71	18	457	24	610
B297-30(*)	665	2.95	24	610	30	762
B297-36(*)	550	2.44	30	762	36	914
B297-42(*)	465	2.06	36	914	42	1067

Rooftop Support Bases with B22 Channel

Designed as a superior rooftop support for cable tray,

UV resistant and approved for most roofing material or other flat surfaces.

Can be used with any of Cooper B-Line's cable tray clamps and guides.

Ultimate Load Capacity:
1,000 lbs. (uniform load)

Catalog No.	Height x Width x Length
● CB10-28	5 5/8" x 6" x 28.0"
● CB10-36	5 5/8" x 6" x 36.0"
● CB10-42	5 5/8" x 6" x 42.0"
● CB10-50	5 5/8" x 6" x 50.0"
● CB10-60	5 5/8" x 6" x 60.0"

LEEDS credit available, base made from 100% recycled material.

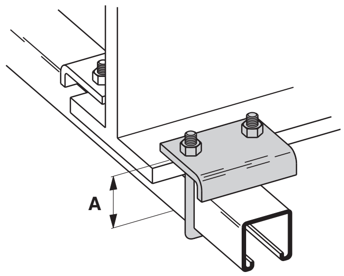
General Note: Consult roofing manufacturer or engineer for roof load capacity. The weakest point may be the insulation board beneath the rubber membrane.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Series 3 & 4 Stainless Steel - Accessories

Beam Clamp

- Sold in pieces with hardware.
- Finishes available: SS4 or SS6

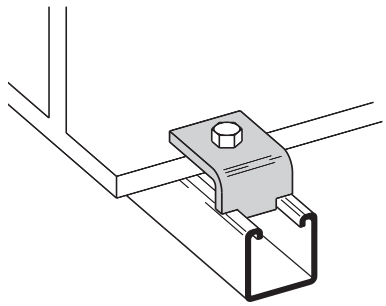


Design load when used in pairs.
Safety Load Factor 5.0

Catalog No.	Design Load*		'A'	
	lbs	kN	in.	mm
B441-22(*)	1200	5.34	3 3/8	86
B441-22A(*)	1200	5.34	5	127

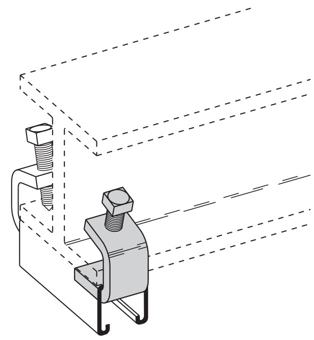
Beam Clamp B355SS4 ●

- Sold in pieces.
- Design load is 1200 lbs. when used in pairs.
- Safety Load Factor 5.0
- Order HHCS and Channel Nuts separately.



Beam Clamp

- Sold in pieces.
- 304 stainless steel

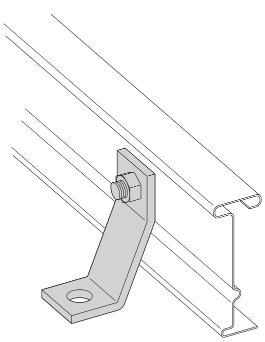


Design load when used in pairs.
Safety Load Factor 5.0

Cat. No.	● B212-1/4SS4		● B212-3/8SS4	
Design Load *	600 lbs.	2.67 kN	1000 lbs.	4.45 kN
Max. Flange Thick	3/4"	19 mm	1 1/8"	28.6 mm
Mat'l. Thickness	1/4"	6.3 mm	3/8"	9.5 mm

Heavy Duty Hold Down Bracket

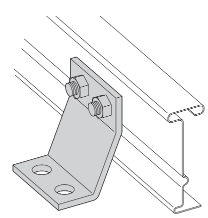
- Design load is 2000 lbs/pair.
- Two bolt design.
- Sold in pairs.
- 3/8" cable tray attachment hardware provided.
- 1/2" support attachment hardware **not** provided.
- (*) Insert SS4 or SS6

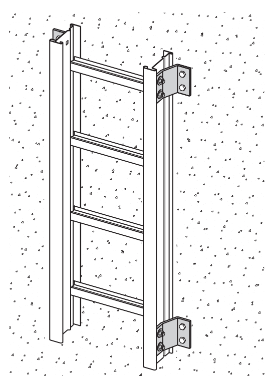


Catalog No.	9(*)-1241

Heavy Duty Hold-Down Bracket

- Design load is 4000 lbs/pair.
- Four bolt design.
- Sold in pairs.
- 3/8" cable tray attachment hardware provided
- 1/2" support attachment hardware **not** provided.
- (*) Insert SS4 or SS6

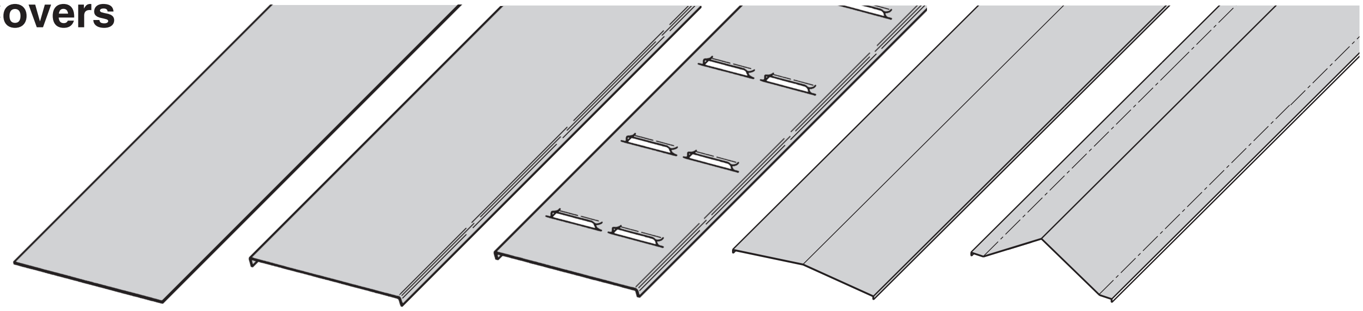




Catalog No.	9(*)-1242

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Covers



Solid Non-Flanged | Solid Flanged | Ventilated Flanged | Peaked Flanged | 2 to 3 Pitch Peaked Flanged (See page AP-3)

A full range of covers is available for straight sections and fittings.

Solid covers should be used when maximum enclosure of the cable is desired and no accumulation of heat is expected. **Ventilated covers** provide an overhead cable shield yet allow heat to escape.

Cooper B-Line recommends that covers be placed on vertical cable tray runs to a height of 6 ft. (1.83 m) to 8 ft. (2.44 m) above the floor to isolate both cables and personnel. **Flanged covers** have a 1/2 in. (13 mm) flange. Cover clamps are not included with the cover and must be ordered separately. All **peaked covers** are flanged. Standard peaked covers have 1/2" peak. Special purpose peaked covers, having a 2 to 3 pitch, provide additional slope and material thickness. The 2 to 3 pitch fitting covers are of multiple piece, welded construction.

Stainless Steel Cover Part Numbering

Prefix

Example: **80 3 SS4 - 20 - 24 - 144**

Cover Type
- 80 = Solid
- 81 = Ventilated
- 82 = Peaked

Detail
- 2= Flanged Stainless Steel (All fittings)
- 3= Flanged Stainless Steel (All straight sections)
- 4= Non-Flanged Stainless Steel (80 & 81 type only) (All fittings)

Material
- SS4 = 304 Stainless Steel
- SS6 = 316 Stainless Steel

Material Thickness
- 20 = 20 Ga. Stainless Steel

Tray Width
- 06 = 6"
- 09 = 9"
- 12 = 12"
- 18 = 18"
- 24 = 24"
- 30 = 30"
- 36 = 36"

Item Description

For Straight Section Cover:
- 144 = 12 ft. (3.66 m)
- 120 = 10 ft. (3.05 m)
- 72 = 6 ft. (1.83 m)
- 60 = 5 ft. (1.52 m)

For fitting covers: Insert suffix of fitting to be covered. See example below.

Covers 30" and 36" wide have reinforcing ridges.

Examples of Catalog Numbers for Fitting Covers:

Horizontal Bend Cover

Prefix / Suffix

80 2 SS4 20 - 18 - 90 HB 24

- 80 = Cover Type
- 2 = Detail
- SS4 = Material
- 20 = Material Thickness
- 18 = Width
- 90 = Angle
- HB = Fitting
- 24 = Radius

Vertical Bend Cover

Prefix / Suffix

80 2 SS4 20 - 24 - 90 VO 24 - 4*

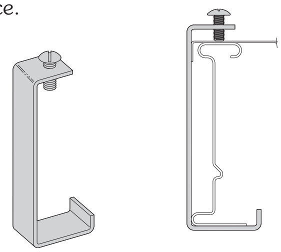
- 80 = Cover Type
- 2 = Detail
- SS4 = Material
- 20 = Material Thickness
- 24 = Width
- 90 = Angle
- VO = Fitting
- 24 = Radius
- 4* = Side Rail* Height

* Required for VO fittings only

- Green = Fastest shipped items (normally 3 to 5 working days)
- Black = Normal lead-time items (normally 5 to 10 working days)
- Red = Normally long lead-time items (15 working days minimum)

Standard Cover Clamp

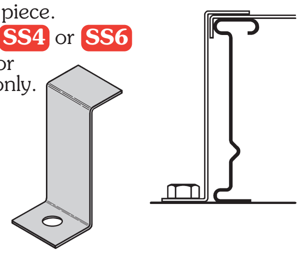
- For indoor service only.
- Sold per piece.



Tray Type	Side Rail Height in.	Side Rail Height mm	Catalog No.
Stainless Steel	4	101	● 9SS6-9014
	5	127	● 9SS6-9015
	6	152	● 9SS6-9016

Combination Cover and Hold Down Clamp

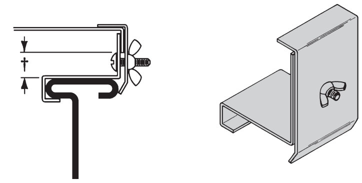
- Sold per piece.
- (*) Insert SS4 or SS6
- For indoor service only.



Tray Type	Side Rail Height in.	Side Rail Height mm	Catalog No.
Stainless Steel	4	101	9(*)-9043
	5	127	9(*)-9053
	6	152	9(*)-9063

Raised Cover Clamp

- For indoor service only.
- (*) Insert SS4 or SS6
- For use with flanged covers only.



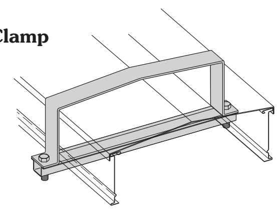
† Specify gap of 1", 2", 3" or 4".

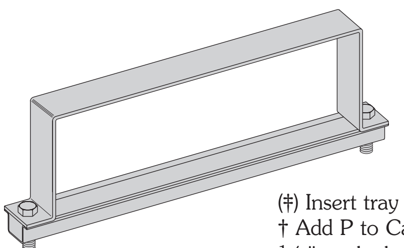
Tray Type	Catalog No.
Series 3 & 4 Steel Straight Section	9(*)-9115-†
All Steel Fittings	9(*)-910†

Heavy Duty Cover Clamp

- Recommended for outdoor service.
- (*) Insert SS4 or SS6

Peaked Cover Clamp





(ǂ) Insert tray width
† Add P to Catalog No. for 1/2" peaked cover clamp.

Catalog No.	Side Rail Height in.	Side Rail Height mm
9(*)-(ǂ)-9044†	4	101
9(*)-(ǂ)-9054†	5	127
9(*)-(ǂ)-9064†	6	152

Quantity of Standard Cover Clamps Required

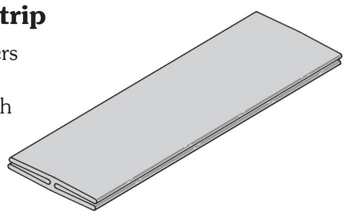
Straight Section 60" or 72" ....4 pcs.
Straight Section 120" or 144" ....6 pcs.
Horizontal/Vertical Bends...............4 pcs.
Tees...6 pcs.
Crosses ....8 pcs.

Note: When using the Heavy Duty Cover Clamp, only one-half the number of clamps stated above is required.

Cover Joint Strip

Catalog No.	● 99-9980-(ǂ)

- Used to join Covers
- Plastic
- (ǂ) Insert tray width



Cable Cleats

(see pages CF-1 thru CF-6)

Emperor Trefoil Cable Cleats

Vulcan Cable Cleats

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Section 1- Acceptable Manufacturers

1.01 Manufacturer: Subject to compliance with these specifications, cable tray systems shall be as manufactured by Cooper B-Line, Inc.

Section 2- Cable Tray Sections and Components

2.01 General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features. Cable tray shall be installed according to the latest revision of NEMA VE 2.

2.02 Stainless Steel: Straight section and fitting side rails and rungs shall be made of AISI Type [304] [316] stainless steel. Transverse members (rungs) or corrugated bottoms shall be welded to the side rails with Type 316 stainless steel welding wire. Hardware shall be AISI Type 316 stainless steel.

2.03 Ladder Cable Trays shall consist of two longitudinal members (side rails) with transverse members (rungs) welded to the side rails. Rungs shall be spaced [6] [9] [12] inches on center. Rung spacing in radiused fittings shall be industry standard 9" and measured at the center of the tray's width. Each rung must be capable of supporting a 200 lb. concentrated load at the center of the cable tray with a safety factor of 1.5.

2.04 Ventilated Trough Cable Trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails or rungs spaced 4" on center. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/4$" and shall be spaced on 6" centers. To provide ventilation in the tray, the valleys of the corrugated bottom shall have $2^1/4$" x 4" rectangular holes punched along the width of the bottom.

2.05 Non-Ventilated Bottom Trough Cable Trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails or a solid sheet over rungs. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/4$" and shall be spaced on 6" centers.

2.06 Cable tray loading depth shall be [3] [4] [5] inches per NEMA VE 1.

2.07 Straight sections shall be fabricated as I-beams. Straight sections shall be supplied in standard [12 foot] [24 foot] [10 foot (3 m)] [20 foot (6 m)] lengths.

2.08 Cable tray widths shall be [6] [9] [12] [18] [24] [30] [36] inches or as shown on drawings.

2.09 Splice plates shall be manufactured of high strength steel and be secured with 8 nuts and bolts per plate. The resistance of fixed splice connections between an adjacent section of tray shall not exceed 0.00033 ohm.

2.11 All fittings must have a minimum radius of [12] [24] [36] [48] inches.

Section 3- Loading Capacities and Testing

3.01 Cable tray shall be capable of carrying a uniformly distributed load of ______ lbs./ft. on a _______ ft. support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1 5.2. In addition to the uniformly distributed load the cable tray shall support 200 lbs. concentrated load at mid-point of span. Load and safety factors specified are applicable to both the side rails and rung capacities. Cable tray shall be made to manufacturing tolerances as specified by NEMA.

3.02 Upon request, manufacturer shall provide test reports in accordance with the latest revision of NEMA VE 1 or CSA C22.2 No. 126.

Series 2, 3, 4, & 5 - *Fittings*

How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

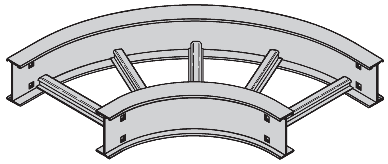
Customer: How do I select my fittings so that I get the quickest turnaround?

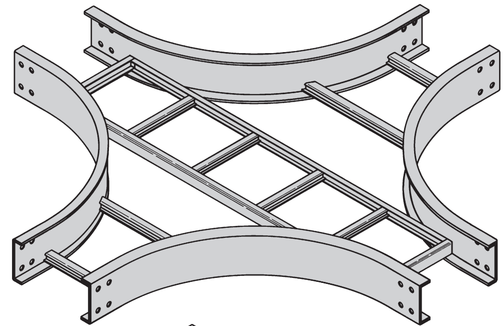
Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

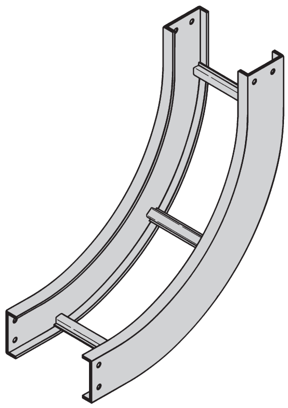
- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Example: (from page 202)	5	G	-	09	-	90	HB	24	**Part will typically ship in 15 days minimum, because of the G material.**
	●	●		●		●	●	●	
Lead time(days)	3-5	15		3-5		5-10	3-5	3-5	

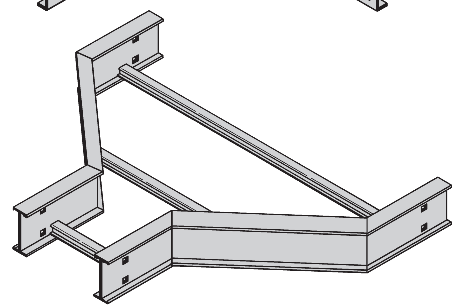
Changing the part number from G to A or P will change the coding to black for all sections of the tray to be 5-10 working days, instead of the original 15 days minimum.







Fittings engineered with 3" tangents for splicing integrity.



Fittings Part Numbering

Prefix

Example: **4 A - 24 - 90 HB 24** (9" rung spacing is standard)

Side Rail Height
- 4 = 4" (101)
- 5 = 5" (127)
- 6 = 6" (152)
- 7 = 7" (178)

Material
- A= Aluminum
- G=HDGAF
- P= Pre-Galvanized
- SS4= 304 Stainless Steel
- SS6= 316 Stainless Steel

Width
- 06 = 6" (152)
- 09 = 9" (228)
- 12 = 12" (305)
- 18 = 18" (457)
- 24 = 24" (609)
- 30 = 30" (762)
- 36 = 36" (914)

Angle
- 30 = 30°
- 45 = 45°
- 60 = 60°
- 90 = 90°

Type
- HB = Horizontal Bend
- HT = Horizontal Tee
- HX = Horizontal Cross
- VI = Vertical Inside Bend
- VO = Vertical Outside Bend
- VT = Vertical Tee
- VTU = Vertical Tee, Up
- HYR = Horizontal Wye, Right
- HYL = Horizontal Wye, Left
- CSF = Cable Support Fitting
- LR = Left Reducer Fitting
- RR = Right Reducer Fitting
- SR = Straight Reducer Fitting

Radius
- 12 = 12" (305)
- 24 = 24" (609)
- 36 = 36" (914)
- 48 = 48" (1219)

See page AP-2 for 6" fittings with 9A-6006 and 9A-6007 splice plates.

For ventilated trough, solid trough, ventilated bottom or solid bottom, add VT, ST, 04 or SB as shown below: Available 6" thru 36"

Prefix
4AVT - 24 - 90HB24
Vented Trough

Prefix
4PST - 24 - 90HB24
Non-Ventilated Trough

For flat non-ventilated: Available 6" and Wider

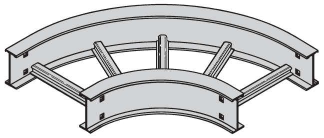
Prefix
5PSB - 24 - 90HB24
Non-Ventilated

Note: Horizontal crosses and tees 30" or wider, with a radius of 36" or larger, will be of two-piece construction.

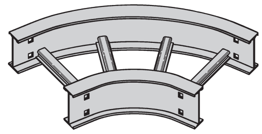
- Green = Fastest shipped items (normally 3 to 5 working days)
- Black = Normal lead-time items (normally 5 to 10 working days)
- Red = Normally long lead-time items (15 working days minimum)

Horizontal Bend 90° 60° (HB)

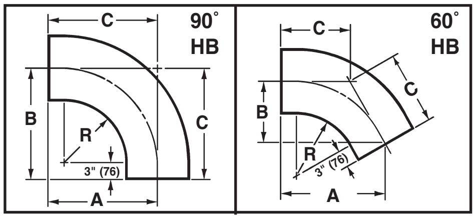
1 pair splice plates with hardware included.



90° Horizontal Bend



60° Horizontal Bend



Bottoms manufactured:

Ladder = 9" Rung Spacing
VT & 04 = 4" Rung Spacing
ST & SB = Flat sheet over 12" Rung Spacing

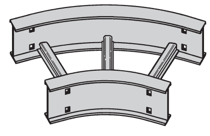
Bend Radius R in.	mm	Tray Width in.	mm	90° Horizontal Bend Catalog No.	Dimensions A in.	A mm	B in.	B mm	C in.	C mm	60° Horizontal Bend Catalog No.	Dimensions A in.	A mm	B in.	B mm	C in.	C mm
12	305	6	152	**(Pre)-06-90HB12**	18	457	18	457	18	457	**(Pre)-06-60HB12**	17 1/2	445	10 1/8	257	11 11/16	297
		9	228	**(Pre)-09-90HB12**	19 1/2	495	19 1/2	495	19 1/2	495	**(Pre)-09-60HB12**	18 13/16	478	10 7/8	276	12 1/2	318
		12	305	**(Pre)-12-90HB12**	21	533	21	533	21	533	**(Pre)-12-60HB12**	20 1/16	510	11 5/8	295	13 3/8	340
		18	457	**(Pre)-18-90HB12**	24	610	24	610	24	610	**(Pre)-18-60HB12**	22 11/16	576	13 1/8	333	15 1/8	384
		24	609	**(Pre)-24-90HB12**	27	686	27	686	27	686	**(Pre)-24-60HB12**	25 5/16	643	14 5/8	372	16 7/8	429
		30	762	**(Pre)-30-90HB12**	30	762	30	762	30	762	**(Pre)-30-60HB12**	27 7/8	708	16 1/8	410	18 9/16	472
		36	914	**(Pre)-36-90HB12**	33	838	33	838	33	838	**(Pre)-36-60HB12**	30 1/2	775	17 5/8	448	20 5/16	516
		42	1218	**(Pre)-42-90HB12**	36	914	36	914	36	914	**(Pre)-42-60HB12**	33 1/16	840	19 1/8	486	22 1/16	560
24	610	6	152	**(Pre)-06-90HB24**	30	762	30	762	30	762	**(Pre)-06-60HB24**	27 7/8	708	16 1/8	410	18 9/16	472
		9	228	**(Pre)-09-90HB24**	31 1/2	800	31 1/2	800	31 1/2	800	**(Pre)-09-60HB24**	29 3/16	741	16 7/8	429	19 7/16	494
		12	305	**(Pre)-12-90HB24**	33	838	33	838	33	838	**(Pre)-12-60HB24**	30 1/2	775	17 5/8	448	20 5/16	516
		18	457	**(Pre)-18-90HB24**	36	914	36	914	36	914	**(Pre)-18-60HB24**	33 1/16	708	19 1/8	486	22 1/16	560
		24	609	**(Pre)-24-90HB24**	39	991	39	991	39	991	**(Pre)-24-60HB24**	35 11/16	907	20 5/8	524	23 13/16	605
		30	762	**(Pre)-30-90HB24**	42	1067	42	1067	42	1067	**(Pre)-30-60HB24**	38 1/4	972	22 1/8	564	25 1/2	648
		36	914	**(Pre)-36-90HB24**	45	1143	45	1143	45	1143	**(Pre)-36-60HB24**	40 7/8	1038	23 5/8	600	27 1/4	692
		42	1218	**(Pre)-42-90HB24**	48	1219	48	1219	48	1219	**(Pre)-42-60HB24**	43 1/2	1105	25 1/8	638	29	737
36	915	6	152	**(Pre)-06-90HB36**	42	1067	42	1067	42	1067	**(Pre)-06-60HB36**	38 1/4	971	22 1/8	562	25 1/2	648
		9	228	**(Pre)-09-90HB36**	43 1/2	1105	43 1/2	1105	43 1/2	1105	**(Pre)-09-60HB36**	39 9/16	1005	22 7/8	581	26 3/8	670
		12	305	**(Pre)-12-90HB36**	45	1143	45	1143	45	1143	**(Pre)-12-60HB36**	40 7/8	1038	23 5/8	600	27 1/4	692
		18	457	**(Pre)-18-90HB36**	48	1219	48	1219	48	1219	**(Pre)-18-60HB36**	43 1/2	1105	25 1/8	638	29	737
		24	609	**(Pre)-24-90HB36**	51	1295	51	1295	51	1295	**(Pre)-24-60HB36**	46 1/16	1170	26 5/8	676	30 11/16	780
		30	762	**(Pre)-30-90HB36**	54	1372	54	1375	54	1372	**(Pre)-30-60HB36**	48 1/16	1237	28 1/8	714	32 7/16	824
		36	914	**(Pre)-36-90HB36**	57	1448	57	1488	57	1448	**(Pre)-36-60HB36**	51 1/4	1302	29 5/8	753	34 3/16	869
		42	1218	**(Pre)-42-90HB36**	60	1524	60	1524	60	1524	**(Pre)-42-60HB36**	53 7/8	1368	31 1/8	791	35 15/16	913
48	1220	6	152	**(Pre)-06-90HB48**	54	1372	54	1372	54	1372	**(Pre)-06-60HB48**	48 1/16	1221	28 1/8	715	32 11/16	830
		9	228	**(Pre)-09-90HB48**	55 1/2	1410	55 1/2	1410	55 1/2	1410	**(Pre)-09-60HB48**	49 15/16	1268	28 7/8	734	33 5/16	846
		12	305	**(Pre)-12-90HB48**	57	1448	57	1448	57	1448	**(Pre)-12-60HB48**	51 1/4	1302	29 5/8	753	34 3/16	868
		18	457	**(Pre)-18-90HB48**	60	1524	60	1524	60	1524	**(Pre)-18-60HB48**	53 7/8	1368	31 1/8	791	35 15/16	913
		24	609	**(Pre)-24-90HB48**	63	1600	63	1600	63	1600	**(Pre)-24-60HB48**	56 7/16	1434	32 5/8	829	37 5/8	956
		30	762	**(Pre)-30-90HB48**	66	1676	66	1676	66	1676	**(Pre)-30-60HB48**	59 1/16	1500	34 1/8	867	39 3/8	1000
		36	914	**(Pre)-36-90HB48**	69	1753	69	1753	69	1753	**(Pre)-36-60HB48**	61 11/16	1567	35 5/8	905	41 1/8	1045
		42	1218	**(Pre)-42-90HB48**	72	1829	72	1829	72	1829	**(Pre)-42-60HB48**	64 1/4	1632	37 1/8	943	42 13/16	1087

(Pre) See page TF-3 for catalog number prefix.
All dimensions in parentheses are in millimeters unless otherwise specified.
Width dimensions are to inside wall. For aluminum fittings add 1.5 inches for total outside width.
Manufacturing tolerances apply to all dimensions.

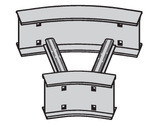
Horizontal Bend 45° 30° (HB)

1 pair splice plates with hardware included.

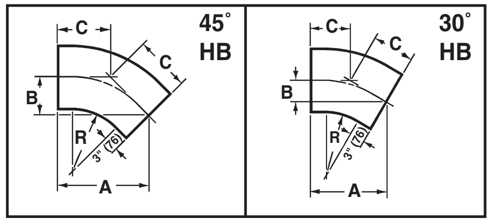
Bottoms manufactured:
Ladder = 9" Rung Spacing
VT & 04 = 4" Rung Spacing
ST & SB = Flat sheet over 12" Rung Spacing



45° Horizontal Bend



30° Horizontal Bend

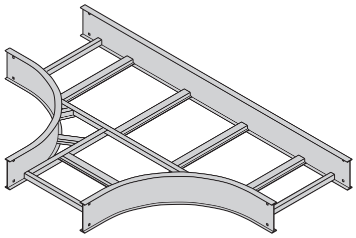


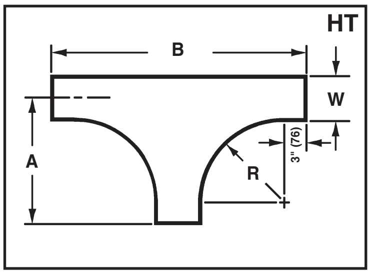
Bend Radius R		Tray Width		45° Horizontal Bend Dimensions							30° Horizontal Bend Dimensions						
				Catalog No.	A		B		C		Catalog No.	A		B		C	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm		in.	mm	in.	mm	in.	mm
12	305	6	152	**(Pre)-06-45HB12**	15 3/4	400	6 1/2	165	9 3/16	233	**(Pre)-06-30HB12**	13 1/8	333	3 1/2	89	7	179
		9	228	**(Pre)-09-45HB12**	16 13/16	427	6 15/16	176	9 13/16	249	**(Pre)-09-30HB12**	13 7/8	352	3 11/16	94	7 7/16	189
		12	305	**(Pre)-12-45HB12**	17 7/8	454	7 3/8	187	10 7/16	265	**(Pre)-12-30HB12**	14 5/8	372	3 15/16	100	7 13/16	198
		18	457	**(Pre)-18-45HB12**	20	508	8 1/4	210	11 11/16	297	**(Pre)-18-30HB12**	16 1/8	410	4 5/16	135	8 5/8	219
		24	609	**(Pre)-24-45HB12**	22 1/16	560	9 1/8	232	12 15/16	329	**(Pre)-24-30HB12**	17 5/8	448	4 11/16	119	9 7/16	240
		30	762	**(Pre)-30-45HB12**	24 3/16	614	10	254	14 3/16	360	**(Pre)-30-30HB12**	19 1/8	486	5 1/8	130	10 1/4	260
		36	914	**(Pre)-36-45HB12**	26 5/16	668	10 15/16	278	15 7/16	392	**(Pre)-36-30HB12**	20 5/8	524	5 1/2	140	11 1/16	281
		42	1218	**(Pre)-42-45HB12**	28 7/16	722	11 13/16	300	16 11/16	424	**(Pre)-42-30HB12**	22 1/8	562	5 15/16	151	11 13/16	300
24	610	6	152	**(Pre)-06-45HB24**	24 3/16	614	10	254	14 3/16	360	**(Pre)-06-30HB24**	19 1/8	486	5 1/8	130	10/4	260
		9	228	**(Pre)-09-45HB24**	25 1/4	641	10 1/2	267	14 13/16	376	**(Pre)-09-30HB24**	19 7/8	505	5 5/16	135	10 5/8	270
		12	305	**(Pre)-12-45HB24**	26 5/16	668	10 15/16	278	15 7/16	392	**(Pre)-12-30HB24**	20 5/8	524	5 1/2	140	11 1/16	281
		18	457	**(Pre)-18-45HB24**	28 7/16	722	11 13/16	300	16 11/16	424	**(Pre)-18-30HB24**	22 1/8	562	5 15/16	151	11 13/16	300
		24	609	**(Pre)-24-45HB24**	30 9/16	766	12 11/16	322	17 15/16	456	**(Pre)-24-30HB24**	23 5/8	600	6 5/16	160	12 5/8	321
		30	762	**(Pre)-30-45HB24**	32 11/16	830	13 9/16	344	19 1/8	486	**(Pre)-30-30HB24**	25 1/8	638	6 3/4	172	13 7/16	341
		36	914	**(Pre)-36-45HB24**	34 13/16	884	14 7/16	367	20 3/8	518	**(Pre)-36-30HB24**	26 5/8	676	7 1/8	181	14 1/4	362
		42	1218	**(Pre)-42-45HB24**	36 15/16	938	15 5/16	389	21 5/8	549	**(Pre)-42-30HB24**	28 1/8	715	7 1/2	191	15 1/16	383
36	915	6	152	**(Pre)-06-45HB36**	32 11/16	830	13 9/16	344	19 1/8	486	**(Pre)-06-30HB36**	25 1/8	638	6 3/4	171	13 7/16	341
		9	228	**(Pre)-09-45HB36**	33 3/4	857	14	356	19 3/4	502	**(Pre)-09-30HB36**	25 7/8	657	6 15/16	176	13 7/8	352
		12	305	**(Pre)-12-45HB36**	34 13/16	884	14 7/16	367	20 3/8	518	**(Pre)-12-30HB36**	26 5/8	676	7 1/8	181	14 1/4	362
		18	457	**(Pre)-18-45HB36**	36 15/16	938	15 5/16	389	21 5/8	549	**(Pre)-18-30HB36**	28 1/8	114	7 1/2	191	15 1/16	383
		24	609	**(Pre)-24-45HB36**	39 1/6	992	16 3/16	411	22 7/8	581	**(Pre)-24-30HB36**	29 5/8	753	7 15/16	202	15 7/8	403
		30	762	**(Pre)-30-45HB36**	41 3/6	1046	17 1/16	433	24 1/8	613	**(Pre)-30-30HB36**	31 1/8	790	8 5/16	211	16 11/16	424
		36	914	**(Pre)-36-45HB36**	43 5/6	1100	17 15/16	456	25 3/8	645	**(Pre)-36-30HB36**	32 5/8	829	8 3/4	222	17 1/2	445
		42	1218	**(Pre)-42-45HB36**	45 7/16	1154	18 13/16	478	26 5/8	676	**(Pre)-42-30HB36**	34 1/8	867	9 1/8	232	18 1/4	464
48	1220	6	152	**(Pre)-06-45HB48**	41 3/16	1046	17 1/16	433	24 1/8	613	**(Pre)-06-30HB48**	31 1/8	791	8 5/16	211	16 11/16	424
		9	228	**(Pre)-09-45HB48**	42 1/4	1073	17 1/2	445	24 3/4	629	**(Pre)-09-30HB48**	31 7/8	810	8 9/16	218	17 1/16	433
		12	305	**(Pre)-12-45HB48**	43 5/16	1100	17 15/16	456	25 3/8	645	**(Pre)-12-30HB48**	32 5/8	829	8 3/4	222	17 1/2	445
		18	457	**(Pre)-18-45HB48**	45 7/16	1154	18 13/16	487	26 5/8	676	**(Pre)-18-30HB48**	34 1/8	867	9 1/8	232	18 1/4	464
		24	609	**(Pre)-24-45HB48**	47 9/16	1208	19 11/16	500	27 7/8	708	**(Pre)-24-30HB48**	35 5/8	905	9 9/16	243	19 1/16	484
		30	762	**(Pre)-30-45HB48**	49 11/16	1262	20 9/16	522	29 1/8	740	**(Pre)-30-30HB48**	37 1/8	943	9 15/16	252	19 7/8	505
		36	914	**(Pre)-36-45HB48**	51 13/16	1316	21 7/16	545	30 5/16	770	**(Pre)-36-30HB48**	38 5/8	981	10 5/16	262	20 11/16	525
		42	1218	**(Pre)-42-45HB48**	54 15/16	1395	22 5/16	567	31 9/16	802	**(Pre)-42-30HB48**	40 1/8	1019	10 3/4	273	21 1/2	546

(Pre) See page TF-3 for catalog number prefix.
All dimensions in parentheses are in millimeters unless otherwise specified.
Width dimensions are to inside wall. For aluminum fittings add 1.5 inches for total outside width.
Manufacturing tolerances apply to all dimensions.

Horizontal Tee (HT)

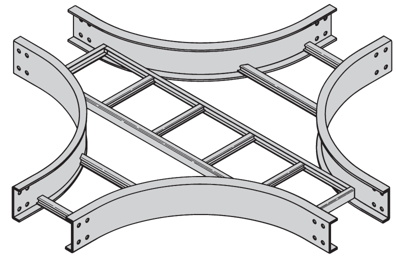
2 pair splice plates with hardware included.

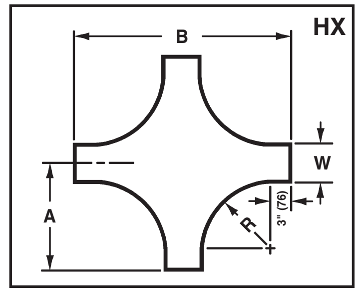




Horizontal Cross (HX)

3 pair splice plates with hardware included.





Bend Radius R in.	Bend Radius R mm	Tray Width in.	Tray Width mm	Horizontal Tee Catalog Number	Horizontal Tee Dimensions A in.	A mm	B in.	B mm	Horizontal Cross Catalog Number	Horizontal Cross Dimensions A in.	A mm	B in.	B mm
12	305	6	152	**(Prefix)-06-HT12**	18	457	36	914	**(Prefix)-06-HX12**	18	457	36	914
		9	229	**(Prefix)-09-HT12**	19 1/2	496	39	991	**(Prefix)-09-HX12**	19 1/2	496	39	991
		12	305	**(Prefix)-12-HT12**	21	533	42	1067	**(Prefix)-12-HX12**	21	533	42	1067
		18	457	**(Prefix)-18-HT12**	24	609	48	1219	**(Prefix)-18-HX12**	24	609	48	1219
		24	609	**(Prefix)-24-HT12**	27	686	54	1372	**(Prefix)-24-HX12**	27	686	54	1372
		30	762	**(Prefix)-30-HT12**	30	762	60	1524	**(Prefix)-30-HX12**	30	762	60	1524
		36	914	**(Prefix)-36-HT12**	33	838	66	1676	**(Prefix)-36-HX12**	33	838	66	1676
		42	1067	**(Prefix)-42-HT12**	36	914	72	1829	**(Prefix)-42-HX12**	36	914	72	1829
24	610	6	152	**(Prefix)-06-HT24**	30	762	60	1542	**(Prefix)-06-HX24**	30	762	60	1524
		9	229	**(Prefix)-09-HT24**	31 1/2	800	63	1600	**(Prefix)-09-HX24**	31 1/2	800	63	1600
		12	305	**(Prefix)-12-HT24**	33	838	66	1676	**(Prefix)-12-HX24**	33	838	66	1676
		18	457	**(Prefix)-18-HT24**	36	914	72	1828	**(Prefix)-18-HX24**	36	914	72	1828
		24	609	**(Prefix)-24-HT24**	39	991	78	1982	**(Prefix)-24-HX24**	39	991	78	1982
		30	762	**(Prefix)-30-HT24**	42	1067	84	2134	**(Prefix)-30-HX24**	42	1067	84	2134
		36	914	**(Prefix)-36-HT24**	45	1143	90	2286	**(Prefix)-36-HX24**	45	1143	90	2286
		42	1067	**(Prefix)-42-HT24**	48	1219	96	2438	**(Prefix)-42-HX24**	48	1219	96	2438
36	915	6	152	**(Prefix)-06-HT36**	42	1067	84	2134	**(Prefix)-06-HX36**	42	1067	84	2134
		9	229	**(Prefix)-09-HT36**	43 1/2	1105	87	2210	**(Prefix)-09-HX36**	43 1/2	1105	87	2210
		12	305	**(Prefix)-12-HT36**	45	1143	90	2286	**(Prefix)-12-HX36**	45	1143	90	2286
		18	457	**(Prefix)-18-HT36**	48	1219	96	2438	**(Prefix)-18-HX36**	48	1219	96	2438
		24	609	**(Prefix)-24-HT36**	51	1295	102	2590	**(Prefix)-24-HX36**	51	1295	102	2590
		30	762	**(Prefix)-30-HT36**	54	1372	108	2744	**(Prefix)-30-HX36**	54	1372	108	2744
		36	914	**(Prefix)-36-HT36**	57	1488	114	2896	**(Prefix)-36-HX36**	57	1448	114	2896
		42	1067	**(Prefix)-42-HT36**	60	1524	120	3048	**(Prefix)-42-HX36**	60	1524	120	3048
48	1220	6	152	**(Prefix)-06-HT48**	54	1372	108	2743	**(Prefix)-06-HX48**	54	1372	108	2743
		9	229	**(Prefix)-09-HT48**	55 1/2	1410	111	2820	**(Prefix)-09-HX48**	55 1/2	1410	111	2820
		12	305	**(Prefix)-12-HT48**	57	1448	114	2896	**(Prefix)-12-HX48**	57	1448	114	2896
		18	457	**(Prefix)-18-HT48**	60	1524	120	3048	**(Prefix)-18-HX48**	60	1524	120	3048
		24	609	**(Prefix)-24-HT48**	63	1600	126	3200	**(Prefix)-24-HX48**	63	1600	126	3200
		30	762	**(Prefix)-30-HT48**	66	1676	132	3353	**(Prefix)-30-HX48**	66	1676	132	3353
		36	914	**(Prefix)-36-HT48**	69	1753	138	3535	**(Prefix)-36-HX48**	69	1753	138	3505
		42	1067	**(Prefix)-42-HT48**	72	1829	144	3658	**(Prefix)-42-HX48**	72	1829	144	3658

(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Width dimensions are to inside wall. For aluminum fittings add 1.5 inches for total outside width. Manufacturing tolerances apply to all dimensions.

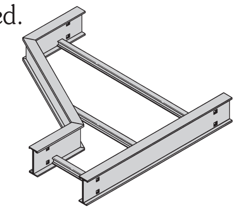
Reducers (LR, SR, RR)

1 pair splice plates with hardware included.

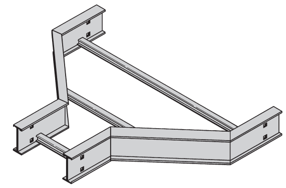
Reducer Part Numbering

Prefix - 24 - RR - 18

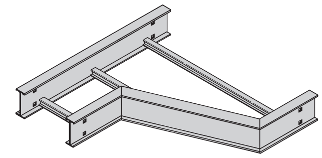
- Width$_2$
- Fitting
- Width$_1$
- Prefix



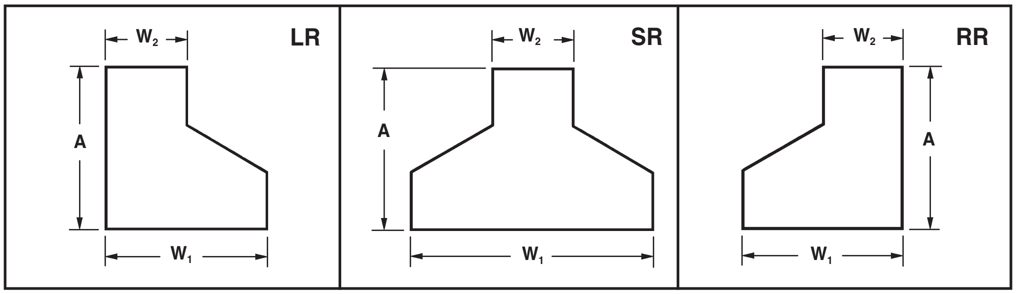
Left Reducer



Straight Reducer



Right Reducer

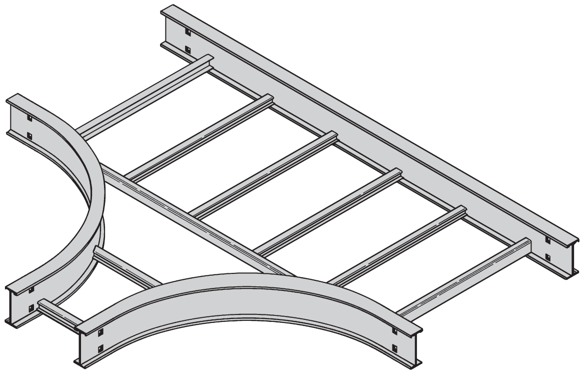


Tray Width				Left Hand Reducer			Straight Reducer			Right Hand Reducer		
W1		W2		Catalog No.	A		Catalog No.	A		Catalog No.	A	
in.	mm	in.	mm		in.	mm		in.	mm		in.	mm
9	228	6	152	**(Prefix)-09-LR06**	9 3/4	248	**(Prefix)-09-SR06**	8 7/8	225	**(Prefix)-09-RR06**	9 3/4	248
12	305	6	152	**(Prefix)-12-LR06**	11 1/2	292	**(Prefix)-12-SR06**	9 3/4	248	**(Prefix)-12-RR06**	11 1/2	292
		9	228	**(Prefix)-12-LR09**	9 3/4	248	**(Prefix)-12-SR09**	8 7/8	225	**(Prefix)-12-RR09**	9 3/4	248
18	457	6	152	**(Prefix)-18-LR06**	14 15/16	379	**(Prefix)-18-SR06**	11 1/2	292	**(Prefix)-18-RR06**	14 15/16	379
		9	228	**(Prefix)-18-LR09**	13 3/16	340	**(Prefix)-18-SR09**	10 5/8	270	**(Prefix)-18-RR09**	13 3/16	340
		12	305	**(Prefix)-18-LR12**	11 1/2	292	**(Prefix)-18-SR12**	9 3/4	248	**(Prefix)-18-RR12**	11 1/2	292
24	609	6	152	**(Prefix)-24-LR06**	18 3/8	467	**(Prefix)-24-SR06**	13 3/16	340	**(Prefix)-24-RR06**	18 3/8	467
		9	228	**(Prefix)-24-LR09**	16 11/16	424	**(Prefix)-24-SR09**	12 3/8	314	**(Prefix)-24-RR09**	16 11/16	424
		12	305	**(Prefix)-24-LR12**	14 15/16	379	**(Prefix)-24-SR12**	11 1/2	292	**(Prefix)-24-RR12**	14 15/16	379
		18	457	**(Prefix)-24-LR18**	11 1/2	292	**(Prefix)-24-SR18**	9 3/4	248	**(Prefix)-24-RR18**	11 1/2	292
30	762	6	152	**(Prefix)-30-LR06**	21 7/8	555	**(Prefix)-30-SR06**	14 15/16	380	**(Prefix)-30-RR06**	21 7/8	555
		9	228	**(Prefix)-30-LR09**	20 1/8	511	**(Prefix)-30-SR09**	14 1/16	358	**(Prefix)-30-RR09**	20 1/8	511
		12	305	**(Prefix)-30-LR12**	18 3/8	462	**(Prefix)-30-SR12**	13 3/16	335	**(Prefix)-30-RR12**	18 3/8	462
		18	459	**(Prefix)-30-LR18**	14 15/16	380	**(Prefix)-30-SR18**	11 1/2	292	**(Prefix)-30-RR18**	14 15/16	380
		24	609	**(Prefix)-30-LR24**	11 1/2	292	**(Prefix)-30-SR24**	9 3/4	248	**(Prefix)-30-RR24**	11 1/2	292
36	914	6	152	**(Prefix)-36-LR06**	25 5/16	643	**(Prefix)-36-SR06**	16 11/16	424	**(Prefix)-36-RR06**	23 5/16	643
		9	228	**(Prefix)-36-LR09**	23 9/16	598	**(Prefix)-36-SR09**	15 13/16	402	**(Prefix)-36-RR09**	23 9/16	598
		12	305	**(Prefix)-36-LR12**	21 7/8	555	**(Prefix)-36-SR12**	14 15/16	380	**(Prefix)-36-RR12**	21 7/8	555
		18	457	**(Prefix)-36-LR18**	18 3/8	462	**(Prefix)-36-SR18**	13 3/16	335	**(Prefix)-36-RR18**	18 3/8	462
		24	609	**(Prefix)-36-LR24**	14 15/16	380	**(Prefix)-36-SR24**	11 1/2	292	**(Prefix)-36-RR24**	14 15/16	380
		30	762	**(Prefix)-36-LR30**	11 1/2	292	**(Prefix)-36-SR30**	9 3/4	248	**(Prefix)-36-RR30**	11 1/2	292
42	1067	6	152	**(Prefix)-42-LR06**	28 3/4	730	**(Prefix)-42-SR06**	18 3/8	467	**(Prefix)-42-RR06**	28 3/4	732
		9	228	**(Prefix)-42-LR09**	27 1/16	687	**(Prefix)-42-SR09**	17 1/2	445	**(Prefix)-42-RR09**	27 1/16	687
		12	305	**(Prefix)-42-LR12**	25 5/16	643	**(Prefix)-42-SR12**	16 11/16	424	**(Prefix)-42-RR12**	25 15/16	643
		18	457	**(Prefix)-42-LR18**	21 7/8	556	**(Prefix)-42-SR18**	14 15/16	379	**(Prefix)-42-RR18**	21 7/8	556
		24	609	**(Prefix)-42-LR24**	18 3/8	467	**(Prefix)-42-SR24**	13 3/16	335	**(Prefix)-42-RR24**	18 3/8	467
		30	762	**(Prefix)-42-LR30**	14 15/16	379	**(Prefix)-42-SR30**	11 1/2	292	**(Prefix)-42-RR30**	14 15/16	379
		36	914	**(Prefix)-42-LR36**	11 1/2	292	**(Prefix)-42-SR36**	9 3/4	249	**(Prefix)-42-RR36**	11 1/2	292

(Prefix) See page TF-3 for catalog number prefix.

All dimensions in parentheses are millimeters unless otherwise specified.

Width dimensions are to inside wall. For aluminum fittings add 1.5 inches for total outside width. Manufacturing tolerances apply to all dimensions.



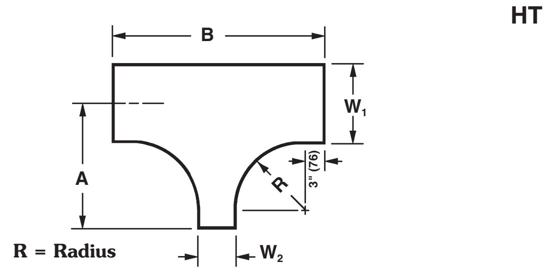
Horizontal Reducing Tee (HT)

2 pair splice plates with hardware included.

Prefix - 36 - 18 HT 24

- Radius (24)
- Fitting (HT)
- Width W2 (18)
- Width W1 (36)
- To complete catalog number, insert fitting prefix. (Prefix)

See page 134 for prefix.

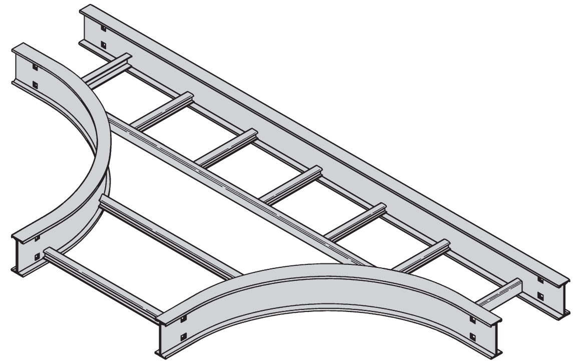


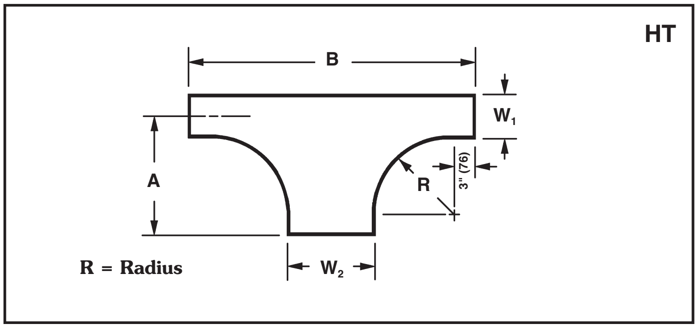
Tray Width				* Insert Radius (12", 24", 36", or 48")	12" Radius				24" Radius				36" Radius				48" Radius			
W1		W2		Catalog No.	A		B		A		B		A		B		A		B	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
9	228	6	152	(Prefix)-09-06-HT*	19 1/2	496	36	914	31 1/2	800	60	1524	43	1092	84	2134	55 1/2	1410	108	2743
12	305	6	152	(Prefix)-12-06-HT*	21	533	36	914	33	838	60	1524	45	1143	84	2134	57	1448	108	2743
		9	228	(Prefix)-12-09-HT*	21	533	39	991	33	838	63	1600	45	1143	87	2210	57	1448	111	2819
18	475	6	152	(Prefix)-18-06-HT*	24	609	36	914	36	914	60	1524	48	1219	84	2134	60	1524	108	2743
		9	228	(Prefix)-18-09-HT*	24	609	39	991	36	914	63	1600	48	1219	87	2210	60	1524	111	2819
		12	305	(Prefix)-18-12-HT*	24	609	42	1067	36	914	66	1676	48	1219	90	2286	60	1524	114	2496
24	609	6	152	(Prefix)-24-06-HT*	27	686	36	914	39	991	60	1524	51	1295	84	2134	63	1600	108	2743
		9	228	(Prefix)-24-09-HT*	27	686	39	991	39	991	63	1600	51	1295	87	2210	63	1600	111	2819
		12	305	(Prefix)-24-12-HT*	27	686	42	1067	39	991	66	1676	51	1295	90	2286	63	1600	114	2496
		18	457	(Prefix)-24-18-HT*	27	686	48	1219	39	991	72	1829	51	1295	96	2438	63	1600	120	3048
30	762	6	152	(Prefix)-30-06-HT*	30	762	36	914	42	1067	60	1524	54	1372	84	2134	66	1676	108	2743
		9	228	(Prefix)-30-09-HT*	30	762	39	991	42	1067	63	1600	54	1372	87	2210	66	1676	111	2819
		12	305	(Prefix)-30-12-HT*	30	762	42	1067	42	1067	66	1676	54	1372	90	2286	66	1676	114	2496
		18	457	(Prefix)-30-18-HT*	30	762	48	1219	42	1067	72	1829	54	1372	96	2438	66	1676	120	3048
		24	609	(Prefix)-30-24-HT*	30	762	54	1372	42	1067	78	1981	54	1372	102	2591	66	1676	126	3200
36	914	6	152	(Prefix)-36-06-HT*	33	838	36	914	45	1143	60	1524	57	1448	84	2134	69	1753	108	2743
		9	228	(Prefix)-36-09-HT*	33	838	39	991	45	1143	63	1600	57	1448	87	2210	69	1753	111	2819
		12	305	(Prefix)-36-12-HT*	33	838	42	1067	45	1143	66	1676	57	1448	90	2286	69	1753	114	2496
		18	457	(Prefix)-36-18-HT*	33	838	48	1219	45	1143	72	1829	57	1448	96	2438	69	1753	120	3048
		24	609	(Prefix)-36-24-HT*	33	838	54	1372	45	1143	78	1981	57	1448	102	2591	69	1753	126	3200
		30	762	(Prefix)-36-30-HT*	33	838	60	1524	45	1143	84	2134	57	1448	108	2743	69	1753	132	3353
42	1067	6	152	(Prefix)-42-06-HT*	36	914	36	914	48	1219	60	1524	60	1524	84	2134	72	1829	108	2743
		9	228	(Prefix)-42-09-HT*	36	914	39	991	48	1219	63	1600	60	1524	87	2210	72	1829	111	2819
		12	305	(Prefix)-42-12-HT*	36	914	42	1067	48	1219	66	1676	60	1524	90	2286	72	1829	114	2496
		18	457	(Prefix)-42-18-HT*	36	914	48	1219	48	1219	72	1829	60	1524	96	2438	72	1829	120	3048
		24	609	(Prefix)-42-24-HT*	36	914	54	1372	48	1219	78	1981	60	1524	102	2591	72	1829	126	3200
		30	762	(Prefix)-42-30-HT*	36	914	60	1524	48	1219	84	2134	60	1524	108	2743	72	1829	132	3353
		36	914	(Prefix)-42-36-HT*	36	914	66	1676	48	1219	90	2286	60	1524	114	2895	72	1829	138	3505

(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Width dimensions are to inside wall. For aluminum fittings add 1.5 inches for total outside width.
Manufacturing tolerances apply to all dimensions.

Horizontal Expanding Tee (HT)

2 pair splice plates with hardware included.





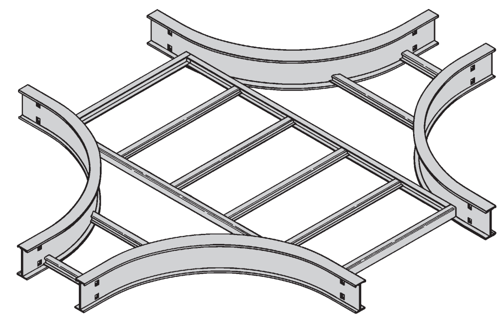
Prefix - 09 - 30 HT 12

- Radius
- Fitting
- Width W2
- Width W1
- To complete catalog number, insert fitting prefix.

See page 134 for prefix.

Tray Width W1 in.	W1 mm	W2 in.	W2 mm	*Insert Radius (12", 24", 36", or 48") Catalog No.	12" Radius A in.	A mm	B in.	B mm	24" Radius A in.	A mm	B in.	B mm	36" Radius A in.	A mm	B in.	B mm	48" Radius A in.	A mm	B in.	B mm
6	152	9	228	(Prefix)-06-09-HT*	18	457	39	991	30	762	63	1600	42	1067	87	2210	54	1372	111	2819
		12	305	(Prefix)-06-12-HT*	18	457	42	1067	30	762	66	1676	42	1067	90	2286	54	1372	114	2496
		18	457	(Prefix)-06-18-HT*	18	457	48	1219	30	762	72	1829	42	1067	96	2438	54	1372	120	3048
		24	609	(Prefix)-06-24-HT*	18	457	54	1372	30	762	78	1981	42	1067	102	2591	54	1372	126	3200
		30	762	(Prefix)-06-30-HT*	18	457	60	1524	30	762	84	2134	42	1067	108	2743	54	1372	132	3353
		36	914	(Prefix)-06-36-HT*	18	457	66	1676	30	762	90	2286	42	1067	114	2895	54	1372	138	3503
		42	1067	(Prefix)-06-42-HT*	18	457	72	1829	30	762	96	2438	42	1067	120	3048	54	1372	144	3658
9	228	12	305	(Prefix)-09-12-HT*	19 1/2	496	42	1067	31 1/2	800	66	1676	43 1/2	1105	90	2286	55 1/2	1410	114	2496
		18	457	(Prefix)-09-18-HT*	19 1/2	496	48	1219	31 1/2	800	72	1829	43 1/2	1105	96	2438	55 1/2	1410	120	3048
		24	609	(Prefix)-09-24-HT*	19 1/2	496	54	1372	31 1/2	800	78	1981	43 1/2	1105	102	2591	55 1/2	1410	126	3200
		30	762	(Prefix)-09-30-HT*	19 1/2	496	60	1524	31 1/2	800	84	2134	43 1/2	1105	108	2743	55 1/2	1410	132	3353
		36	914	(Prefix)-09-36-HT*	19 1/2	496	66	1676	31 1/2	800	90	2286	43 1/2	1105	114	2895	55 1/2	1410	138	3503
		42	1067	(Prefix)-09-42-HT*	19 1/2	496	72	1829	31 1/2	800	96	2438	43 1/2	1105	120	3048	55 1/2	1410	144	3658
12	305	18	457	(Prefix)-12-18-HT*	21	533	48	1219	33	838	72	1829	45	1143	96	2438	57	1448	120	3048
		24	609	(Prefix)-12-24-HT*	21	533	54	1372	33	838	78	1981	45	1143	102	2591	57	1448	126	3200
		30	762	(Prefix)-12-30-HT*	21	533	60	1524	33	838	84	2134	45	1143	108	2743	57	1448	132	3353
		36	914	(Prefix)-12-36-HT*	21	533	66	1676	33	838	90	2286	45	1143	114	2895	57	1448	138	3503
		42	1067	(Prefix)-12-42-HT*	21	533	72	1829	33	838	96	2438	45	1143	120	3048	57	1448	144	3658
18	457	24	609	(Prefix)-18-24-HT*	24	609	54	1372	36	914	78	1981	48	1219	102	2591	60	1524	126	3200
		30	762	(Prefix)-18-30-HT*	24	609	60	1524	36	914	84	2134	48	1219	108	2743	60	1524	132	3353
		36	914	(Prefix)-18-36-HT*	24	609	66	1676	36	914	90	2286	48	1219	114	2895	60	1524	138	3503
		42	1067	(Prefix)-18-42-HT*	24	609	72	1829	36	914	96	2438	48	1219	120	3048	60	1524	144	3658
24	609	30	762	(Prefix)-24-30-HT*	27	686	60	1524	39	991	84	2134	51	1295	108	2743	63	1600	132	3353
		36	914	(Prefix)-24-36-HT*	27	686	66	1676	39	991	90	2286	51	1295	114	2895	63	1600	138	3503
		42	1067	(Prefix)-24-42-HT*	27	686	72	1829	39	991	96	2438	51	1295	120	3048	63	1600	144	3658
30	762	36	914	(Prefix)-30-36-HT*	30	762	66	1676	42	1067	90	2286	54	1372	114	2895	66	1676	138	3503
		42	1067	(Prefix)-30-42-HT*	30	762	72	1829	42	1067	96	2438	54	1372	120	3048	66	1676	144	3658
36	914	42	1067	(Prefix)-36-42-HT*	33	838	72	1829	45	1143	96	2438	57	1448	120	3048	69	1753	144	3658

(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Width dimensions are to inside wall. For aluminum fittings add 1.5 inches for total outside width.
Manufacturing tolerances apply to all dimensions.



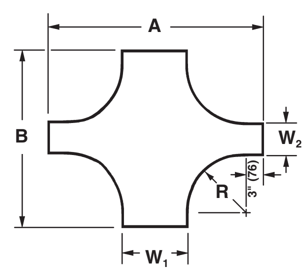
Horizontal Expanding/Reducing Cross (HX)

3 pair splice plates with hardware included.

Prefix - 36 - 18 HX 24

- Radius
- Fitting
- Width W_2
- Width W_1
- To complete catalog number, insert fitting prefix.

See page 134 for prefix.

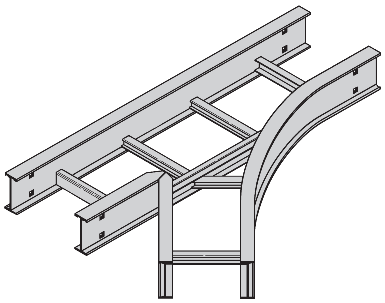


Tray Width				* Insert Radius (12", 24", 36", or 48")	12" Radius				24" Radius				36" Radius				48" Radius			
W1		W2		Catalog No.	A		B		A		B		A		B		A		B	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
9	228	6	152	**(Prefix)-09-06-HX***	39	991	36	914	63	1600	60	1372	87	2210	84	2134	111	2819	108	2743
12	305	6	152	**(Prefix)-12-06-HX***	42	1067	36	914	66	1676	60	1372	90	2286	84	2134	114	2896	108	2743
		9	228	**(Prefix)-12-09-HX***	42	1067	39	991	66	1676	63	1600	90	2286	87	2210	114	2896	111	2819
18	457	6	152	**(Prefix)-18-06-HX***	48	1219	36	914	72	1829	60	1372	96	2438	84	2134	120	3048	108	2743
		9	228	**(Prefix)-18-09-HX***	48	1219	39	991	72	1829	63	1600	96	2438	87	2210	120	3048	111	2819
		12	305	**(Prefix)-18-12-HX***	48	1219	42	1067	72	1829	66	1676	96	2438	90	2286	120	3048	114	2896
24	609	6	152	**(Prefix)-24-06-HX***	54	1372	36	914	78	1981	60	1372	102	2591	84	2134	126	3200	108	2743
		9	228	**(Prefix)-24-09-HX***	54	1372	39	991	78	1981	63	1600	102	2591	87	2210	126	3200	111	2819
		12	305	**(Prefix)-24-12-HX***	54	1372	42	1067	78	1981	66	1676	102	2591	90	2286	126	3200	114	2896
		18	457	**(Prefix)-24-18-HX***	54	1372	48	1219	78	1981	72	1829	102	2591	96	2438	126	3200	120	3048
30	762	6	152	**(Prefix)-30-06-HX***	60	1524	36	914	84	2134	60	1372	108	2743	84	2134	132	3353	108	2743
		9	228	**(Prefix)-30-09-HX***	60	1524	39	991	84	2134	63	1600	108	2743	87	2210	132	3353	111	2819
		12	305	**(Prefix)-30-12-HX***	60	1524	42	1067	84	2134	66	1676	108	2743	90	2286	132	3353	114	2896
		18	457	**(Prefix)-30-18-HX***	60	1524	48	1219	84	2134	72	1829	108	2743	96	2438	132	3353	120	3048
		24	609	**(Prefix)-30-24-HX***	60	1524	54	1372	84	2134	78	1981	108	2743	102	2591	132	3353	126	3200
36	914	6	152	**(Prefix)-36-06-HX***	66	1676	36	914	90	2286	60	1372	114	2896	84	2134	138	3505	108	2743
		9	228	**(Prefix)-36-09-HX***	66	1676	39	991	90	2286	63	1600	114	2896	87	2210	138	3505	111	2819
		12	305	**(Prefix)-36-12-HX***	66	1676	42	1067	90	2286	66	1676	114	2896	90	2286	138	3505	114	2896
		18	457	**(Prefix)-36-18-HX***	66	1676	48	1219	90	2286	72	1829	114	2896	96	2438	138	3505	120	3048
		24	609	**(Prefix)-36-24-HX***	66	1676	54	1372	90	2286	78	1981	114	2896	102	2591	138	3505	126	3200
		30	762	**(Prefix)-36-30-HX***	66	1676	60	1524	90	2286	84	2134	114	2896	108	2743	138	3505	132	3353
42	1067	6	152	**(Prefix)-42-06-HX***	72	1829	36	914	96	2438	60	1372	120	3048	84	2134	144	3658	108	2743
		9	228	**(Prefix)-42-09-HX***	72	1829	39	991	96	2438	63	1600	120	3048	87	2210	144	3658	111	2819
		12	305	**(Prefix)-42-12-HX***	72	1829	42	1067	96	2438	66	1676	120	3048	90	2286	144	3658	114	2896
		18	457	**(Prefix)-42-18-HX***	72	1829	48	1219	96	2438	72	1829	120	3048	96	2438	144	3658	120	3048
		24	609	**(Prefix)-42-24-HX***	72	1829	54	1372	96	2438	78	1981	120	3048	102	2591	144	3658	126	3200
		30	762	**(Prefix)-42-30-HX***	72	1829	60	1524	96	2438	84	2134	120	3048	108	2743	144	3658	132	3353
		36	914	**(Prefix)-42-36-HX***	72	1829	66	1676	96	2438	90	2286	120	3048	114	2896	144	3658	138	3505

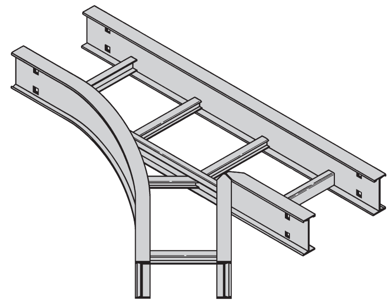
(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Width dimensions are to inside wall. For aluminum fittings add 1.5 inches for total outside width.
Manufacturing tolerances apply to all dimensions.

Horizontal Wye (HYL, HYR)

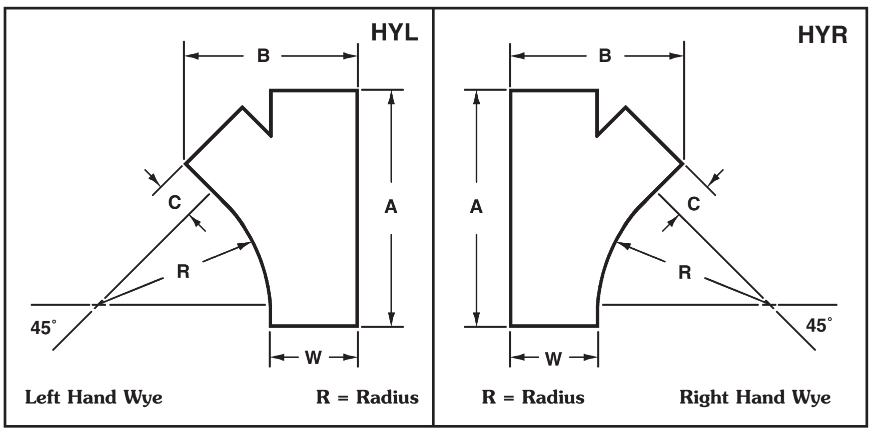
2 pair splice plates with hardware included.



Left Hand Wye



Right Hand Wye

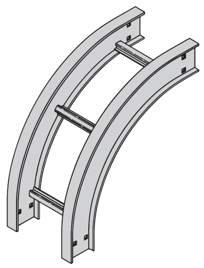


Bend Radius in.	Bend Radius mm	Tray Width in.	Tray Width mm	Left Hand Wye Catalog No.	Right Hand Wye Catalog No.	A in.	A mm	B in.	B mm	C in.	C mm
24	609	6	152	(Prefix)-06-HYL	(Prefix)-06-HYR	28 7/16	722	15 3/16	386	3 1/16	77
		9	228	(Prefix)-09-HYL	(Prefix)-09-HYR	32 11/16	831	20 5/16	516	6 1/16	154
		12	305	(Prefix)-12-HYL	(Prefix)-12-HYR	36 15/16	938	25 7/16	646	9 1/16	231
		18	457	(Prefix)-18-HYL	(Prefix)-18-HYR	45 3/8	1153	35 13/16	910	15 1/16	383
		24	609	(Prefix)-24-HYL	(Prefix)-24-HYR	53 7/8	1368	45 15/16	1167	21 1/16	535
		30	762	(Prefix)-30-HYL	(Prefix)-30-HYR	62 3/8	1585	56 3/16	1427	27 1/16	688
		36	914	(Prefix)-36-HYL	(Prefix)-36-HYR	70 7/8	1800	66 7/16	1687	33 1/16	993
		42	1067	(Prefix)-42-HYL	(Prefix)-42-HYR	79 3/8	2016	76 5/8	1946	39 1/16	992

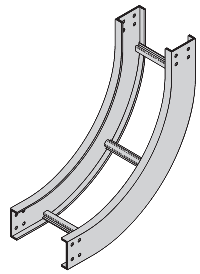
(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Width dimensions are to inside wall. For aluminum fittings add 1.5 inches for total outside width. Manufacturing tolerances apply to all dimensions.

Vertical Bend 90˚ (VO, VI)

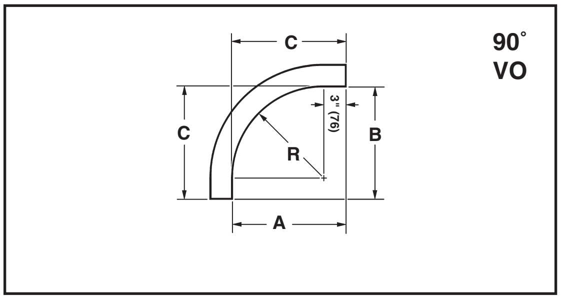
1 pair splice plates with hardware included.

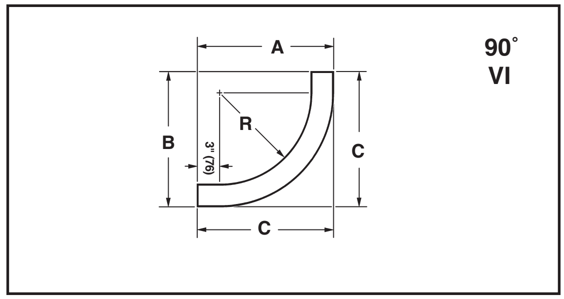


90˚ Vertical Outside



90˚ Vertical Inside



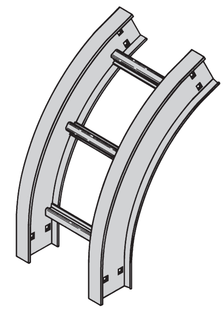


Bend Radius R in.	Tray Width in.	Tray Width mm	(*) Insert "VO" for Vert. Outside Bend Insert "VI" for Vert. Inside Bend Catalog No.	VO Side Rail Height 4" - 7" A in.	VO B in.	VO C in.	VI Side Rail Height 4" A in.	4" B in.	4" C in.	5" A in.	5" B in.	5" C in.	6" A in.	6" B in.	6" C in.	7" A in.	7" B in.	7" C in.
	6	152	**(Prefix)-06-90(*)12**															
	9	228	**(Prefix)-09-90(*)12**															
	12	305	**(Prefix)-12-90(*)12**															
12	18	457	**(Prefix)-18-90(*)12**	15	15	15	19	19	19	20	20	20	21	21	21	22	22	22
(305)	24	609	**(Prefix)-24-90(*)12**	(381)	(381)	(381)	(483)	(483)	(483)	(508)	(508)	(508)	(533)	(533)	(533)	(559)	(559)	(559)
	30	762	**(Prefix)-30-90(*)12**															
	36	914	**(Prefix)-36-90(*)12**															
	42	1067	**(Prefix)-42-90(*)12**															
	6	152	**(Prefix)-06-90(*)24**															
	9	228	**(Prefix)-09-90(*)24**															
	12	305	**(Prefix)-12-90(*)24**															
24	18	457	**(Prefix)-18-90(*)24**	27	27	27	31	31	31	32	32	32	33	33	33	34	34	34
(609)	24	609	**(Prefix)-24-90(*)24**	(686)	(686)	(686)	(787)	(787)	(787)	(813)	(813)	(813)	(838)	(838)	(838)	(864)	(864)	(864)
	30	762	**(Prefix)-30-90(*)24**															
	36	914	**(Prefix)-36-90(*)24**															
	42	1067	**(Prefix)-42-90(*)24**															
	6	152	**(Prefix)-06-90(*)36**															
	9	228	**(Prefix)-09-90(*)36**															
	12	305	**(Prefix)-12-90(*)36**															
36	18	457	**(Prefix)-18-90(*)36**	39	39	39	43	43	43	44	44	44	45	45	45	46	46	46
(914)	24	609	**(Prefix)-24-90(*)36**	(991)	(991)	(991)	(1092)	(1092)	(1092)	(1118)	(1118)	(1118)	(1143)	(1143)	(1143)	(1168)	(1168)	(1168)
	30	762	**(Prefix)-30-90(*)36**															
	36	914	**(Prefix)-36-90(*)36**															
	42	1067	**(Prefix)-42-90(*)36**															
	6	152	**(Prefix)-06-90(*)48**															
	9	228	**(Prefix)-09-90(*)48**															
	12	305	**(Prefix)-12-90(*)48**															
48	18	457	**(Prefix)-18-90(*)48**	51	51	51	55	55	55	56	56	56	57	57	57	58	58	58
(1219)	24	609	**(Prefix)-24-90(*)48**	(1295)	(1295)	(1295)	(1397)	(1397)	(1397)	(1422)	(1422)	(1422)	(1448)	(1448)	(1448)	(1473)	(1473)	(1473)
	30	762	**(Prefix)-30-90(*)48**															
	36	914	**(Prefix)-36-90(*)48**															
	42	1067	**(Prefix)-42-90(*)48**															

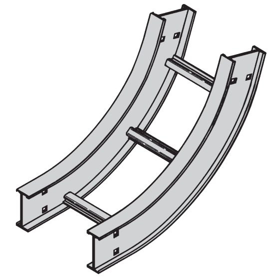
(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

Vertical Bend 60° (VO, VI)

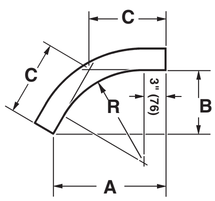
1 pair splice plates with hardware included.



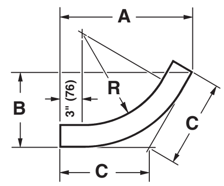
60° Vertical Outside



60° Vertical Inside



60°
VO



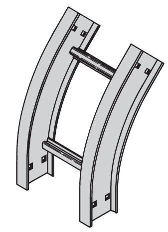
60°
VI

Bend Radius R in.	Tray Width in.	mm	(*) Insert "VO" for Vert. Outside Bend Insert "VI" for Vert. Inside Bend Catalog No.	VO Side Rail Height 4" - 7"			VI Side Rail Height											
							4"			5"			6"			7"		
				A in.	B in.	C in.	A in.	B in.	C in.	A in.	B in.	C in.	A in.	B in.	C in.	A in.	B in.	C in.
	6	152	(Prefix)-06-60(*)12															
	9	228	(Prefix)-09-60(*)12															
	12	305	(Prefix)-12-60(*)12															
12 (305)	18	457	(Prefix)-18-60(*)12	14 7/8 (378)	8 5/8 (219)	9 15/16 (253)	18 3/8 (467)	10 5/8 (270)	12 1/4 (311)	19 1/4 (489	11 1/8 (283)	12 13/16 (326)	20 1/16 (510)	11 5/8 (296)	13 3/8 (340)	21 15/16 (557)	12 1/8 (308)	14 (356)
	24	609	(Prefix)-24-60(*)12															
	30	762	(Prefix)-30-60(*)12															
	36	914	(Prefix)-36-60(*)12															
	42	1067	(Prefix)-42-60(*)12															
	6	152	(Prefix)-06-60(*)24															
	9	228	(Prefix)-09-60(*)24															
	12	305	(Prefix)-12-60(*)24															
24 (609)	18	457	(Prefix)-18-60(*)24	25 5/16 (643)	14 5/8 (372)	16 7/8 (428)	28 3/4 (730)	16 5/8 (422)	19 3/16 (488)	29 5/8 (753)	17 1/8 (435)	19 3/4 (502)	30 1/2 (775)	17 5/8 (448)	20 5/16 (516)	31 3/8 (797)	18 1/8 (461)	20 7/8 (530)
	24	609	(Prefix)-24-60(*)24															
	30	762	(Prefix)-30-60(*)24															
	36	914	(Prefix)-36-60(*)24															
	42	1067	(Prefix)-42-60(*)24															
	6	152	(Prefix)-06-60(*)36															
	9	228	(Prefix)-09-60(*)36															
	12	305	(Prefix)-12-60(*)36															
36 (914)	18	457	(Prefix)-18-60(*)36	35 11/16 (907)	20 5/8 (524)	23 13/16 (605)	39 1/8 (994)	22 5/8 (575)	26 1/8 (663)	40 (1016)	23 1/8 (587)	26 11/16 (687)	40 7/8 (1038)	23 5/8 (600)	27 1/4 (692)	41 3/4 (1060)	24 1/8 (613)	27 13/16 (706)
	24	609	(Prefix)-24-60(*)36															
	30	762	(Prefix)-30-60(*)36															
	36	914	(Prefix)-36-60(*)36															
	42	1067	(Prefix)-42-60(*)36															
	6	152	(Prefix)-06-60(*)48															
	9	228	(Prefix)-09-60(*)48															
	12	305	(Prefix)-12-60(*)48															
48 (1219)	18	457	(Prefix)-18-60(*)48	46 1/16 (1170)	26 5/8 (676)	30 11/16 (780)	49 9/16 (1259)	28 5/8 (727)	33 (838)	50 3/8 (1280)	29 1/8 (740)	33 5/8 (854)	51 1/4 (1302)	29 5/8 (753)	34 3/16 (868)	52 1/8 (1324)	30 1/8 (765)	34 3/4 (883)
	24	609	(Prefix)-24-60(*)48															
	30	762	(Prefix)-30-60(*)48															
	36	914	(Prefix)-36-60(*)48															
	42	1067	(Prefix)-42-60(*)48															

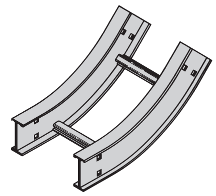
(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

Vertical Bend 45° (VO, VI)

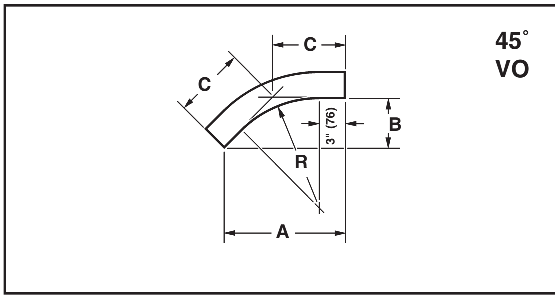
1 pair splice plates with hardware included.

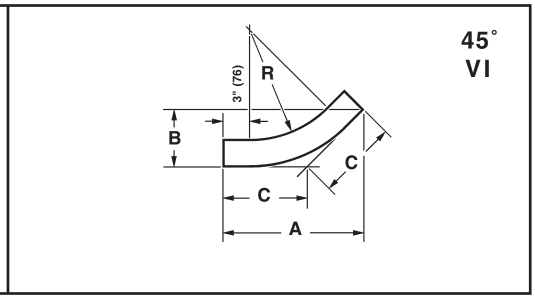


45° Vertical Outside



45° Vertical Inside



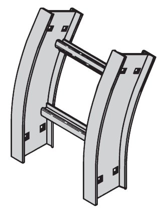


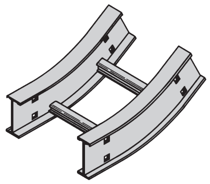
Bend Radius R in.	Tray Width in.	Tray Width mm	(*) Insert "VO" for Vert. Outside Bend Insert "VI" for Vert. Inside Bend Catalog No.	VO Side Rail Height 4" - 7" A in.	VO B in.	VO C in.	VI 4" A in.	VI 4" B in.	VI 4" C in.	VI 5" A in.	VI 5" B in.	VI 5" C in.	VI 6" A in.	VI 6" B in.	VI 6" C in.	VI 7" A in.	VI 7" B in.	VI 7" C in.
12 (305)	6	152	**(Prefix)-06-45(*)12**	13 5/8 (346)	5 5/8 (143)	8 (203)	16 7/16 (417)	6 13/16 (173)	9 5/8 (245)	17 1/8 (435)	7 1/8 (181)	10 1/16 (256)	17 7/8 (454)	7 3/8 (188)	10 7/16 (265)	18 9/16 (471)	7 11/16 (195)	10 7/8 (2176)
	9	228	**(Prefix)-09-45(*)12**															
	12	305	**(Prefix)-12-45(*)12**															
	18	457	**(Prefix)-18-45(*)12**															
	24	609	**(Prefix)-24-45(*)12**															
	30	762	**(Prefix)-30-45(*)12**															
	36	914	**(Prefix)-36-45(*)12**															
	42	1067	**(Prefix)-42-45(*)12**															
24 (609)	6	152	**(Prefix)-06-45(*)24**	22 1/16 (561)	9 1/8 (232)	12 15/16 (329)	24 15/16 (634)	10 5/16 (262)	14 5/8 (372)	25 5/8 (651)	10 5/8 (270)	15 (381)	26 5/16 (668)	10 15/16 (278)	15 7/16 (392)	27 1/16 (687)	11 3/16 (284)	15 13/16 (402)
	9	228	**(Prefix)-09-45(*)24**															
	12	305	**(Prefix)-12-45(*)24**															
	18	457	**(Prefix)-18-45(*)24**															
	24	609	**(Prefix)-24-45(*)24**															
	30	762	**(Prefix)-30-45(*)24**															
	36	914	**(Prefix)-36-45(*)24**															
	42	1067	**(Prefix)-42-45(*)24**															
36 (924)	6	152	**(Prefix)-06-45(*)36**	30 9/16 (776)	12 11/16 (323)	17 15/16 (456)	33 3/8 (848)	13 13/16 (351)	19 9/16 (497)	34 1/8 (867)	14 1/8 (359)	20 (508)	34 13/16 (885)	14 7/16 (367)	20 3/8 (518)	35 1/2 (902)	14 11/16 (284)	20 13/16 (402)
	9	228	**(Prefix)-09-45(*)36**															
	12	305	**(Prefix)-12-45(*)36**															
	18	457	**(Prefix)-18-45(*)36**															
	24	609	**(Prefix)-24-45(*)36**															
	30	762	**(Prefix)-30-45(*)36**															
	36	914	**(Prefix)-36-45(*)36**															
	42	1067	**(Prefix)-42-45(*)36**															
48 (1219)	6	152	**(Prefix)-06-45(*)48**	39 1/16 (992)	16 3/16 (411)	22 7/8 (581)	41 7/8 (1064)	17 3/8 (441)	24 9/16 (624)	42 5/8 (1083)	17 5/8 (448)	24 15/16 (633)	43 5/16 (1100)	17 15/16 (456)	25 3/8 (645)	44 (1118)	18 1/4 (464)	25 13/16 (656)
	9	228	**(Prefix)-09-45(*)48**															
	12	305	**(Prefix)-12-45(*)48**															
	18	457	**(Prefix)-18-45(*)48**															
	24	609	**(Prefix)-24-45(*)48**															
	30	762	**(Prefix)-30-45(*)48**															
	36	914	**(Prefix)-36-45(*)48**															
	42	1067	**(Prefix)-42-45(*)48**															

(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

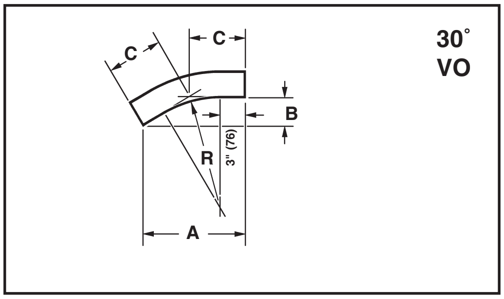
Vertical Bend 30˚ (VO, VI)

1 pair splice plates with hardware included.

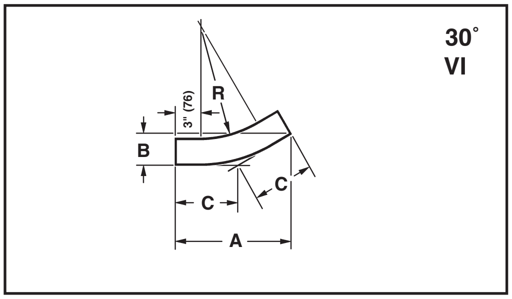




30˚ Vertical Outside



30˚ Vertical Inside



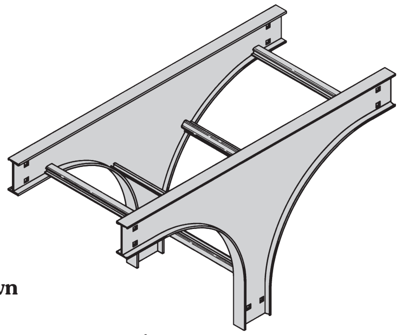
Bend Radius R in.	Tray Width in.	mm	(*) Insert "VO" for Vert. Outside Bend Insert "VI" for Vert. Inside Bend Catalog No.	VO Side Rail Height 4" - 7"			VI Side Rail Height											
							4"			5"			6"			7"		
				A in.	B in.	C in.	A in.	B in.	C in.	A in.	B in.	C in.	A in.	B in.	C in.	A in.	B in.	C in.
	6	152	(Prefix)-06-30(*)12															
	9	228	(Prefix)-09-30(*)12															
	12	305	(Prefix)-12-30(*)12															
12 (305)	18	457	(Prefix)-18-30(*)12	11 5/8 (296)	3 1/8 (79)	6 3/16 (157)	13 5/8 (346)	3 5/8 (92)	7 5/16 (186)	14 1/8 (359)	3 3/4 (95)	7 9/16 (192)	14 5/8 (372)	3 15/16 (100)	7 13/16 (199)	15 1/8 (384)	4 1/16 (103)	8 1/16 (205)
	24	609	(Prefix)-24-30(*)12															
	30	762	(Prefix)-30-30(*)12															
	36	914	(Prefix)-36-30(*)12															
	42	1067	(Prefix)-42-30(*)12															
	6	152	(Prefix)-06-30(*)24															
	9	228	(Prefix)-09-30(*)24															
	12	305	(Prefix)-12-30(*)24															
24 (609)	18	457	(Prefix)-18-30(*)24	17 5/8 (448)	4 11/16 (120)	9 7/16 (240)	19 5/8 (499)	5 1/4 (133)	10 1/2 (267)	20 1/8 (511	5 3/8 (137)	10 3/4 (273)	20 5/8 (524)	5 1/2 (140)	11 1/16 (282)	21 1/8 (537)	5 5/8 (143)	11 5/16 (287)
	24	609	(Prefix)-24-30(*)24															
	30	762	(Prefix)-30-30(*)24															
	36	914	(Prefix)-36-30(*)24															
	42	1067	(Prefix)-42-30(*)24															
	6	152	(Prefix)-06-30(*)36															
	9	228	(Prefix)-09-30(*)36															
	12	305	(Prefix)-12-30(*)36															
36 (914)	18	457	(Prefix)-18-30(*)36	23 5/8 (600)	6 5/16 (160)	12 5/8 (321)	25 5/8 (651)	6 7/8 (174)	13 11/16 (348)	26 1/8 (663)	7 (175)	14 (356)	26 5/8 (676)	7 1/8 (181)	14 1/4 (362)	27 1/8 (689)	7 1/4 (184)	14 1/2 (287)
	24	609	(Prefix)-24-30(*)36															
	30	762	(Prefix)-30-30(*)36															
	36	914	(Prefix)-36-30(*)36															
	42	1067	(Prefix)-42-30(*)36															
	6	152	(Prefix)-06-30(*)48															
	9	228	(Prefix)-09-30(*)48															
	12	305	(Prefix)-12-30(*)48															
48 (1219)	18	457	(Prefix)-18-30(*)48	29 5/8 (753)	7 15/16 (202)	15 7/8 (403)	31 5/8 (803)	8 7/16 (214)	16 15/16 (430)	32 1/8 (816)	8 5/8 (219)	17 3/16 (437)	32 5/8 (829)	8 3/4 (222)	17 1/2 (445)	33 1/8 (842)	8 7/8 (226)	17 3/4 (451)
	24	609	(Prefix)-24-30(*)48															
	30	762	(Prefix)-30-30(*)48															
	36	914	(Prefix)-36-30(*)48															
	42	1067	(Prefix)-42-30(*)48															

(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

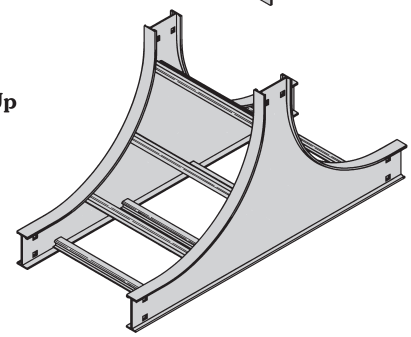
Vertical Tee Up/Down (VTU/VT)

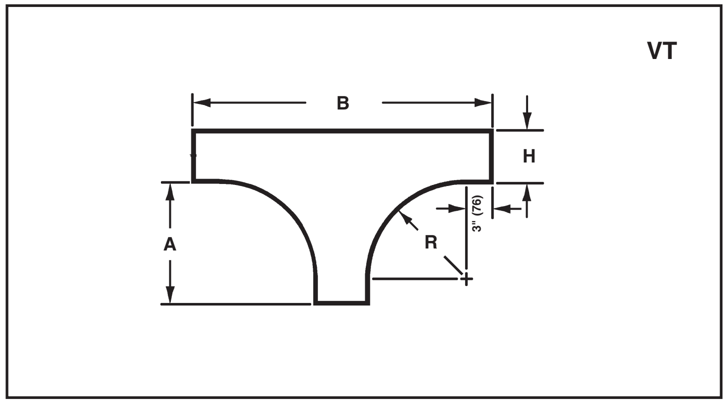
2 pair splice plates with hardware included.

Down



Up



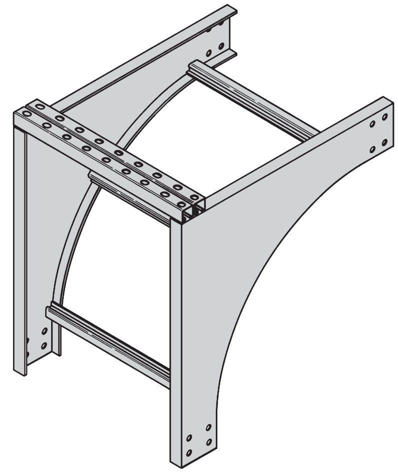


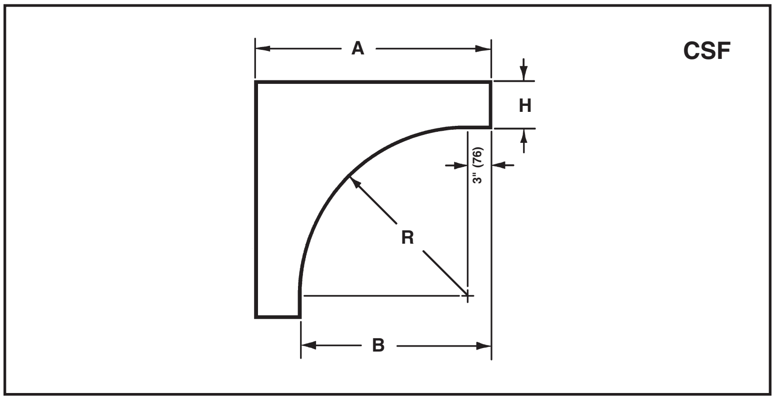
Bend Radius R in.	Tray Width in.	mm	Vertical Tee Down Catalog No.	Vertical Tee Up Catalog No.	Side Rail Height "H" 4" A in.	4" B in.	5" A in.	5" B in.	6" A in.	6" B in.	7" A in.	7" B in.
	6	152	**(Prefix)-06-VT12**	**(Prefix)-06-VTU12**								
	9	228	**(Prefix)-09-VT12**	**(Prefix)-09-VTU12**								
	12	305	**(Prefix)-12-VT12**	**(Prefix)-12-VTU12**								
12	18	457	**(Prefix)-18-VT12**	**(Prefix)-18-VTU12**	15	34	15	35	15	36	15	37
(305)	24	609	**(Prefix)-24-VT12**	**(Prefix)-24-VTU12**	(381)	(846)	(381)	(889)	(381)	(914)	(381)	(940)
	30	762	**(Prefix)-30-VT12**	**(Prefix)-30-VTU12**								
	36	914	**(Prefix)-36-VT12**	**(Prefix)-36-VTU12**								
	42	1067	**(Prefix)-42-VT12**	**(Prefix)-42-VTU12**								
	6	152	**(Prefix)-06-VT24**	**(Prefix)-06-VTU24**								
	9	228	**(Prefix)-09-VT24**	**(Prefix)-09-VTU24**								
	12	305	**(Prefix)-12-VT24**	**(Prefix)-12-VTU24**								
24	18	457	**(Prefix)-18-VT24**	**(Prefix)-18-VTU24**	27	58	27	59	27	60	27	61
(609)	24	609	**(Prefix)-24-VT24**	**(Prefix)-24-VTU24**	(6867)	(1473)	(686)	(1498)	(686)	(1524)	(686)	(1549)
	30	762	**(Prefix)-30-VT24**	**(Prefix)-30-VTU24**								
	36	914	**(Prefix)-36-VT24**	**(Prefix)-36-VTU24**								
	42	1067	**(Prefix)-42-VT24**	**(Prefix)-42-VTU24**								
	6	152	**(Prefix)-06-VT36**	**(Prefix)-06-VTU36**								
	9	228	**(Prefix)-09-VT36**	**(Prefix)-09-VTU36**								
	12	305	**(Prefix)-12-VT36**	**(Prefix)-12-VTU36**								
36	18	457	**(Prefix)-18-VT36**	**(Prefix)-18-VTU36**	39	82	39	83	39	84	39	85
(914)	24	609	**(Prefix)-24-VT36**	**(Prefix)-24-VTU36**	(991)	(2083)	(991)	(2108)	(991)	(2134)	(991)	(2159)
	30	762	**(Prefix)-30-VT36**	**(Prefix)-30-VTU36**								
	36	914	**(Prefix)-36-VT36**	**(Prefix)-36-VTU36**								
	42	1067	**(Prefix)-42-VT36**	**(Prefix)-42-VTU36**								
	6	152	**(Prefix)-06-VT48**	**(Prefix)-06-VTU48**								
	9	228	**(Prefix)-09-VT48**	**(Prefix)-09-VTU48**								
	12	305	**(Prefix)-12-VT48**	**(Prefix)-12-VTU48**								
48	18	457	**(Prefix)-18-VT48**	**(Prefix)-18-VTU48**	51	106	51	107	51	108	51	109
(1219)	24	609	**(Prefix)-24-VT48**	**(Prefix)-24-VTU48**	(1295)	(2692)	(1295)	(2718)	(1295)	(2743)	(1295)	(2769)
	30	762	**(Prefix)-30-VT48**	**(Prefix)-30-VTU48**								
	36	914	**(Prefix)-36-VT48**	**(Prefix)-36-VTU48**								
	42	1067	**(Prefix)-42-VT48**	**(Prefix)-42-VTU48**								

(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

Cable Support Fittings (CSF)

1 pair splice plates with hardware included.





This fitting is recommended for use at the top of vertical runs to support the weight of the cables. The top cross brace is drilled for installing eyebolts, ordered separately.

Bend Radius R in.	Tray Width in.	Tray Width mm	Catalog No.	Side Rail Height "H" 4" A in.	4" B in.	5" A in.	5" B in.	6" A in.	6" B in.	7" A in.	7" B in.
12 (305)	6	152	**(Prefix)-06-CSF12**	19 (483)	15 (381)	20 (508)	15 (381)	21 (533)	15 (381)	22 (559)	15 (381)
	9	228	**(Prefix)-09-CSF12**								
	12	305	**(Prefix)-12-CSF12**								
	18	457	**(Prefix)-18-CSF12**								
	24	609	**(Prefix)-24-CSF12**								
	30	762	**(Prefix)-30-CSF12**								
	36	914	**(Prefix)-36-CSF12**								
	42	1067	**(Prefix)-42-CSF12**								
24 (609)	6	152	**(Prefix)-06-CSF24**	31 (787)	27 (686)	32 (813)	27 (686)	33 (838)	27 (686)	34 (864)	27 (686)
	9	228	**(Prefix)-09-CSF24**								
	12	305	**(Prefix)-12-CSF24**								
	18	457	**(Prefix)-18-CSF24**								
	24	609	**(Prefix)-24-CSF24**								
	30	762	**(Prefix)-30-CSF24**								
	36	914	**(Prefix)-36-CSF24**								
	42	1067	**(Prefix)-42-CSF24**								
36 (914)	6	152	**(Prefix)-06-CSF36**	43 (1092)	39 (991)	44 (1118)	39 (991)	45 (1143)	39 (991)	46 (1168)	39 (991)
	9	228	**(Prefix)-09-CSF36**								
	12	305	**(Prefix)-12-CSF36**								
	18	457	**(Prefix)-18-CSF36**								
	24	609	**(Prefix)-24-CSF36**								
	30	762	**(Prefix)-30-CSF36**								
	36	914	**(Prefix)-36-CSF36**								
	42	1067	**(Prefix)-42-CSF36**								
48 (1219)	6	152	**(Prefix)-06-CSF48**	55 (1397)	51 (1295)	56 (1422)	51 (1295)	57 (1448)	51 (1295)	58 (1473)	51 (1295)
	9	228	**(Prefix)-09-CSF48**								
	12	305	**(Prefix)-12-CSF48**								
	18	457	**(Prefix)-18-CSF48**								
	24	609	**(Prefix)-24-CSF48**								
	30	762	**(Prefix)-30-CSF48**								
	36	914	**(Prefix)-36-CSF48**								
	42	1067	**(Prefix)-42-CSF48**								

(Prefix) See page TF-3 for catalog number prefix.
All dimensions in parentheses are millimeters unless otherwise specified.
Manufacturing tolerances apply to all dimensions.

Fiberglass

Fiberglass

How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

Example: (from page FT-21)	**13** ●	**FT** ●	-	**09** ●	-	**24** ●	-	**144** ●	**Part will typically ship in 15 days minimum, because of the FT material.**
Lead time(days)	3-5	15		3-5		3-5		3-5	

Changing the part number from 13FT to 13F will change the coding to black for all sections of the tray to be 5-10 working days, instead of the original 15 days.

Fiberglass - Technical Data

Corrosion Guide

The information shown in this corrosion guide is based on full immersion laboratory tests and data generated from resin manufacturer's data. It should be noted that in some of the environments listed, splashes and spill situations may result in a more corrosive situation than indicated due to the evaporation of water. Regular wash down is recommended in these situations.
All data represents the best available information and is believed to be correct. The data should not be construed as a warranty of performance for that product as presented in these tables. User tests should be performed to determine suitability of service if there is any doubt or concern. Such variables as concentration, temperature, time and combined chemical effects of mixtures of chemicals make it impossible to specify the exact suitability of fiber reinforced plastics in all environments. Cooper B-Line will be happy to supply material samples for testing. These recommendations should only be used as a guide and Cooper B-Line does not take responsibility for design or suitability of materials for service intended. In no event will Cooper B-Line be liable for any consequential or special damages for any defective material or workmanship including without limitation, labor charge, other expense or damage to properties resulting from loss of materials or profits or increased expenses of operations.

CHEMICAL ENVIRONMENT	POLYESTER		VINYL ESTER	
	Max Wt. %	Max Oper. Temp °F	Max Wt. %	Max Oper. Temp °F
Acetic Acid	10	190	10	210
Acetic Acid	50	125	50	180
Acetone	N/R	N/R	100	75
Aluminum Chloride	SAT	170	SAT	200
Aluminum Hydroxide	SAT	160	SAT	170
Aluminum Nitrate	SAT	150	SAT	170
Aluminum Sulfate	SAT	180	SAT	200
Ammonium Chloride	SAT	170	SAT	190
Ammonium Hydroxide	1	100	10	150
Ammonium Hydroxide	28	N/R	28	100
Ammonium Carbonate	N/R	N/R	SAT	150
Ammonium Bicarbonate	15	125	SAT	130
Ammonium Nitrate	SAT	160	SAT	190
Ammonium Persulfate	SAT	N/R	SAT	150
Ammonium Sulfate	SAT	170	SAT	200
Amyl Alcohol	ALL	N/R	ALL	90
Amyl Alcohol Vapor	-	140	-	120
Benzene	N/R	N/R	100	140
Benzene Sulfonic Acid	25	110	SAT	200
Benzoic Acid	SAT	150	SAT	200
Benzoyl Alcohol	100	N/R	100	N/R
Borax	SAT	170	SAT	200
Calcium Carbonate	SAT	170	SAT	200
Calcium Chloride	SAT	170	SAT	200
Calcium Hydroxide	25	70	25	165
Calcium Nitrate	SAT	180	SAT	200
Calcium Sulfate	SAT	180	SAT	200
Carbon Disulfide	N/R	N/R	N/R	N/R
Carbonic Acid	SAT	130	SAT	180
Carbon Dioxide Gas	-	200	-	200
Carbon Monoxide Gas	-	200	-	200
Carbon Tetrachloride	N/R	N/R	100	75
Chlorine, Dry Gas	-	140	-	170
Chlorine, Wet Gas	-	N/R	-	180
Chlorine Water	SAT	80	SAT	180

CHEMICAL ENVIRONMENT	POLYESTER		VINYL ESTER	
	Max Wt. %	Max Oper. Temp °F	Max Wt. %	Max Oper. Temp °F
Chromic Acid	5	70	10	120
Citric Acid	SAT	170	SAT	200
Copper Chloride	SAT	170	SAT	200
Copper Cyanide	SAT	170	SAT	200
Copper Nitrate	SAT	170	SAT	200
Crude Oil, Sour	100	170	100	200
Cyclohexane	N/R	N/R	N/R	N/R
Cyclohexane, Vapor	ALL	100	ALL	130
Diesel Fuel	100	160	100	180
Diethyl Ether	N/R	N/R	N/R	N/R
Dimethyl Phthalate	N/R	N/R	N/R	N/R
Ethanol	50	75	50	90
Ethyl Acetate	N/R	N/R	N/R	N/R
Ethylene Chloride	N/R	N/R	N/R	N/R
Ethylene Glycol	100	90	100	200
Fatty Acids	SAT	180	SAT	200
Ferric Chloride	SAT	170	SAT	200
Ferric Nitrate	SAT	170	SAT	200
Ferric Sulfate	SAT	170	SAT	200
Ferrous Chloride	SAT	170	SAT	200
Fluoboric Acid	N/R	N/R	SAT	165
Fluosilicic Acid	N/R	N/R	SAT	70
Formaldehyde	50	75	50	100
Formic Acid	N/R	N/R	50	100
Gasoline	100	80	100	150
Glucose	100	170	100	200
Glycerine	100	150	100	200
Heptane	100	110	100	120
Hexane	100	90	100	130
Hydrobromic Acid	50	120	50	120
Hydrochloric Acid	10	150	10	200
Hydrochloric Acid	20	140	20	190
Hydrochloric Acid	37	75	37	95
Hydrofluoric Acid	N/R	N/R	15	80
Hydrogen Bromide, Dry	100	190	100	200

-: No Information Available   N/R: Not Recommended   SAT: Saturated Solution   FUM: Fumes

Corrosion Guide

CHEMICAL ENVIRONMENT	POLYESTER		VINYL ESTER	
	Max Wt. %	Max Oper. Temp °F	Max Wt. %	Max Oper. Temp °F
Hydrogen Bromide, Wet	100	75	100	130
Hydrogen Chloride	-	120	-	200
Hydrogen Peroxide	5	100	30	100
Hydrogen Sulfide, Dry	100	170	100	210
Hydrogen Sulfide, Wet	100	170	100	210
Hypochlorous Acid	20	80	20	150
Isopropyl Alcohol	N/R	N/R	15	80
Kerosene	100	140	100	180
Lactic Acid	SAT	170	SAT	200
Lead Acetate	SAT	170	SAT	200
Lead Chloride	SAT	140	SAT	200
Lead Nitrate	SAT	-	SAT	200
Linseed Oil	100	150	100	190
Lithium Chloride	SAT	150	SAT	190
Magnesium Carbonate	SAT	140	SAT	170
Magnesium Chloride	SAT	170	SAT	200
Magnesium Hydroxide	SAT	150	SAT	190
Magnesium Nitrate	SAT	140	SAT	180
Magnesium Sulfate	SAT	170	SAT	190
Mercuric Chloride	SAT	150	SAT	190
Mercurous Chloride	SAT	140	SAT	180
Methyl Ethyl Ketone	N/R	N/R	N/R	N/R
Mineral Oils	100	170	100	200
Monochlorobenzene	N/R	N/R	N/R	N/R
Naphtha	100	140	100	170
Nickel Chloride	SAT	170	SAT	200
Nickel Nitrate	SAT	170	SAT	200
Nickel Sulfate	SAT	170	SAT	200
Nitric Acid	5	140	5	150
Nitric Acid	20	70	20	100
Oleic Acid	100	170	100	190
Oxalic Acid	ALL	75	ALL	120
Paper Mill Liquors	-	100	-	120
Perchlorethylene	100	N/R	100	N/R
Perchloric Acid	N/R	N/R	10	150
Perchloric Acid	N/R	N/R	30	80
Phosphoric Acid	10	160	10	200
Phosphoric Acid	100	120	100	200
Potassium Aluminum Sulfate	SAT	170	SAT	200
Potassium Bicarbonate	50	80	50	140
Potassium Carbonate	10	N/R	10	120
Potassium Chloride	SAT	170	SAT	200
Potassium Dichromate	SAT	170	SAT	200
Potassium Hydroxide	N/R	N/R	25	150
Potassium Nitrate	SAT	170	SAT	200
Potassium Permanganate	100	80	100	210
Potassium Sulfate	SAT	170	SAT	200
Propylene Glycol	ALL	170	ALL	200
Phthalic Acid	-	-	SAT	200
Sodium Acetate	SAT	160	SAT	200
Sodium Benzoate	SAT	170	SAT	200
Sodium Bicarbonate	SAT	160	SAT	175
Sodium Bisulfate	ALL	170	ALL	200
Sodium Bromide	ALL	170	ALL	200
Sodium Carbonate	10	80	35	160
Sodium Chloride	SAT	170	SAT	200
Sodium Cyanide	SAT	170	SAT	200
Sodium Hydroxide	N/R	N/R	50	150
Sodium Hydroxide	N/R	N/R	25	80
Sodium Hypochloride	N/R	N/R	10	150
Sodium Monophosphate	SAT	170	SAT	200
Sodium Nitrate	SAT	170	SAT	200
Sodium Sulfate	SAT	170	SAT	200
Sodium Thiosulfate	ALL	100	ALL	120
Stannic Chloride	SAT	160	SAT	190
Styrene	N/R	N/R	N/R	N/R
Sulfated Detergent	0/50	170	0/50	200
Sulfur Dioxide	100	80	100	200
Sulfur Trioxide	100	80	100	200
Sulfuric Acid	93	N/R	93	N/R
Sulfuric Acid	50	N/R	50	180
Sulfuric Acid	25	75	25	190
Sulfurous Acid	SAT	80	N/R	N/R
Tartaric Acid	SAT	170	SAT	200
Tetrachloroethylene	N/R	N/R	FUM	75
Toluene	N/R	N/R	N/R	N/R
Trisodium Phosphate	N/R	N/R	SAT	175
Urea	SAT	130	SAT	140
Vinegar	100	170	100	200
Water, Distilled	100	170	100	190
Water, Tap	100	170	100	190
Water, Sea	SAT	170	SAT	190
Xylene	N/R	N/R	N/R	N/R
Zinc Chloride	SAT	170	SAT	200
Zinc Nitrate	SAT	170	SAT	200
Zinc Sulfate	SAT	170	SAT	200

- : No Information Available N/R: Not Recommended SAT: Saturated Solution FUM: Fumes

Load Data

Fiberglass Cable Tray and Cable Channel are offered in four versions for applications as follows:

Standard Series	Resin Type	Color	Meets
13F, 24F, 36F, 46F, H46F, 48F FCC-03, FCC-04, FCC-06, FCC-08	Fire Retardant Polyester	Gray	ASTM E-84 Class 1 - UL94 VO Good Corrosion Resistance in most environments
High Performance			
13FV, 24FV, 36FV, 46FV, H46FV, 48FV FCCV-03, FCCV-04, FCCV-06, FCCV-08	Fire Retardant Vinyl Ester	Beige	ASTM E-84 Class 1 - UL94 VO Improved Corrosion Resistance For more severe environments Higher Heat Distortion Temperature
Dis-Stat			
13FD, 24FD, 36FD, 46FD, H46FD, 48FD FCCD-03, FCCD-04, FCCD-06, FCCD-08	Fire Retardant Dis-Stat	Black	ASTM E-84 Class 1 - UL94 VO ASTM D257-99 Dissipates Static Charge
Low Smoke			
13FT, 24FT, 36FT, 46FT, H46FT, 48FT FCCT-03, FCCT-04, FCCT-06, FCCT-08	Zero Halogen Fire Retardant	Dark Gray	ASTM E-84 Class 1 - UL94 VO Smoke Generation and Toxicity for Mass Transit Requirements and Off Shore application

Effect of Temperature

Strength properties of reinforced plastics are reduced when continuously exposed to elevated temperatures. Working loads shall be reduced based on the following:

Temperature in Degrees F	Approximate Percent of Strength
75	100
100	90
125	78
150	68
175	60
200	52

NEMA Standard 8-10-1986
If unusual temperature conditions exist, the manufacturer should be consulted.
Authorized Engineering information 8-20-1986

Typical Properties of Pultruded Components

B-Line Fiberglass Cable Tray systems are manufactured from glass fiber-reinforced plastic shapes that meet ASTM E-84, Smoke Density rating for polyester of 680, for vinyl ester 1025, Class 1 Flame Rating and self-extinguishing requirements of ASTM D-635. A surface veil is applied during pultrusion to insure a resin-rich surface and ultraviolet resistance.

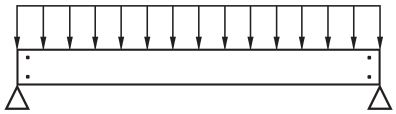
Flame Resistance (FTMS 406-2023) ign/burn, seconds	75/75
Intermittent Flame Test (HLT-15), rating	100
Flammability Test (ASTM D635) Ignition Burning Time	 none 0 sec.

Properties	Test Method	Unit/ Value	3" & 4" Cable Tray, Cable Channel		6" Cable Tray	
			Longitudinal	Transverse	Longitudinal	Transverse
Tensile Strength	ASTM D638	psi	30,000	7,000	40,000	4,500
Tensile Modulus	ASTM D638	psi x 10^6	2.5	.8	3.2	.6
Flexural Strength	ASTM D790	psi	30,000	10,000	40,000	10,000
Flexural Modulus	ASTM D790	psi x 10^6	1.6	.8	2.1	.8
Izod Impact	ASTM D256	ft - lbs/in	28	4	28	4
Compressive Strength	ASTM D695	psi	30,000	15,000	40,000	10,000
Compressive Modulus	ASTM D695	psi x 10^6	2.5	1.0	3.2	.7
Barcol Hardness	ASTM D2583	-	45	45	45	45
Sheer Strength	ASTM D732	psi	5,500	5,500	5,500	5,500
Density	ASTM D1505	lbs/in³	.058-.062	-	.072 - .076	-
Coefficient of Thermal Expansion	ASTM D696	in/in/°F	5.0 x 10^{-6}	-	5.0 x 10^{-6}	-
Water Absorption	ASTM D570	Max %	0.5	-	0.5	-
Dielectric Strength	ASTM D149	V/mil (vpm)	200	-	200	-
Flammability Classification	UL94	VO	-	-	-	-
Flame Spread	ASTM E-84	20 Max	-	-	-	-

Structural Characteristics of Cable Tray and Supports

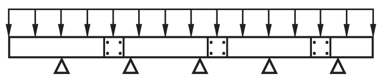
When viewed in its installed condition, any cable tray system performs functionally as a beam under a uniformly distributed load. There are four basic beam configurations typically found in a cable tray installation. All four types of beams support cable tray but each differ in the way that the beam is attached to the support.
The first two beam configurations, simple and continuous, apply to the cable tray itself. The second two beam configurations, cantilever and fixed, apply more to the cable tray supports than to the cable tray itself.

Simple Beam
A good example of simple beam is a single straight section of cable tray supported but not fastened at either end. When the tray is loaded the cable tray is allowed to deflect.

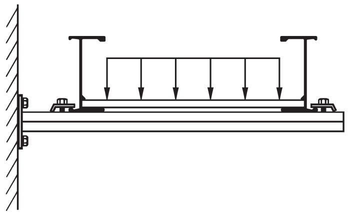


Simply beam analysis is used almost universally for beam comparisons even though it is seldom practical in field installations. The three most prominent reasons for using a simple beam analysis are: calculations are simplified; it represents the worst case loading; and testing is simple and reliable. The published load data in the B-Line cable tray catalog is based on the simple beam analysis per NEMA Standard FG-1.

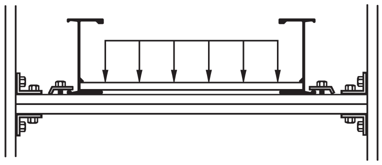
Continuous Beam
Continuous beam is the beam configuration most commonly used in cable tray installations. An example of this configuration is where cable trays are installed across several supports to form a number of spans. The continuous beam possesses traits of both the simple and fixed beams.
When equal loads are applied to all spans simultaneously, the counterbalancing effect of the loads on both sides of a support restricts the movement of the cable tray at the support. The effect is similar to that of a fixed beam. The end spans behave substantially like simple beams. When cable trays of identical design are compared, continuous beam installations will typically have approximately half the deflection of a simple beam of the same span. Therefore, simple beam data should be used for a general comparison only.



Cantilever Beam
A cantilever beam configuration occurs when one end of the beam is rigidly attached to the support and the other end is unsupported. This type of configuration is typically used when wall mounting a bracket to support cable tray. Since one end is unsupported, the cantilever beam will hold considerably less load than a comparable simple beam.



Fixed Beam
A fixed beam configuration has both ends of the beam rigidly attached to the supports. A good example of a fixed beam is the rung of a cable tray. By attaching the ends of the rung to the side rails, the ends are not free to move, bend or twist. This restriction in end movement effectively increases the load carrying capacity of the member.
Fixed beam configurations are also typically found in strut rack type support systems. These types of racks are found extensively in tunnel applications for support of pipe and cable tray.



Fiberglass

Standard B-Line Label

Warning! Walkways

It should be noted that cable tray is designed as a support for power or control cables, or both and is not intended or designed to be a walkway for personnel, the user is urged to display appropriate warnings cautioning against the use of this support as a walkway. The following language is suggested:

WARNING! Not to be used as a walkway, ladder or support for personnel. To be used only as a mechanical support for cables and tubing.

Authorized Engineering Information 8-20-1986

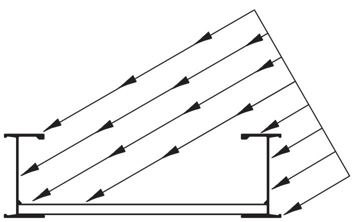
Structural Characteristics of Cable Tray and Supports

Cable Loads
The cable load is simply the total weight of all the cables to be placed in the tray. This load should be expressed in lbs./ft.

Concentrated Loads
A concentrated static load represents a static weight applied between the side rails. Tap boxes, conduit attachments and long cable drops are just some of the many types of concentrated loads. When so specified, these concentrated static loads may be converted to an equivalent, uniform load (We) in pounds per linear foot by using the following formula:

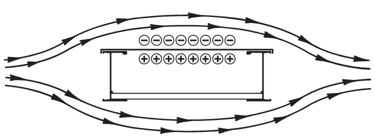
$$We: = \frac{2x \text{ (concentrated static load)}}{\text{span length (ft.)}}$$

Wind Loads
Wind loads need to be determined for all outdoor cable tray installations. Most outdoor cable trays are ladder type trays, therefore the most severe loading to be considered is



Detail 1

pressure on the tray side rails (see Detail 1). When covers are installed on outdoor cable trays, another factor to be considered is the aerodynamic effect which can produce a lift strong enough to separate a cover from a tray. Wind moving across a covered tray (see Detail 2) creates a positive pressure inside the tray and a negative pressure above the cover. This pressure difference can lift the cover off the tray.



Detail 2

B-Line recommends the use of heavy duty wrap-around cover clamps when covered trays are installed in an area where strong winds occur.

Ice Loads
Glaze ice is the most commonly seen form of ice build-up. It is the result of rain or drizzle freezing on impact with an exposed object. Generally, only the top surface (or the cover) and the windward side of a cable tray system is significantly coated with ice. The maximum design load to be added due to ice should be determined from local and federal weather bureau information.

Snow Loads
Snow is measured by density and thickness. The density of snow varies almost as much as its thickness. The additional design load from snowfall should be determined using local snowfall records which can be obtained from local and federal weather bureaus.

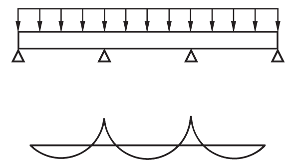
Seismic Loads
In recent years a great deal of testing and evaluation of cable tray systems, and their supports, has been performed. The conclusions reached from these evaluations have shown the cable tray/strut support system exhibited more seismic capacity than originally expected. One of the factors contributing to this is the energy dissipating motion of the cables within the tray. Another factor is the high degree of ductility of the cable tray and the support material. These factors, working in conjunction with a properly designed cable tray system, should afford reasonable assurance to withstand even strong motion earthquakes. Please consult the factory with your specific seismic specifications and request a seismic brochure.

Splices
A lot of attention has been given to the strength of the side rails. These load bearing side rails must be spliced to form a continuous system, therefore the design of the splice plate is very important. The splice plate needs to be both strong and simple to install. These characteristics have been designed into B-Line's splice plates.
B-Line's new high strength "L" shaped LAY-IN splice plate offers several advantages:
1) stronger than flat plate splices.
2) time saving - holds tray in position before fasteners are inserted.
3) provides base for an expansion splice to function - no vertical binding.
4) discourages splice on support-positioning, over the support is the worst place to splice - Fig 3.

The location of splices in a continuous span cable tray system is also very important. The splices should be located at points of minimum stress whenever practical. NEMA standards FG-1 limits the use of splice plates as follows:

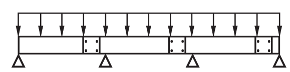
> Unspliced straight sections should be used on a simple span and on end spans of continuous runs. Straight section lengths should be equal to or greater than the span length to ensure not more than one splice between supports. See Figures 1 through 3 for examples on splicing configurations.

Typical Continuous Span Configuration
Figure 1



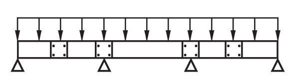
\+ Maximum positive moment
\- Maximum negative moment

Preferred Splice Plate Locations
Figure 2



Preferred splice location:
- ¼ span

Undesirable Splice Plate Locations
Figure 3



Undesired location:
- over supports
- mid spans

Cable Tray Thermal Contraction and Expansion

X : Denotes hold-down clamp (anchor) at support.
– : Denotes expansion guide clamp at support.

It is important that thermal contraction and expansion be considered when installing cable tray systems. The length of the straight cable tray runs and the temperature differential govern the number of expansion splice plates required (see Table 1 below).

The cable tray should be anchored at the support nearest to its midpoint between the expansion splice plates and secured by expansion guides at all other support locations (see Figure 1 - Typical Cable Tray Installation). The cable tray should be permitted longitudinal movement in both directions from that fixed point.

Accurate gap settings at the time of installation is necessary for the proper operation of the expansion splice plates. The following procedure should assist the installer in determining the correct gap: (see Figure 2 - Gap Setting)

1. Plot the highest expected tray temperature on the maximum temperature line.
2. Plot the lowest expected tray temperature on the minimum temperature line.
3. Draw a line between the maximum and minimum points.
4. Plot the tray temperature at the time of installation to determine the gap setting.

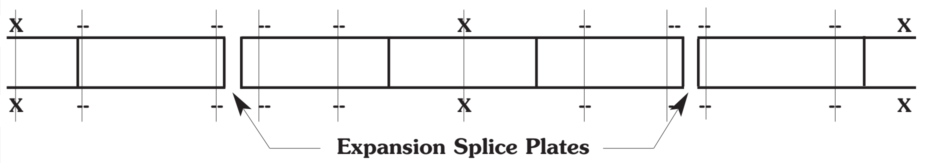


Figure 1 Typical Cable Tray Installation

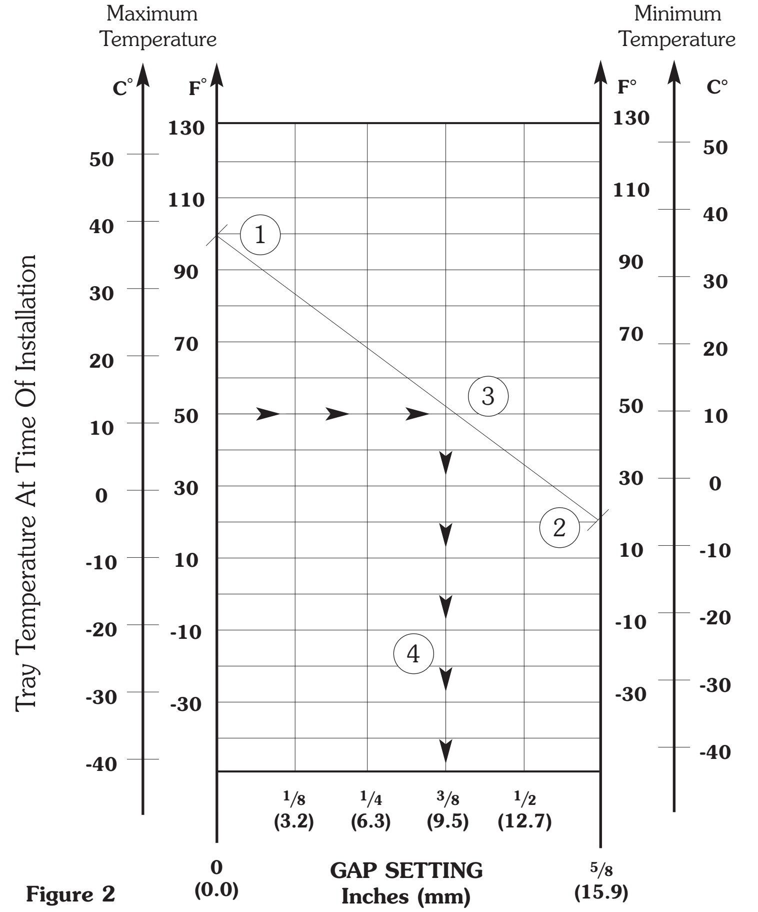


Figure 2

Table 1

Expansion or Contraction for Various Temperature Differences

Temperature Differential °F	(°C)	Cable Tray Length for 1" Expansion		Tray Length for Each Expansion Connector*	
25	(-4)	667 Feet	(203.3m)	417 Feet	(127.1m)
50	(10)	333 Feet	(101.5m)	208 Feet	(63.4m)
75	(24)	222 Feet	(67.6m)	139 Feet	(42.3m)
100	(38)	167 Feet	(50.9m)	104 Feet	(31.7m)
125	(51)	133 Feet	(40.5m)	83 Feet	(25.3m)
150	(65)	111 Feet	(33.8m)	69 Feet	(21.0m)
175	(79)	95 Feet	(28.9m)	59 Feet	(18.0m)

Note for gap set and hold down/guide location, see installation instruction above.
*1" (25.4mm) slotted holes in each expansion connector allow 5/8" (15.9mm) total expansion or contraction.
Authorized Engineering Information 8-20-1986

Fiberglass

Cable Tray Installation Guide

Installation of B-Line fiberglass cable tray should be made in accordance with the standards set by NEMA Publication VE-2, Cable Tray Installation Guide, and National Electrical Code, Article 318.

- Always observe common safety practices when assembling tray and fittings. Installations generally require some field cutting. Dust created during fabrication presents no serious health hazard, but skin irritation may be experienced by some workers.
- Operators of saws and drills should wear masks, long sleeve shirts or coveralls.
- Fabrication with fiberglass is relatively easy and comparable to working with wood. Ordinary hand tools may be used in most cases.
- Avoid excessive pressure when sawing or drilling. Too much force can rapidly dull tools and also produce excessive heat which softens the bonding resin in the fiberglass resulting in a ragged edge rather than a clean-cut edge.
- Field cutting is simple and can be accomplished with a circular power saw with an abrasive cut-off wheel (masonry type) or hack saw (24 to 32 teeth per inch).
- Drill fiberglass as you would drill hard wood. Standard twist drills are more than adequate.
- Any surface that has been drilled, cut, sanded or otherwise broken, **must be sealed** with a compatible resin. (see page FT-64)
- Carbide tipped saw blades and drill bits are recommended when cutting large quantities.
- Support the fiberglass material firmly during cutting operations to keep material from shifting which may cause chipping at the cut edge.
- Each tray section length should be equal to or greater than the support span.
- When possible, the splice should be located at quarter span.
- Fittings should be supported as per NEMA FG-1.

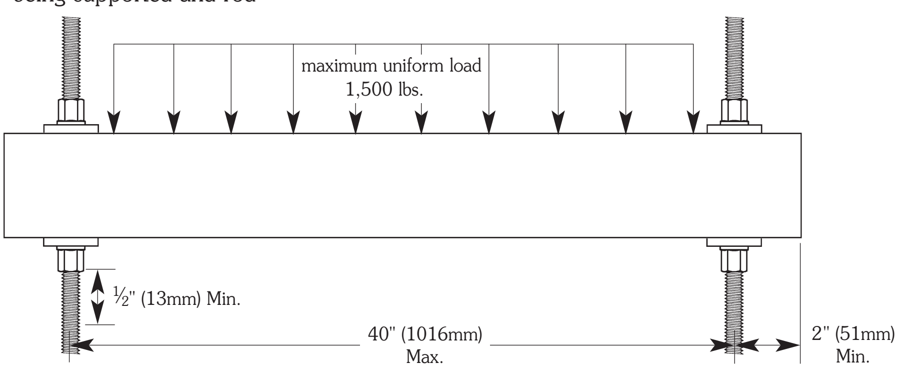
Recommended Fiberglass Trapeze Hanging Systems

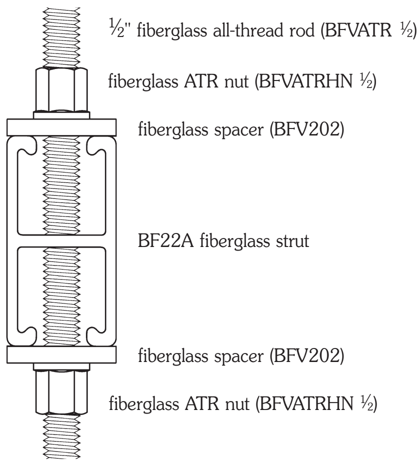
Notes:

1) A snug three to four ft.-lbs. torque is sufficient for all thread rod nuts.
2) When supporting cable tray, the spacing between each trapeze should not exceed the distance between splice plates.
3) When hanging from beam, B-Line BFPU751 series clamps provide extra thread engagement necessary for load ratings. All thread rod must be fully engaged in the clamp.
4) Design load safety factor is 3:1

BF22A Strut:

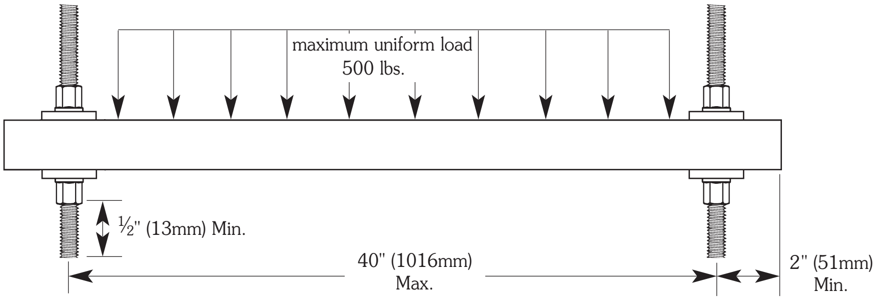
2" max between material being supported and rod

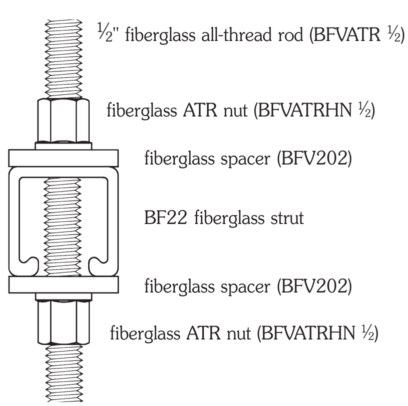




BF22 Strut:

2" max between material being supported and rod

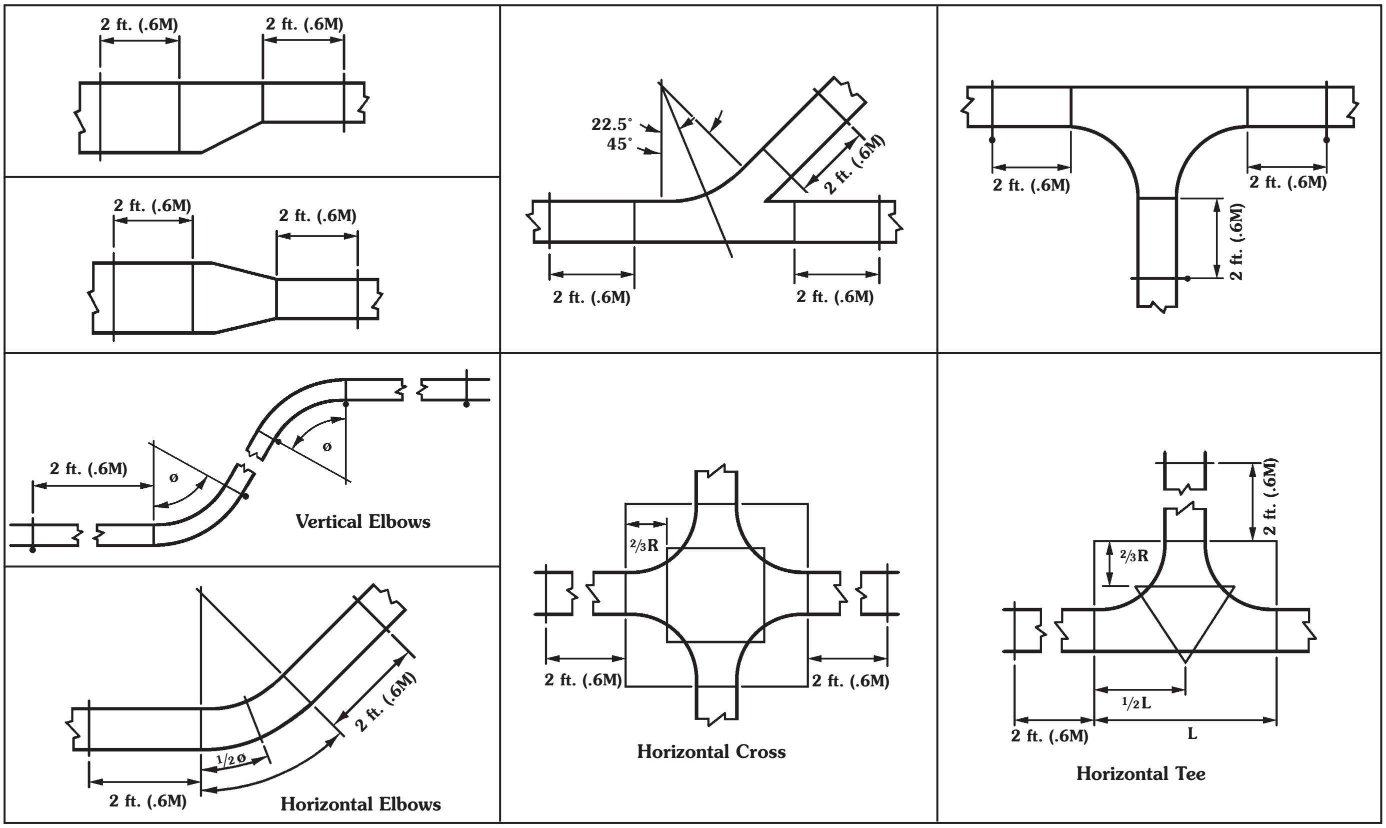




For vinyl ester resin, 'V' must be added appropriately to part number. Example: BFV22A.

Cable Tray Support Locations For Fittings

per NEMA VE-2 Installation Guide



Ø = 30°, 45°, 60°, 90°

How To Size Cable Tray

Based on the National Electrical Code - 1993, Section 318

The National Electrical Code Article 318 was written primarily for verifying the cable fill in cable trays but little has been done to convert this information into a design procedure.

In the development of a complete cable tray support system, B-Line established a simple method of determining the right size tray to support any given amount of cables. The following tables cover our method for determining cable tray widths based on tray design and system voltage.

Table I

Table I is subdivided into two categories covering electrical service of 2000 volts or less. The first, Category A, is for any mixture of power or lighting cables with any mixture of control or signal cables. Category B is used when control and/or signal cables only are being used.

Control Circuit - the circuit of a control apparatus or system that carries the electric signals directing the performance of the controller, but does not carry the main power (NEC Article 100).

Signaling Circuit - any electric circuit that energizes signaling equipment (NEC Article 100).

Table II

Table II has only one category of electrical service and that is 2001 volts and over for types MV and MC cables both single and multiconductor.

Type MV is a single or multiconductor solid dielectric insulated cable rated 2001 volts or higher (NEC Article 326).

Type MC cable is a factory assembly of one or more conductors, each individually insulated and enclosed in a metallic sheath or interlocking tape, or a smooth or corrugated tube (NEC Article 334).

Cables other than Types MV and MC can be installed provided they are "specifically approved for installation in cable trays."

Table III

Table III covers 3, 4 and 6 inch ventilated cable channels.

Tray Sizing Procedure

Step 1. Select proper cable tray table below based on cable voltage and tray type.

Cable Voltage	Cable Tray Type	Use:
2000 Volts or less	Ladder, Cable Tray	Table I
2001 Volts or more	Ladder, Cable Tray	Table II
2001 Volts or less	Cable Channel, ventilated	Table III

How To Size Cable Tray

Tables I - Ladder Cable Tray - for cables rated 2000 volts or less

For power or lighting or any mixture of power, lighting, control or signal cables:

1. Multiconductor Cable

Conductor sizes 4/0 and larger*	tray width ≥ Sd	NEC 318-9(a) (1)
Conductor sizes 3/0 and smaller	tray width ≥ 0.857 Sa	NEC 318-9(a) (2)

Example: Calculate width of cable tray required for the following Type TC Cables.

6	4/c	500 kcmil	Power:	Diameter = 3.14	6 x 3.14 = 18.84
21	4/c	#8 AWG	Lighting:	Area = 0.407	.857 (21 x 0.407) = 7.32
20	5/c	#12 AWG	Control:	Area = 0.170	.857 (20 x 0.170) = 2.91
					29.07

Solution: Use 30 inch wide tray

2. Single Conductor Cable

Conductor sizes 250 MCM thru 900 MCM† only	tray width ≥ 0.023 Sa*	NEC 318-10(a) (2)
Conductor sizes 3/0 and smaller	tray width ≥ 0.857 Sa	NEC 318-10(a) (4)

Example: Calculate width of cable tray required for the following Type THW Wires.

6	1/c	4/0 AWG	Power:	Diameter = 0.710	(6 x 0.71) = 4.26
9	1/c	500 kcmil	Power:	Area = 0.83	.923 (9 x 0.83) = 6.89
6	1/c	250 kcmil	Power:	Area = 0.49	.923 (6 x 0.49) = 2.71
					13.86

Solution: Use 18 inch wide tray

3. Mixture of Single and Multiconductor Cable

Example: Calculate width of cable tray required for the following mix of cables. Use guidelines from (1) & (2) above.

2	3/c	250 kcmil	Type MC	Power:	Diameter = 1.84	2 x 1.84 = 3.68
12	4/c	#8 AWG	Type TC	Lighting:	Area = 0.41	.857 (12 x 0.41) = 4.22
60	4/c	#12 AWG	Type TC	Control:	Area = 0.12	.857 (60 x 0.12) = 6.17
4	1/c	1/0AWG	Type THW	Power:	Diameter = 0.55	(4 x 0.55) = 2.20
6	1/c	500kc mil	Type THW	Power:	Area = 0.83	.923 (6 x 0.83) = 4.60
						20.87

Solution: Use 24 inch wide tray

For control and/or signal duty cable only:

1. Multiconductor Cable

All conductor sizes**

$$\text{tray width} \geq \frac{2Sa}{D} \qquad \text{NEC 318-9(b)}$$

Example: Calculate width of cable tray required for the following Type TC Cables in 4 inch deep tray.

24	16/c	16 AWG	Control:	Area = 0.29	2(24 x 0.29) ÷ 4 = 3.48
42	4/c	12 AWG	Control:	Area = 0.13	2(42 x 0.13) ÷ 4 = 2.73
18	4/c	10 AWG	Control:	Area = 0.20	2(18 x 0.20) ÷ 4 = 1.80
					8.01

Solution: Use 24 inch wide tray

* The 4/0 and larger cable shall be installed in a single layer and no other cables shall be placed on them.
** For computation only depth D can not exceed 6 inches.
† For 1000 MCM and larger single conductor cable, refer to NEC 318-10(a)1 for sizing information.
Sd = the sum of the diameters, in inches, of all cables in the same ladder cable tray.
Sa = the sum of the cross-sectional areas, in square inches, of all cables in the same ladder cable tray.

Fiberglass

How To Size Cable Tray

Table II - Ladder - for cables rated 2000 volts or less

For MV or MC cables:

1. Mixture of Single and Multiconductor Cable NEC 318-12

All conductor sizes† tray width ≥ Sd

Example: Calculate width of cable tray required for the following cables.

4	1/c	500 kcmil	Type MV	Diameter =	1.05	4 x 1.05 = 4.20
10	3/c	2/0 AWG	Type MC	Diameter =	1.55	10 x 1.55 = 15.50
4	3/c	4/0 AWG	Type MV	Diameter =	1.78	4 x 1.78 = 7.12
						26.82

Solution: Use 30 inch wide tray

Table III - Cable Channel, Ventilated - for cables rated 2000 volts or less

For power, lighting, control and/or signal duty cables:

1. Multiconductor Cable (all size cables) NEC 318-9(E)

	3 inch wide	4 inch wide	6 inch wide
One cable only	Sa ≤ 2.3 in^2	Sa ≤ 4.5 in^2	Sa ≤ 7.0 in^2
Two or more cables	Sa ≤ 1.3 in^2	Sa ≤ 2.5 in^2	Sa ≤ 3.8 in^2

Example: Calculate width of cable channel required for the following Type TC Cables.

1	3/c	1/0 AWG	Area =	1.17 which is less than 1.3. **Use 3 inch wide.**
1	4/c	300 kcmil	Area =	3.77 which is less than 4.5. **Use 3 inch wide.**
6	4/c	#10 AWG	Area =	6 x 0.20 = 1.20 which is less than 1.3. **Use 3 inch wide.**
2	3/c	1/0 AWG	Area =	2 x 1.17 = 2.34 which is less than 2.5. **Use 4 inch wide.**

2. Single Conductor (1/0 AWG or larger) NEC 318-10(b)

	3 inch wide	4 inch wide	6 inch wide
Any number of cables	Sd ≤ 3.0	Sd ≤ 4.0	Sd ≤ 6.0

Example: Type THW Cables.

3	1/c	500 kcmil	Type THW	Diameter =	3 x 1.029 = 3.09 which is less than 4.0. **Use 4 inch wide.**
8	1/c	4/0 kcmil	Type THW	Diameter =	8 x 0.71 = 5.68 which is less than 6.0. **Use 6 inch wide.**

† Cables shall be installed in a single layer. Where single conductor cables are triplexed, quadruplexed or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width and these groups shall be installed in single layer arrangement.
Sd = the sum of the diameters, in inches, of all cables in the same ladder cable tray.
Sa = the sum of the cross-sectional areas, in square inches, of all cables in the same ladder cable tray.

Covers (Derating)

When cable trays are continuously covered for more than six feet with solid unventilated covers, the ampacity of the installed cables must be reduced per NEC-1993.

2000 volts or less

- MULTICONDUCTOR CABLES
  - use 95% of tables 310-16 and 310-18
- SINGLE CONDUCTOR CABLES
  - 600 MCM and larger use 70% of tables 310-17 and 310-19 1/0 AWG thru 500 kc mil use 60% of tables 310-17 and 310-19

2001 volts and over

- MULTICONDUCTOR CABLES
  - use 95% of tables 310-75 and 310-76
- SINGLE CONDUCTOR CABLES
  - use 70% of tables 310-69 and 310-70

Cross-Sectional Area

Rarely is the cross-sectional area of a multiconductor cable given in manufacturers literature or the National Electrical Code. To calculate the cross-sectional area simply square the diameter and multiply by 0.7854. The diameter used in the calculations is the overall outside diameter (O.D.) of the cable including insulation and/or armor.

Cross Sectional Area (Square Inches) = 0.7854 $(O.D.)^2$

Multipliers Used in Tables

The multipliers used in all tables are mathematical equivalents of Tables 318-9 and 318-10 of the National Electrical Code-1993.

An example can be found in column 1 of Table 318-9. The proportion of cable tray width (size inches) to allowable fill (seven square inches) is 0.857 for 3/0 and smaller multiconductor cables in ladder type trays. Therefore the product of 0.857 and the cross-sectional area of cables is the tray width.

SECTION 161xx
NON-METALLIC CABLE TRAY
POLYESTER, VINYL ESTER & DIS-STAT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, tests and services to install complete cable tray systems as shown on the drawings.

B. Cable tray systems are defined to include, but are not limited to straight sections of [ladder type] [vented bottom type] [solid bottom type] cable trays, bends, tees, elbows, drop-outs, supports and accessories.

1.02 REFERENCES

A. ANSI/NFPA 70 – National Electrical Code

B. NEMA FG 1-2002 – Non-Metallic Cable Tray Systems

C. NEMA VE 2-2002 – Cable Tray Installation Guidelines

1.03 DRAWINGS

A. The drawings, which constitute a part of these specifications, indicate the general route of the cable tray systems. Data presented on these drawings are as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification, of all dimensions, routing, etc., is directed.

B. Specifications and drawings are for assistance and guidance, but exact routing, locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings.

1.04 SUBMITTALS

A. Submittal Drawings: Submit drawings of cable tray and accessories including clamps, brackets, hanger rods, splice plate connectors, expansion joint assemblies, and fittings, showing accurately scaled components.

B. Product Data: Submit manufacturer's data on cable tray including, but not limited to, types, materials, finishes, rung spacings, inside depths and fitting radii. For side rails and rungs, submit cross sectional properties including Section Modulus (Sx) and Moment of Inertia (Ix).

1.05 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of cable trays and fittings of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. NEMA Compliance: Comply with NEMA Standards Publication Number FG-1, "Non-Metallic Cable Tray Systems".

C. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable tray and cable channel systems (Article 318, NEC).

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver cable tray systems and components carefully to avoid breakage, denting and scoring finishes. Do not install damaged equipment.

B. Store cable trays and accessories in original cartons and in clean dry space; protect from weather and construction traffic. Wet materials should be unpacked and dried before storage.

continued on page PT-14

Fiberglass

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with these specifications, cable tray systems shall be as manufactured by Cooper B-Line, Inc. [or engineer approved equal].

2.02 CABLE TRAY SECTIONS AND COMPONENTS

A. General: Except as otherwise indicated, provide non-metallic cable trays, of types, classes, and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features. Cable tray shall be installed according to the latest revision of NEMA VE 2.

B. Material and Finish: Straight section structural elements; side rails, rungs and splice plates shall be pultruded from glass fiber reinforced polyester resin, vinyl ester resin or dis-stat.

C. Pultruded shapes shall be constructed with a surface veil to insure a resin-rich surface and ultraviolet resistance.

D. Pultruded shapes shall meet ASTM E-84, Class 1 flame rating and self-extinguishing requirements of ASTM D-635.

2.03 TYPE OF TRAY SYSTEM

A. Ladder Cable Trays shall consist of two longitudinal members (side rails) with transverse members (rungs) mechanically fastened and adhesively bonded to the side rails. Rungs shall be spaced [6] [9] [12] inches on center. Rung spacing in radiused fittings shall be industry standard 9" and measured at the center of the tray's width. Each rung must be capable of supporting a 200 lb. concentrated load at the center of the cable tray with a safety factor of 1.5 (See following rung loading table).

B. Ventilated Bottom Cable Trays shall consist of two longitudinal members (side rails) with rungs spaced 4" on center.

C. Solid Bottom Cable Trays shall consist of two longitudinal members (side rails) with a solid sheet over rungs spaced on 12" centers.

D. Cable tray loading depth shall be [2] [3] [5] inches per NEMA FG 1.

E. Straight sections shall be supplied in standard [10 foot (3m)] [20 foot (6m)] lengths.

F. Cable tray inside widths shall be [6] [9] [12] [18] [24] [30] [36] inches or as shown on drawings. Outside width shall not exceed inside by more than a total of 2".

G. Straight and expansion splice plates will be of "L" shaped lay-in design with an eight-bolt pattern in 5" fill systems and four-bolt pattern in 3" and 2" fill systems. Splice plates shall be furnished with straight sections and fittings.

H. All fittings must have a minimum radius of [12] [24] [36].

I. Molded fittings shall be formed with a minimum 3" tangent following the radius.

J. Systems with 3 inch loading depth shall have 90-degree and 45-degree molded fittings in 12 inch or 24 inch radius. (Polyester and vinylester only.)

K. Systems with 5 inch loading depth shall have 90-degree and 45-degree molded fittings in 24 inch or 36 inch radius. (Polyester and vinylester only.)

L. All other fittings shall be of mitered construction.

M. Dimension tolerances will be per NEMA FG 1.

continued on page PT-15

2.04 LOADING CAPACITIES

A. Cable trays shall meet NEMA class designation: [8C] [12C] [20B] [20C].

Or

A. Cable tray shall be capable of carrying a uniformly distributed load of _______ lbs./ft on a _______ foot support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1 Section 5.2.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install cable trays as indicated: Installation shall be in accordance with equipment manufacturer's instructions, and with recognized industry practices to ensure that cable tray equipment comply with requirements of NEC and applicable portions of NFPA 70B. Reference NEMA VE 2 for general cable tray installation guidelines.

B. Coordinate cable tray with other electrical work as necessary to properly integrate installation of cable tray work with other work.

C. Provide sufficient space encompassing cable trays to permit access for installing and maintaining cables.

D. Cable tray fitting supports shall be located such that they meet the strength requirements of straight sections. Install fitting supports per NEMA VE 2 guidelines, or in accordance with manufacturer's instructions.

3.02 TESTING

A. Upon request manufacturer shall provide test reports witnessed by an independent testing laboratory of the "worst case" loading conditions outlined in this specification and performed in accordance with the latest revision of NEMA FG 1.

SECTION 161xx

LOW SMOKE, ZERO HALOGEN, NON-METALLIC CABLE TRAY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, tests and services to install complete cable tray systems as shown on the drawings.

B. Cable tray systems are defined to include, but are not limited to straight sections of ladder type cable trays, bends, tees, elbows, drop-outs, supports and accessories.

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B. NEMA FG 1-2002 – Non-Metallic Cable Tray Systems

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B. Specifications and drawings are for assistance and guidance, but exact routing, locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings.

1.04 SUBMITTALS

A. Submittal Drawings: Submit drawings of cable tray and accessories including clamps, brackets, hanger rods, splice plate connectors, expansion joint assemblies, and fittings, showing accurately scaled components.

B. Product Data: Submit manufacturer's data on cable tray including, but not limited to, types, materials, finishes, rung spacings, inside depths and fitting radii. For side rails and rungs, submit cross sectional properties including Section Modulus (Sx) and Moment of Inertia (Ix).

1.05 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of cable trays and fittings of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. NEMA Compliance: Comply with NEMA Standards Publication Number FG-1, "Non-Metallic Cable Tray Systems".

C. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable tray and cable channel systems (Article 392, NEC).

continued on page PT-17

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver cable tray systems and components carefully to avoid breakage, denting and scoring finishes. Do not install damaged equipment.

B. Store cable trays and accessories in original cartons and in clean dry space; protect from weather and construction traffic. Wet materials should be unpacked and dried before storage.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with these specifications, cable tray systems shall be part number **24FT09-12-240** as manufactured by Cooper B-Line, Inc. [or engineer approved equal].

2.02 CABLE TRAY SECTIONS AND COMPONENTS

A. General: Except as otherwise indicated, provide non-metallic cable trays, of types, classes, and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features. Cable tray shall be installed according to the latest revision of NEMA VE 2.

B. Material and Finish: Straight section structural elements; side rails, rungs and splice plates shall be pultruded from glass fiber reinforced zero halogen resin.

C. Pultruded shapes shall be constructed with a surface veil to insure a resin-rich surface and ultraviolet resistance.

D. Pultruded shapes shall meet the following criteria shown in Table 1:

Table 1

Test Performed	Specified Requirement
Flexural Strength	25,000 psi, Min.
Flexural Modulus	1,000,000 psi, Min.
Tensile Strength	17,000 psi, Min.
Tensile Modulus	900,000 psi, Min.
Impact Strength	25 ft-lb./in., Min.
Dielectric Strength	170 volts/mil, Min.
Arc Resistance	180 seconds, Min.
Water Absorption	0.2%, Max.
Thermal Expansion	0.000007 in./in./°F., Max.
Flame Spread Index	60, Max.
Flame Resistance	UL 94 V-0, Min.
Tracking Resistance	600 minutes, Min. at 2500V
Specific Optical	200 Max. within 4 minutes
Smoke Density	after start of test.

continued on page PT-18

SMOKE TOXICITY

Gases	Maximum Quantities
Hydrogen Chloride	10 ppm
Hydrogen Bromide	10 ppm
Hydrogen Cyanide	10 ppm
Hydrogen Sulfide	10 ppm
Vinyl Chloride	10 ppm
Ammonia	500 ppm
Aldehydes	30 ppm
Oxides of Nitrogen	100 ppm
Carbon Dioxide	15,000 ppm
Carbon Monoxide	1,000 ppm

Fiberglass pultruded shapes are manufactured per Creative Pultrusions Inc. Fiberglass Transportation Products-130 specifications.

2.03 TYPE OF TRAY SYSTEM

A. Ladder Cable Trays shall consist of two longitudinal members (side rails) with transverse members (rungs) mechanically fastened and adhesively bonded to the side rails. Ladder Cable Tray shall be Cooper B-Line part number 24FT09-12-240 [or engineered approved equal]. Rung spacing in radiused fittings shall be industry standard 9" and measured at the center of the tray's width.

B. Straight and expansion splice plates will be of "L" shaped lay-in design with a four-bolt pattern. Splice plates shall be furnished with straight sections and fittings.

C. All fittings must have a minimum radius of [12] [24] [36].

D. All fittings shall be of mitered construction.

E. Dimension tolerances will be per NEMA FG 1.

2.04 LOADING CAPACITIES

A. Cable tray shall be capable of carrying a uniformly distributed load of ______ lbs./ft on a ______-foot support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1 Section 5.2.

continued on page PT-19

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install cable trays as indicated: Installation shall be in accordance with equipment manufacturer's instructions, and with recognized industry practices to ensure that cable tray equipment comply with requirements of NEC and applicable portions of NFPA 70B. Reference NEMA VE 2 for general cable tray installation guidelines.

B. Coordinate cable tray with other electrical work as necessary to properly integrate installation of cable tray work with other work.

C. Provide sufficient space encompassing cable trays to permit access for installing and maintaining cables.

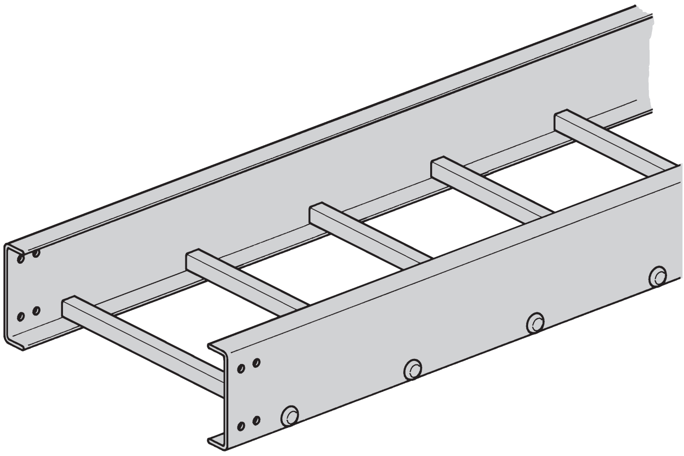
D. Cable tray fitting supports shall be located such that they meet the strength requirements of straight sections. Install fitting supports per NEMA VE 2 guidelines, or in accordance with manufacturer's instructions.

3.02 TESTING

A. Upon request manufacturer shall provide test reports witnessed by an independent testing laboratory of the "worst case" loading conditions outlined in this specification and performed in accordance with the latest revision of NEMA FG 1.

Fiberglass - Cable Tray Numbering System

To order a Fiberglass straight section of cable tray, select the appropriate size and material from the charts below and place those symbols in the sequence shown to form the complete catalog number.



Procedure:

1. Select the correct Cooper B-Line **series** Fiberglass tray using the Load Data for straight sections shown on page FT-21 for 3", page FT-22 for 4", page 23 for 6" and page 24 for 8" fittings.
2. Select the resin required. Polyester, Vinyl Ester, or Zero Halogen. Refer to Corrosion Guide on pages FT-3 and FT-4, for the effect of environmental conditions on the desired material and the effective temperature range on page FT-5.
3. The tray prefix is completed by inserting the **rung spacing.**
4. Select the desired **width** in inches. Refer to How To Size Cable Tray Section if width has to be computed based on number and size of cables. See pages FT-10 thru FT-12.
5. Finally select the straight section **length** in inches. Fiberglass 120 [10'] (3m) or 240 [20'] (6m)

Straight Section Part Numbering

Prefix

Example: **24 F 09 - 24 - 120**

Series	Material	Rung Spacing	Width	Length
13	F - Fiberglass Polyester Resin	6" (152)	6" (152)	120 [10 ft] (3m)
24	FV - Fiberglass Vinyl Ester Resin	9" (228)	9" (228)	240 [20 ft] (6m)
36	FT - Zero Halogen	12" (305)	12" (305)	
46	FD - Dis-Stat	18" (457)	18" (457)	
H46		*See page FT-50 for Marine Rung option.	24" (609)	
48			30" (762)	
			36" (914)	

Note: One pair of splice plates with SS6 hardware included.

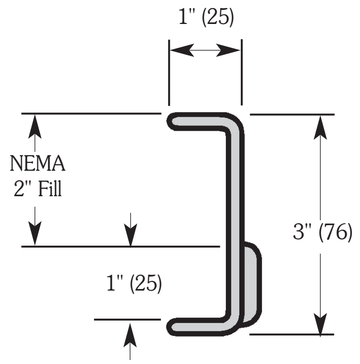
Fitting Section Part Selector

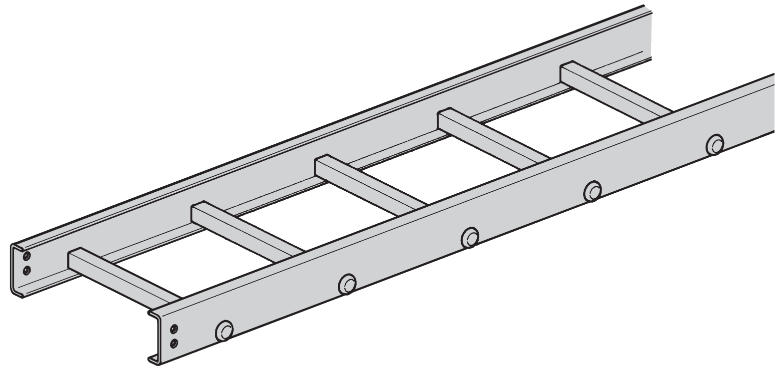
Prefix

Example: **4 F - 24 - 90 HB 24**

Height	Material	Width	Angle	Type	Radius
3" (76)	F - Fiberglass Polyester Resin	6" (152)	30°	HB - Horizontal Bend	12" (305)
4" (101)	FV - Fiberglass Vinyl Ester Resin	9" (228)	45°	HT - Horizontal Tee	24" (609)
6" (152)	FT - Zero Halogen	12" (305)	60°	HX - Horizontal Cross	36" (914)
8" (203)	FD - Dis-Stat	18" (457)	90°	VI - Vertical Inside Bend	
		24" (609)		VO - Vertical Outside Bend	
		30" (762)		VT - Vertical Tee	
		36" (914)		VTU- Vertical Tee, Up	
				RR - Right Reducer	
				LR - Left Reducer	
				SR - Straight Reducer	

Notes: Standard rung spacing on fittings is 9" (225).
Splice plates with SS6 hardware included.





One pair of splice plates with SS6 (316 Stainless Steel) hardware included

Series 13 Fiberglass Straight Section Part Numbering

Prefix

Example: **13 F 09 - 24 - 120**

Series

- **13**

Material

- ● **F** = Polyester
- ● **FV** = Vinyl Ester
- ● **FT** = Zero Halogen
- ● **FD** = Dis-Stat

Type

Ladder -

- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Width

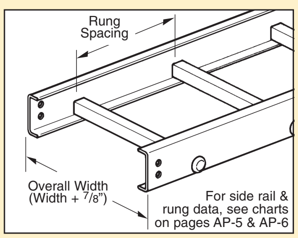
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"

Length

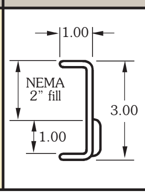
- ● ① **120** = 10 ft. 13F
- ● ② 240 = 20 ft.

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.



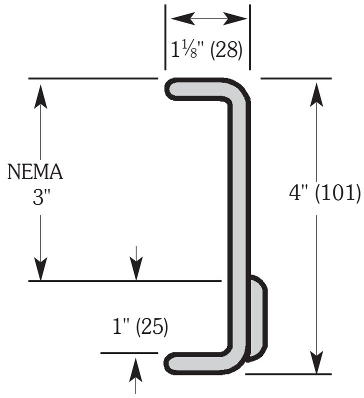
See page FT-50 for additional rung options.

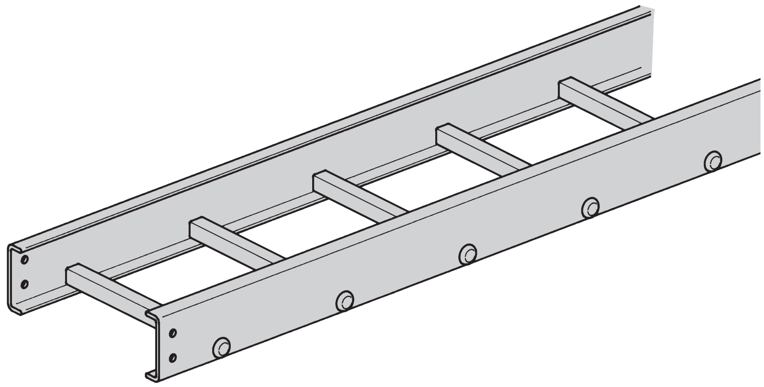
B-Line Series	Side Rail Dimensions	NEMA & CSA Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Span meters	Load kg/m	Deflection Multiplier
13F		NEMA: 8C	6	257	0.005	1.8	382	0.086
			8	145	0.016	2.4	216	0.267
			10	93	0.040	3.0	138	0.681
			12	64	0.083	3.7	95	1.411
			14	47	0.153	4.3	70	2.614

Values are based on simple beam tests per NEMA VFG-1 on 24" wide cable tray rungs spaced on 12" centers. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable being installed.

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)





One pair of splice plates with SS6 (316 Stainless Steel) hardware included

Series 24 Fiberglass Straight Section Part Numbering

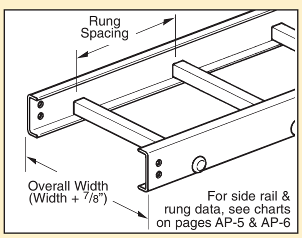
Prefix

Example: **24 F 09 - 24 - 120**

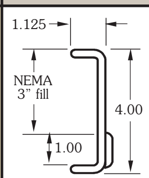
Series	Material	Type	Width	Length
24	● **F** = Polyester ● **FV** = Vinyl Ester ● **FT** = Zero Halogen ● **FD** = Dis-Stat	**Ladder -** ● **06** = 6" rung spacing ● **09** = 9" rung spacing ● **12** = 12" rung spacing	● **06** = 6" ● **09** = 9" ● **12** = 12" ● **18** = 18" ● **24** = 24" ● **30** = 30" ● **36** = 36"	● ① **120** = 10 ft. ● ② 240 = 20 ft. 24F

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.



See page FT-50 for additional rung options.

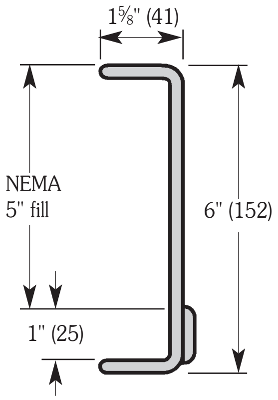
B-Line Series	Side Rail Dimensions	NEMA & CSA Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Span meters	Load kg/m	Deflection Multiplier
24F		NEMA: 12C CSA: E-3m	6 8 10 12	627 353 226 157	0.001 0.004 0.011 0.022	1.8 2.4 3.0 3.7	933 525 336 233	0.023 0.074 0.182 0.378

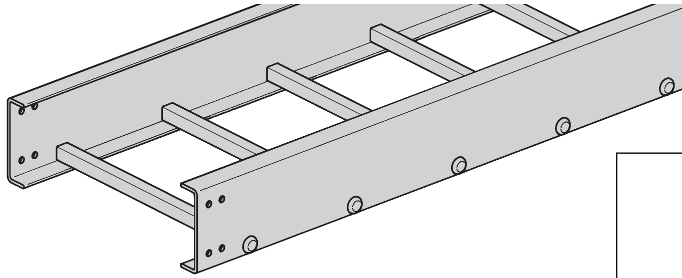
Values are based on simple beam tests per NEMA VFG-1 on 36" wide cable tray rungs spaced on 12" centers. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable being installed.

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%.

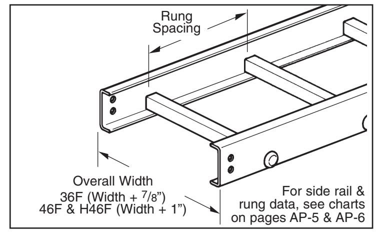
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Fiberglass - 6" Straight Sections





One pair of splice plates with SS6
(316 Stainless Steel) hardware included



Series 36,46, H46 Fiberglass Straight Section Part Numbering

Prefix

Example: **36 F 09 - 24 - 120**

Series
- 36
- 46
- H46

Material
- ● **F** = Polyester
- ● **FV** = Vinyl Ester
- ● **FT** = Zero Halogen
- ● **FD** = Dis-Stat

Type

Ladder -
- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

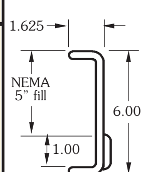
Width
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length
- 36F: ● ① **120** = 10 ft.; ● ② 240 = 20 ft.
- 46F: ● ① **120** = 10 ft.; ● ② 240 = 20 ft.
- H46F: ● ① **120** = 10 ft.; ● ② 240 = 20 ft.

①Primary Length.
②Secondary Length.

See page FT-50 for additional rung options.

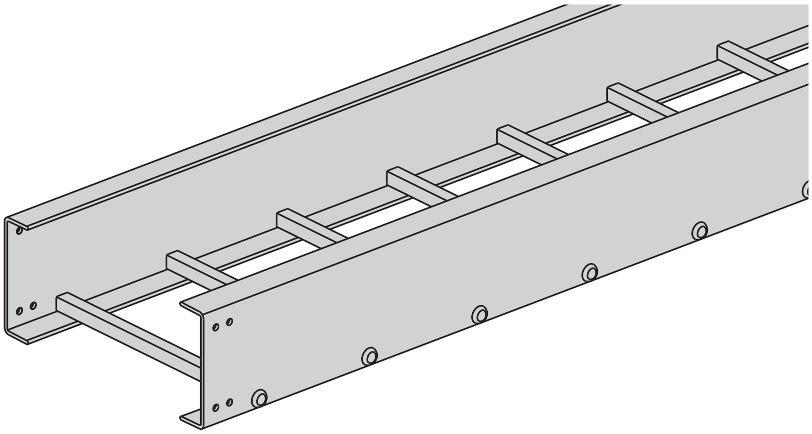
See page CTS-23 for explanation of lengths.

B-Line Series	Side Rail Dimensions	NEMA & CSA Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Span meters	Load kg/m	Deflection Multiplier
36F		NEMA: 20B CSA: E-6m	12	246	0.006	3.7	367	0.104
			14	181	0.011	4.3	269	0.193
			16	139	0.019	4.9	206	0.330
			18	109	0.031	5.5	163	0.528
			20	89	0.047	6.1	132	0.811
46F		NEMA: 20C+ CSA: E-6m	12	393	0.005	3.7	584	0.079
			14	288	0.009	4.3	429	0.145
			16	221	0.015	4.9	329	0.246
			18	174	0.023	5.5	260	0.396
			20	141	0.035	6.1	210	0.605
H46F		NEMA: 20C+ CSA: E-6m	12	424	0.005	3.7	631	0.079
			14	312	0.009	4.3	464	0.144
			16	239	0.015	4.9	355	0.248
			18	188	0.023	5.5	280	0.396
			20	153	0.035	6.1	227	0.608

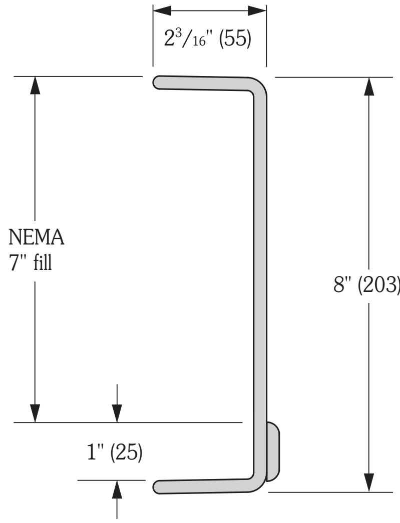
Values are based on simple beam tests per NEMA VFG-1 on 36" wide cable tray rungs spaced on 12" centers. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable being installed.

When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)



One pair of splice plates with SS6 (316 Stainless Steel) hardware included



Series 48 Fiberglass Straight Section Part Numbering

Prefix

Example: **48 F 09 - 24 - 120**

Series

48

Material

- ● **F** = Polyester
- ● **FV** = Vinyl Ester
- ● **FT** = Zero Halogen
- ● **FD** = Dis-Stat

Type

Ladder -

- ● **06** = 6" rung spacing
- ● **09** = 9" rung spacing
- ● **12** = 12" rung spacing

Width

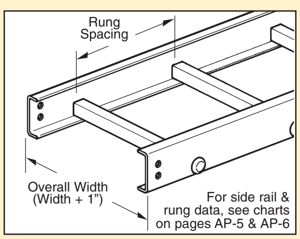
- ● **06** = 6"
- ● **09** = 9"
- ● **12** = 12"
- ● **18** = 18"
- ● **24** = 24"
- ● **30** = 30"
- ● **36** = 36"

Length 48F

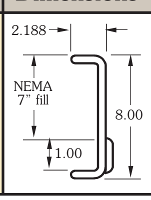
- ● ① **120** = 10 ft.
- ● ② 240 = 20 ft.

①Primary Length.
②Secondary Length.

See page CTS-23 for explanation of lengths.



See page FT-50 for additional rung options.

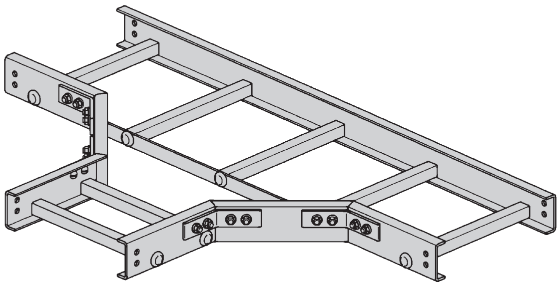
B-Line Series	Side Rail Dimensions	NEMA & CSA Classifications	Span ft	Load lbs/ft	Deflection Multiplier	Span meters	Load kg/m	Deflection Multiplier
48F		NEMA: 20C+	12	348	0.003	3.7	518	0.052
			14	256	0.006	4.3	381	0.097
			16	196	0.010	4.9	291	0.165
			18	155	0.015	5.5	231	0.210
			20	125	0.024	6.1	187	0.401

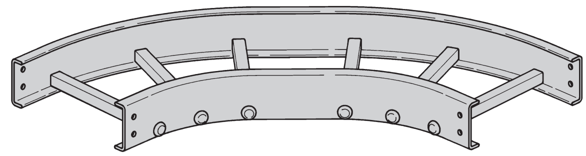
Values are based on simple beam tests per NEMA VFG-1 on 36" wide cable tray rungs spaced on 12" centers. Published load safety factor is 1.5. To convert 1.5 safety factor to 2.0, multiply published load by 0.75. To obtain mid-span deflection, multiply a load by the deflection multiplier. Cable tray must be supported on spans shorter than or equal to the length of the cable being installed.

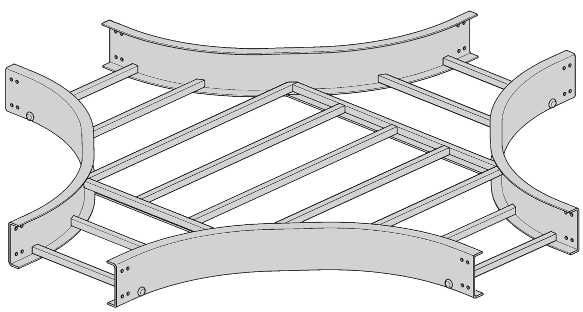
When trays are used in continuous spans, the deflection of the tray is reduced by as much as 50%.

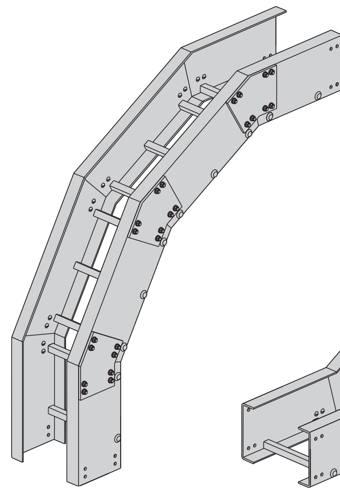
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

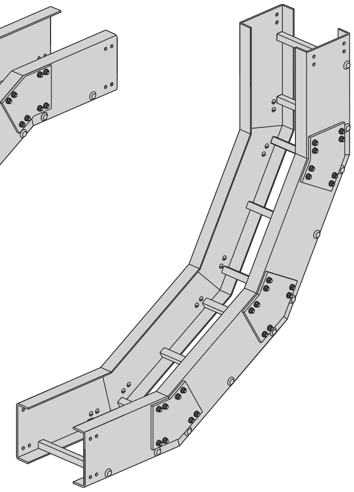
Fiberglass - Fitting Numbering System











Series 24 Fiberglass Fittings Part Numbering

Prefix

Example: **4 F - 12 - 90 HB 12** (9" rung spacing is standard)

Height
- ● **3** = 3" **
- ● **4** = 4"
- ● **6** = 6"
- ● **8** = 8"

Material
- ● **F** = Polyester
- ● **FV** = Vinyl Ester
- ● **FT** = Zero Halogen
- ● **FD** = Dis-Stat

Width
- ● **06** = 6" (152)
- ● **09** = 9" (228)
- ● **12** = 12" (305)
- ● **18** = 18" (457)
- ● **24** = 24" (609)
- ● **30** = 30" (762)
- ● **36** = 36" (914)

Angle
- ● **45** = 45°
- ● **90** = 90°

Type
- ● **HB** = Horizontal Bend
- ● **HT** = Horizontal Tee
- ● **HX** = Horizontal Cross
- ● **VI** = Vertical Inside Bend
- ● **VO** = Vertical Outside Bend
- ● **LR** = Left Reducer
- ● **RR** = Right Reducer
- ● **SR** = Straight Reducer
- ● **VT** = Vertical Tee Down
- ● **VTU** = Vertical Tee Up

Radius
- ● **12** = 12" (305)
- ● **24** = 24" (609)
- ● **36** = 36" (914)

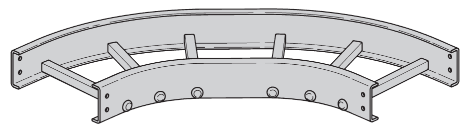
** 3" deep fittings are only available in 6" thru 24" widths and 12" radius only.

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

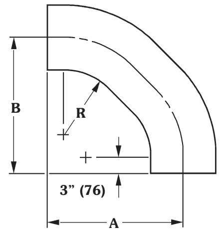
- R - Bend Radius		Tray Width		90˚ Horizontal Bend - Molded				
				Catalog No.	Dimensions A		Dimensions B	
in.	mm	in.	mm		in.	mm	in.	mm
12	305	6	152	**(Prefix)-06-90HB12**	22¼	565	22¼	565
		9	228	**(Prefix)-09-90HB12**	23¾	603	23¾	603
		12	305	**(Prefix)-12-90HB12**	25¼	641	25¼	641
		18	457	**(Prefix)-18-90HB12**	28¼	717	28¼	717
		24	609	**(Prefix)-24-90HB12**	31¼	794	31¼	794
		30	762	**(Prefix)-30-90HB12**	34¼	870	34¼	870
		36	914	**(Prefix)-36-90HB12**	37¼	946	37¼	946
24	609	6	152	**(Prefix)-06-90HB24**	34¼	870	34¼	870
		9	228	**(Prefix)-09-90HB24**	35¾	908	35¾	908
		12	305	**(Prefix)-12-90HB24**	37¼	946	37¼	946
		18	457	**(Prefix)-18-90HB24**	40¼	1022	40¼	1022
		24	609	**(Prefix)-24-90HB24**	43¼	1098	43¼	1098
		30	762	**(Prefix)-30-90HB24**	46¼	1175	46¼	1175
		36	914	**(Prefix)-36-90HB24**	49¼	1251	49¼	1251
36	914	6	152	**(Prefix)-06-90HB36**	46¼	1174	46¼	1174
		9	228	**(Prefix)-09-90HB36**	47¾	1213	47¾	1213
		12	305	**(Prefix)-12-90HB36**	49¼	1251	49¼	1251
		18	457	**(Prefix)-18-90HB36**	52¼	1327	52¼	1327
		24	609	**(Prefix)-24-90HB36**	55¼	1403	55¼	1403
		30	762	**(Prefix)-30-90HB36**	58¼	1479	58¼	1479
		36	914	**(Prefix)-36-90HB36**	61¼	1556	61¼	1556

- R - Bend Radius		Tray Width		90˚ Horizontal Bend - Mitered				
				Catalog No.	Dimensions A		Dimensions B	
in.	mm	in.	mm		in.	mm	in.	mm
12	305	6	152	**(Prefix)-06-90HB12**	20⅜	517	20⅜	517
		9	228	**(Prefix)-09-90HB12**	21⅞	555	21⅞	555
		12	305	**(Prefix)-12-90HB12**	22¾	578	22¾	578
		18	457	**(Prefix)-18-90HB12**	26 5/16	668	26 5/16	668
		24	609	**(Prefix)-24-90HB12**	29⅜	746	29⅜	746
		30	762	**(Prefix)-30-90HB12**	32⅜	822	32⅜	822
		36	914	**(Prefix)-36-90HB12**	35⅜	898	35⅜	898
24	609	6	152	**(Prefix)-06-90HB24**	32½	826	32½	826
		9	228	**(Prefix)-09-90HB24**	34	864	34	864
		12	305	**(Prefix)-12-90HB24**	35½	902	35½	902
		18	457	**(Prefix)-18-90HB24**	38½	978	38½	978
		24	609	**(Prefix)-24-90HB24**	41½	1054	41½	1054
		30	762	**(Prefix)-30-90HB24**	44½	1130	44½	1130
		36	914	**(Prefix)-36-90HB24**	47½	1207	47½	1207
36	914	6	152	**(Prefix)-06-90HB36**	44⅝	1133	44⅝	1133
		9	228	**(Prefix)-09-90HB36**	46⅛	1171	46⅛	1171
		12	305	**(Prefix)-12-90HB36**	47⅝	1209	47⅝	1209
		18	457	**(Prefix)-18-90HB36**	50⅝	1286	50⅝	1286
		24	609	**(Prefix)-24-90HB36**	53⅝	1362	53⅝	1362
		30	762	**(Prefix)-30-90HB36**	56⅝	1438	56⅝	1438
		36	914	**(Prefix)-36-90HB36**	59⅝	1514	59⅝	1514

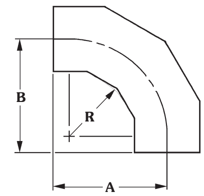
Horizontal Bend 90° (HB)



One pair of splice plates with SS6 hardware included.



90˚ Molded



90˚ Mitered

Prefix - 06 - 90 HB 12
Radius
Fitting
Angle
Width
To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.

For 3" Fittings

(Tray Widths - 6" thru 24" • Radius 12" only)
Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat are all mitered

For 4" Fittings

(Tray Widths - 6" thru 36" • Radius 12", 24" & 36")
Polyester, Vinyl Ester - 12" & 24" radius are molded
36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

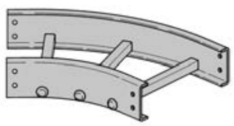
For 6" Fittings

(Tray Widths - 6" thru 36" • Radius 12", 24" & 36")
Polyester, Vinyl Ester - 12" radius are mitered
24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

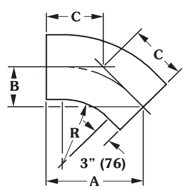
For 8" Fittings

(Tray Widths - 6" thru 36" • Radius 12", 24" & 36")
Polyester, Vinyl Ester - all radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

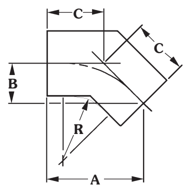
Horizontal Bend 45° (HB)



One pair of splice plates with SS6 hardware included.



45° Molded



45° Mitered

Prefix - 06 - 45 HB 12
- Radius
- Fitting
- Angle
- Width
- To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.

- R - Bend Radius in.	mm	Tray Width in	mm	45° Horizontal Bend - Molded Catalog No.	Dimensions A in.	A mm	B in.	B mm	C in.	C mm
		6	152	**(Prefix)-06-45HB12**	15 3/4	400	6 1/2	165	9 3/16	233
		9	228	**(Prefix)-09-45HB12**	16 13/16	427	6 15/16	176	9 13/16	249
		12	305	**(Prefix)-12-45HB12**	17 7/8	454	7 3/8	187	10 7/16	265
12	305	18	457	**(Prefix)-18-45HB12**	20	508	8 1/4	209	11 11/16	297
		24	609	**(Prefix)-24-45HB12**	22 1/16	560	9 1/8	232	12 15/16	328
		30	762	**(Prefix)-30-45HB12**	24 3/16	614	10	254	14 3/16	360
		36	914	**(Prefix)-36-45HB12**	26 5/16	668	10 15/16	278	15 7/16	392
		6	152	**(Prefix)-06-45HB24**	24 3/16	614	10	254	14 3/16	360
		9	228	**(Prefix)-09-45HB24**	25 1/4	641	10 1/2	267	14 13/16	376
		12	305	**(Prefix)-12-45HB24**	26 5/16	668	10 15/16	278	15 7/16	392
24	609	18	457	**(Prefix)-18-45HB24**	28 7/16	722	11 13/16	300	16 11/16	424
		24	609	**(Prefix)-24-45HB24**	30 9/16	776	12 11/16	322	17 15/16	455
		30	762	**(Prefix)-30-45HB24**	32 11/16	830	13 9/16	344	19 1/8	486
		36	914	**(Prefix)-36-45HB24**	34 13/16	884	14 7/16	367	20 3/8	517
		6	152	**(Prefix)-06-45HB36**	32 11/16	830	13 9/16	344	19 1/8	486
		9	228	**(Prefix)-09-45HB36**	33 3/4	857	14	355	19 3/4	501
		12	305	**(Prefix)-12-45HB36**	34 13/16	884	14 7/16	367	20 3/8	517
36	914	18	457	**(Prefix)-18-45HB36**	36 15/16	938	15 5/16	389	21 5/8	549
		24	609	**(Prefix)-24-45HB36**	39 1/16	992	16 3/16	411	22 7/8	581
		30	762	**(Prefix)-30-45HB36**	41 3/16	1046	17 1/16	433	24 1/8	613
		36	914	**(Prefix)-36-45HB36**	43 5/16	1100	17 15/16	455	25 3/8	644

For 3" Fittings

(Tray Widths - 6" thru 24" • Radius 12" only)
Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat are all mitered

For 4" Fittings

(Tray Widths - 6" thru 36" Radius 12", 24" & 36")
Polyester, Vinyl Ester - 12" & 24" radius are molded
36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

For 6" Fittings

(Tray Widths - 6" thru 36" Radius 12", 24" & 36")
Polyester, Vinyl Ester - 12" radius are mitered
24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

For 8" Fittings

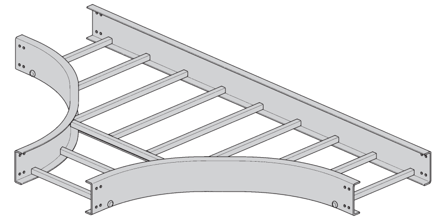
(Tray Widths - 6" thru 36" Radius 12", 24" & 36")
Polyester, Vinyl Ester - all radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

- R - Bend Radius in.	mm	Tray Width in	mm	45° Horizontal Bend - Mitered Catalog No.	Dimensions A in.	A mm	B in.	B mm	C in.	C mm
		6	152	**(Prefix)-06-45HB12**	22 13/16	579	9 7/16	240	13 3/8	340
		9	228	**(Prefix)-09-45HB12**	23 7/8	606	9 7/8	251	14	355
		12	305	**(Prefix)-12-45HB12**	24 7/8	632	10 5/16	262	14 5/8	371
12	305	18	457	**(Prefix)-18-45HB12**	27	686	11 3/16	284	15 7/8	403
		24	609	**(Prefix)-24-45HB12**	29 1/8	740	12 1/16	306	17 1/16	433
		30	762	**(Prefix)-30-45HB12**	31 1/4	794	12 15/16	328	18 5/16	465
		36	914	**(Prefix)-36-45HB12**	33 3/8	848	13 13/16	351	19 9/16	497
		6	152	**(Prefix)-06-45HB24**	31 11/32	796	12 31/32	329	18 3/8	467
		9	228	**(Prefix)-09-45HB24**	32 13/32	823	13 13/32	341	19	483
		12	305	**(Prefix)-12-45HB24**	33 13/32	849	13 27/32	352	19 5/8	498
24	609	18	457	**(Prefix)-18-45HB24**	35 17/32	902	14 23/32	374	20 7/8	530
		24	609	**(Prefix)-24-45HB24**	37 21/32	956	15 19/32	396	22 1/16	560
		30	762	**(Prefix)-30-45HB24**	39 25/32	1010	16 15/32	418	23 5/16	592
		36	914	**(Prefix)-36-45HB24**	41 29/32	1064	17 11/32	441	24 9/16	624
		6	152	**(Prefix)-06-45HB36**	39 7/8	1013	16 1/2	419	23 3/8	594
		9	228	**(Prefix)-09-45HB36**	40 15/16	1040	16 15/16	430	23 15/16	608
		12	305	**(Prefix)-12-45HB36**	42	1067	17 3/8	441	24 9/16	624
36	914	18	457	**(Prefix)-18-45HB36**	44 1/8	1121	18 1/4	463	25 13/16	655
		24	609	**(Prefix)-24-45HB36**	46 3/16	1173	19 1/8	486	27 1/16	687
		30	762	**(Prefix)-30-45HB36**	48 5/16	1227	20	508	28 5/16	719
		36	914	**(Prefix)-36-45HB36**	50 7/16	1281	20 7/8	530	29 9/16	751

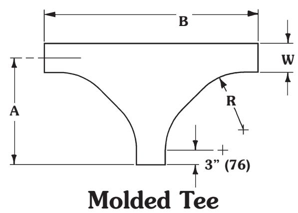
Horizontal Tee (HT)

- R - Bend Radius in.	mm	Tray Width in.	mm	Horizontal Tee - Molded Catalog No.	Dimensions A in.	A mm	B in.	B mm
12	305	6	152	**(Prefix)-06-HT12**	22¼	565	44½	1130
		9	228	**(Prefix)-09-HT12**	23¾	603	47½	1207
		12	305	**(Prefix)-12-HT12**	25¼	641	50½	1283
		18	457	**(Prefix)-18-HT12**	28¼	717	56½	1435
		24	609	**(Prefix)-24-HT12**	31¼	794	62½	1587
		30	762	**(Prefix)-30-HT12**	34¼	870	68½	1740
		36	914	**(Prefix)-36-HT12**	37¼	946	74½	1892
24	609	6	152	**(Prefix)-06-HT24**	34¼	870	68½	1740
		9	228	**(Prefix)-09-HT24**	35¾	908	71½	1816
		12	305	**(Prefix)-12-HT24**	37¼	946	74½	1892
		18	457	**(Prefix)-18-HT24**	40¼	1022	80½	2045
		24	609	**(Prefix)-24-HT24**	43¼	1098	86½	2191
		30	762	**(Prefix)-30-HT24**	46¼	1175	92½	2343
		36	914	**(Prefix)-36-HT24**	49¼	1251	98½	2502
36	914	6	152	**(Prefix)-06-HT36**	46¼	1175	92½	2349
		9	228	**(Prefix)-09-HT36**	47¾	1213	95½	2425
		12	305	**(Prefix)-12-HT36**	49¼	1251	98½	2501
		18	457	**(Prefix)-18-HT36**	52¼	1327	104½	2654
		24	609	**(Prefix)-24-HT36**	55¼	1403	110½	2806
		30	762	**(Prefix)-30-HT36**	58¼	1479	116½	2959
		36	914	**(Prefix)-36-HT36**	61¼	1556	122½	3111

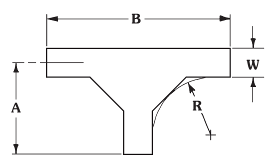
- R - Bend Radius in.	mm	Tray Width in.	mm	Horizontal Tee - Mitered Catalog No.	Dimensions A in.	A mm	B in.	B mm
12	305	6	152	**(Prefix)-06-HX12**	19¼	489	38	965
		9	228	**(Prefix)-09-HX12**	20¾	527	41	1041
		12	305	**(Prefix)-12-HX12**	22¼	565	44	1117
		18	457	**(Prefix)-18-HX12**	25¼	641	50	1270
		24	609	**(Prefix)-24-HX12**	28¼	717	56	1422
		30	762	**(Prefix)-30-HX12**	31¼	794	62	1575
		36	914	**(Prefix)-36-HX12**	34¼	870	68	1727
24	609	6	152	**(Prefix)-06-HX24**	31¼	794	62¼	1581
		9	228	**(Prefix)-09-HX24**	32¾	832	65¼	1657
		12	305	**(Prefix)-12-HX24**	34¼	870	68¼	1734
		18	457	**(Prefix)-18-HX24**	37¼	946	74¼	1886
		24	609	**(Prefix)-24-HX24**	40¼	1022	80¼	2038
		30	762	**(Prefix)-30-HX24**	43¼	1098	86¼	2191
		36	914	**(Prefix)-36-HX24**	46¼	1175	92¼	2343
36	914	6	152	**(Prefix)-06-HX36**	43¼	1098	86½	2191
		9	228	**(Prefix)-09-HX36**	44¾	1136	89½	2273
		12	305	**(Prefix)-12-HX36**	46¼	1175	92½	2343
		18	457	**(Prefix)-18-HX36**	49¼	1251	98½	2502
		24	609	**(Prefix)-24-HX36**	52¼	1327	104½	2654
		30	762	**(Prefix)-30-HX36**	55¼	1403	110½	2807
		36	914	**(Prefix)-36-HX36**	58¼	1479	116½	2959



Two pair of splice plates with SS6 hardware included.



Molded Tee



Mitered Tee

Prefix - 06 - HT 12
- Radius
- Fitting
- Width
- To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.

For 3" Fittings

(Tray Widths - 6" thru 24" • Radius 12" only)
Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat are all mitered

For 4" Fittings

(Tray Widths - 6" thru 36" • Radius 12", 24" & 36")
Polyester, Vinyl Ester - 12" & 24" radius are molded
36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

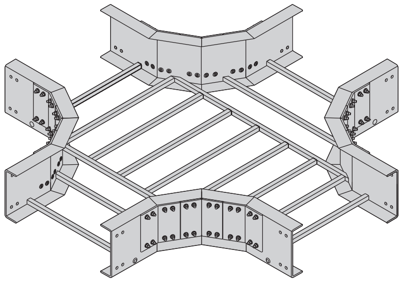
For 6" Fittings

(Tray Widths - 6" thru 36" • Radius 12", 24" & 36")
Polyester, Vinyl Ester - 12" radius are mitered
24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

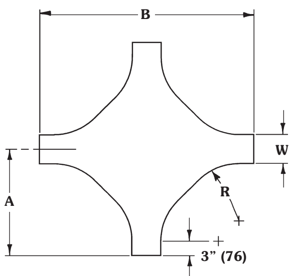
For 8" Fittings

(Tray Widths - 6" thru 36" • Radius 12", 24" & 36")
Polyester, Vinyl Ester - all radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

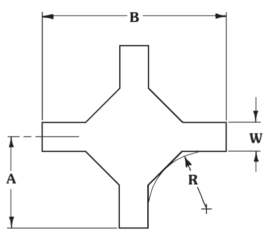
Horizontal Cross (HX)



Three pair of splice plates with SS6 hardware included.



Molded Cross



Mitered Cross

Prefix - 06 - HX 12
- 12 — Radius
- HX — Fitting
- 06 — Width
- Prefix — To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.

- R - Bend Radius in.	mm	Tray Width in.	mm	Horizontal Cross - Molded Dimensions Catalog No.	A in.	A mm	B in.	B mm
12	305	6	152	**(Prefix)-06-HX12**	22¼	565	44½	1130
		9	228	**(Prefix)-09-HX12**	23¾	603	47½	1206
		12	305	**(Prefix)-12-HX12**	25¼	641	50½	1283
		18	457	**(Prefix)-18-HX12**	28¼	717	56½	1435
		24	609	**(Prefix)-24-HX12**	31¼	794	62½	1587
		30	762	**(Prefix)-30-HX12**	34¼	870	68½	1740
		36	914	**(Prefix)-36-HX12**	37¼	946	74½	1892
24	609	6	152	**(Prefix)-06-HX24**	34¼	870	68½	1740
		9	228	**(Prefix)-09-HX24**	35¾	908	71½	1816
		12	305	**(Prefix)-12-HX24**	37¼	946	74½	1892
		18	457	**(Prefix)-18-HX24**	40¼	1022	80½	2045
		24	609	**(Prefix)-24-HX24**	43¼	1098	86½	2191
		30	762	**(Prefix)-30-HX24**	46¼	1175	92½	2343
		36	914	**(Prefix)-36-HX24**	49¼	1251	98½	2502
36	914	6	152	**(Prefix)-06-HX36**	46¼	1175	92½	2349
		9	228	**(Prefix)-09-HX36**	47¾	1213	95½	2425
		12	305	**(Prefix)-12-HX36**	49¼	1251	98½	2501
		18	457	**(Prefix)-18-HX36**	52¼	1327	104½	2654
		24	609	**(Prefix)-24-HX36**	55¼	1403	110½	2806
		30	762	**(Prefix)-30-HX36**	58¼	1479	116½	2959
		36	914	**(Prefix)-36-HX36**	61¼	1556	122½	3111

- R - Bend Radius in.	mm	Tray Width in.	mm	Horizontal Cross - Mitered Dimensions Catalog No.	A in.	A mm	B in.	B mm
12	305	6	152	**(Prefix)-06-HX12**	19¼	489	38	965
		9	228	**(Prefix)-09-HX12**	20¾	527	41	1041
		12	305	**(Prefix)-12-HX12**	22¼	565	44	1117
		18	457	**(Prefix)-18-HX12**	25¼	641	50	1270
		24	609	**(Prefix)-24-HX12**	28¼	717	56	1422
		30	762	**(Prefix)-30-HX12**	31¼	794	62	1575
		36	914	**(Prefix)-36-HX12**	34¼	870	68	1727
24	609	6	152	**(Prefix)-06-HX24**	31¼	794	62¼	1581
		9	228	**(Prefix)-09-HX24**	32¾	832	65¼	1657
		12	305	**(Prefix)-12-HX24**	34¼	870	68¼	1734
		18	457	**(Prefix)-18-HX24**	37¼	946	74¼	1886
		24	609	**(Prefix)-24-HX24**	40¼	1022	80¼	2038
		30	762	**(Prefix)-30-HX24**	43¼	1098	86¼	2191
		36	914	**(Prefix)-36-HX24**	46¼	1175	92¼	2343
36	914	6	152	**(Prefix)-06-HX36**	43¼	1098	86½	2191
		9	228	**(Prefix)-09-HX36**	44¾	1136	89½	2273
		12	305	**(Prefix)-12-HX36**	46¼	1175	92½	2343
		18	457	**(Prefix)-18-HX36**	49¼	1251	98½	2502
		24	609	**(Prefix)-24-HX36**	52¼	1327	104½	2654
		30	762	**(Prefix)-30-HX36**	55¼	1403	110½	2807
		36	914	**(Prefix)-36-HX36**	58¼	1479	116½	2959

For 3" Fittings

(Tray Widths - 6" thru 24" • Radius 12" only)
Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat are all mitered

For 4" Fittings

(Tray Widths - 6" thru 36" Radius 12", 24" & 36")
Polyester, Vinyl Ester - 12" & 24" radius are molded 36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

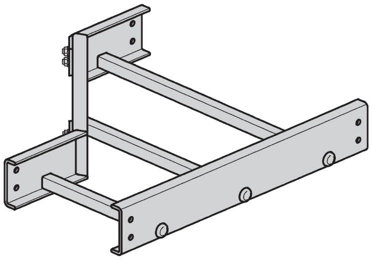
For 6" Fittings

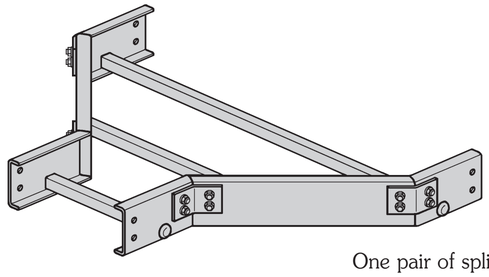
(Tray Widths - 6" thru 36" Radius 12", 24" & 36")
Polyester, Vinyl Ester - 12" radius are mitered 24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

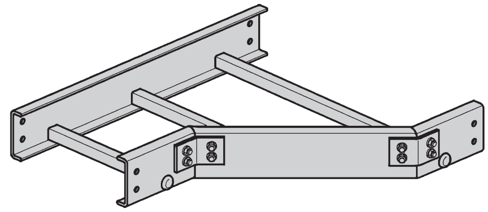
For 8" Fittings

(Tray Widths - 6" thru 36" Radius 12", 24" & 36")
Polyester, Vinyl Ester - all radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

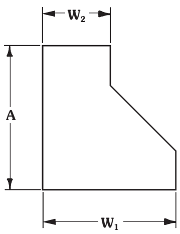
Reducers (LR) (SR) (RR)



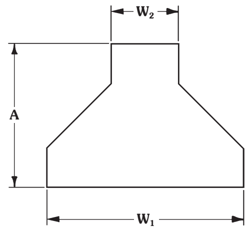




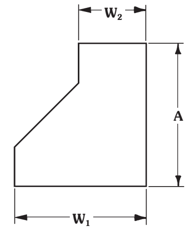
One pair of splice plates with SS6 hardware included.



Left Reducer



Straight Reducer



Right Reducer

3" Fittings
(Only available in W1 widths of 9", 12", 18" & 24")

4", 6" & 8" Fittings
(Available in all W1 widths shown in chart)

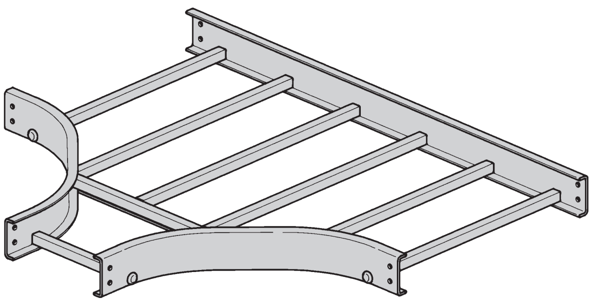
Reducers are all of mitered construction.

Prefix - 12 - SR09
- Width2 W2
- Fitting
- Width1 W1
- To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.

Tray Width				Left Hand Reducer			Straight Reducer			Right Hand Reducer		
W1		W2		Catalog No.	A		Catalog No.	A		Catalog No.	A	
in.	mm	in.	mm		in.	mm		in.	mm		in.	mm
9	228	6	152	**(Prefix)-09-LR06**	17½	444	**(Prefix)-09-SR06**	16	406	**(Prefix)-09-RR06**	17½	444
12	305	6	152	**(Prefix)-12-LR06**	20½	521	**(Prefix)-12-SR06**	17½	444	**(Prefix)-12-RR06**	20½	521
		9	228	**(Prefix)-12-LR09**	17½	444	**(Prefix)-12-SR09**	16	406	**(Prefix)-12-RR09**	17½	444
18	457	6	152	**(Prefix)-18-LR06**	26½	673	**(Prefix)-18-SR06**	20½	521	**(Prefix)-18-RR06**	26½	673
		9	228	**(Prefix)-18-LR09**	23½	597	**(Prefix)-18-SR09**	19	482	**(Prefix)-18-RR09**	23½	597
		12	305	**(Prefix)-18-LR12**	20½	521	**(Prefix)-18-SR12**	17½	444	**(Prefix)-18-RR12**	20½	521
24	609	6	152	**(Prefix)-24-LR06**	32½	825	**(Prefix)-24-SR06**	23½	597	**(Prefix)-24-RR06**	32½	825
		9	228	**(Prefix)-24-LR09**	29½	749	**(Prefix)-24-SR09**	22	559	**(Prefix)-24-RR09**	29½	749
		12	305	**(Prefix)-24-LR12**	26½	673	**(Prefix)-24-SR12**	20½	521	**(Prefix)-24-RR12**	26½	673
		18	457	**(Prefix)-24-LR18**	20½	521	**(Prefix)-24-SR18**	17½	444	**(Prefix)-24-RR18**	20½	521
30	762	6	152	**(Prefix)-30-LR06**	38½	978	**(Prefix)-30-SR06**	26½	673	**(Prefix)-30-RR06**	38½	978
		9	228	**(Prefix)-30-LR09**	35½	902	**(Prefix)-30-SR09**	25	635	**(Prefix)-30-RR09**	35½	902
		12	305	**(Prefix)-30-LR12**	32½	825	**(Prefix)-30-SR12**	23½	597	**(Prefix)-30-RR12**	32½	825
		18	457	**(Prefix)-30-LR18**	26½	673	**(Prefix)-30-SR18**	20½	521	**(Prefix)-30-RR18**	26½	673
		24	609	**(Prefix)-30-LR24**	20½	521	**(Prefix)-30-SR24**	17½	444	**(Prefix)-30-RR24**	20½	521
36	914	6	152	**(Prefix)-36-LR06**	44½	1130	**(Prefix)-36-SR06**	29½	749	**(Prefix)-36-RR06**	44½	1130
		9	228	**(Prefix)-36-LR09**	41½	1054	**(Prefix)-36-SR09**	28	711	**(Prefix)-36-RR09**	41½	1054
		12	305	**(Prefix)-36-LR12**	38½	978	**(Prefix)-36-SR12**	26½	673	**(Prefix)-36-RR12**	38½	978
		18	457	**(Prefix)-36-LR18**	32½	825	**(Prefix)-36-SR18**	23½	597	**(Prefix)-36-RR18**	32½	825
		24	609	**(Prefix)-36-LR24**	26½	673	**(Prefix)-36-SR24**	20½	521	**(Prefix)-36-RR24**	26½	673
		30	762	**(Prefix)-36-LR30**	20½	521	**(Prefix)-36-SR30**	17½	444	**(Prefix)-36-RR30**	20½	521

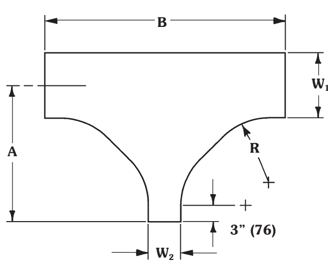
Horizontal Reducing Tee (HT)



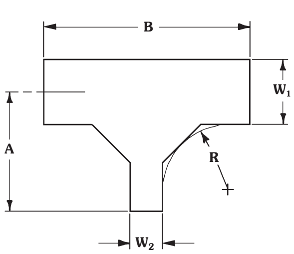
Two pair of splice plates with SS6 hardware included.

Prefix - 36 - 18 HT 24
- Radius
- Fitting
- Width2 W_2
- Width1 W_1
- To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.



Molded
(For dimensions, see chart on page FT-32)



Mitered
(For dimensions, see chart on page FT-32)

For 3" Fittings

(Radius 12" only
W1 tray widths - 9", 12", 18" & 24")
Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat are all mitered

For 4" Fittings

(Radius 12", 24" & 36"
W1 tray widths - 9" thru 36")
Polyester, Vinyl Ester - 12" & 24" radius are molded
36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

For 6" Fittings

(Radius 12", 24" & 36"
W1 tray widths - 9" thru 36")
Polyester, Vinyl Ester - 12" radius are mitered
24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

For 8" Fittings

(Radius 12", 24" & 36"
W1 tray widths - 9" thru 36")
Polyester, Vinyl Ester,
Zero Halogen, and Dis-Stat
all radius are mitered

Horizontal Reducing Tee (HT)

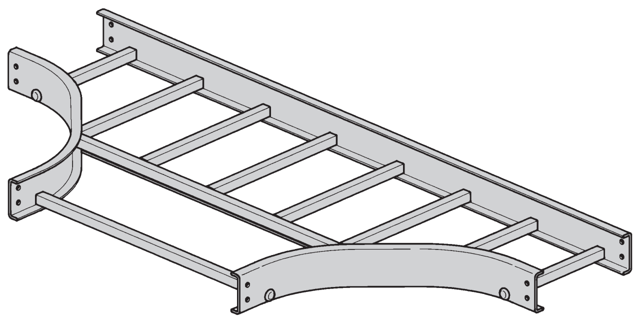
Molded Fittings

Tray Width				Catalog No.	12" Radius (305)				24" Radius (609)				36" Radius (914)			
W_1		W_2		* Insert radius (12", 24" or 36")	A		B		A		B		A		B	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
9	228	6	152	**(Prefix)-09-06-HT***	23¾	603	44½	1130	35¾	908	68½	1740	47¾	1213	92½	2350
12	305	6	152	**(Prefix)-12-06-HT***	25¼	641	44½	1130	37¼	946	68½	1740	49¼	1251	92½	2350
		9	228	**(Prefix)-12-09-HT***	25¼	641	47½	1206	37¼	946	71½	1816	49¼	1251	95½	2426
18	457	6	152	**(Prefix)-18-06-HT***	28¼	717	44½	1130	40¼	1022	68½	1740	52¼	1327	92½	2350
		9	228	**(Prefix)-18-09-HT***	28¼	717	47½	1206	40¼	1022	71½	1816	52¼	1327	95½	2426
		12	305	**(Prefix)-18-12-HT***	28¼	717	50½	1283	40¼	1022	74½	1892	52¼	1327	98½	2502
24	609	6	152	**(Prefix)-24-06-HT***	31¼	794	44½	1130	43¼	1098	68½	1740	55¼	1403	92½	2350
		9	228	**(Prefix)-24-09-HT***	31¼	794	47½	1206	43¼	1098	71½	1816	55¼	1403	95½	2426
		12	305	**(Prefix)-24-12-HT***	31¼	794	50½	1283	43¼	1098	74½	1892	55¼	1403	98½	2502
		18	457	**(Prefix)-24-18-HT***	31¼	794	56½	1435	43¼	1098	80½	2045	55¼	1403	104½	2654
30	762	6	152	**(Prefix)-30-06-HT***	34¼	870	44½	1130	46¼	1175	68½	1740	58¼	1480	92½	2350
		9	228	**(Prefix)-30-09-HT***	34¼	870	47½	1206	46¼	1175	71½	1816	58¼	1480	95½	2426
		12	305	**(Prefix)-30-12-HT***	34¼	870	50½	1283	46¼	1175	74½	1892	58¼	1480	98½	2502
		18	457	**(Prefix)-30-18-HT***	34¼	870	56½	1435	46¼	1175	80½	2045	58¼	1480	104½	2654
		24	609	**(Prefix)-30-24-HT***	34¼	870	62½	1587	46¼	1175	86½	2197	58¼	1480	110½	2807
36	914	6	152	**(Prefix)-36-06-HT***	37¼	946	44½	1130	49¼	1251	68½	1740	61¼	1556	92½	2350
		9	228	**(Prefix)-36-09-HT***	37¼	946	47½	1206	49¼	1251	71½	1816	61¼	1556	95½	2426
		12	305	**(Prefix)-36-12-HT***	37¼	946	50½	1283	49¼	1251	74½	1892	61¼	1556	98½	2502
		18	457	**(Prefix)-36-18-HT***	37¼	946	56½	1435	49¼	1251	80½	2045	61¼	1556	104½	2654
		24	609	**(Prefix)-36-24-HT***	37¼	946	62½	1587	49¼	1251	86½	2197	61¼	1556	110½	2807
		30	762	**(Prefix)-36-30-HT***	37¼	946	68½	1740	49¼	1251	92½	2349	61¼	1556	116½	2959

Mitered Fittings

Tray Width				Catalog No.	12" Radius (305)				24" Radius (609)				36" Radius (914)			
W_1		W_2		* Insert radius (12", 24" or 36")	A		B		A		B		A		B	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
9	228	6	152	**(Prefix)-09-06-HT***	20¾	527	38½	978	32¾	832	62½	1587	44¾	1137	86½	2197
12	305	6	152	**(Prefix)-12-06-HT***	22¼	565	38½	978	34¼	870	62½	1587	46¼	1175	86½	2197
		9	228	**(Prefix)-12-09-HT***	22¼	565	41½	1054	34¼	870	65½	1664	46¼	1175	89½	2273
18	457	6	152	**(Prefix)-18-06-HT***	25¼	641	38½	978	37¼	946	62½	1587	49¼	1251	86½	2197
		9	228	**(Prefix)-18-09-HT***	25¼	641	41½	1054	37¼	946	65½	1664	49¼	1251	89½	2273
		12	305	**(Prefix)-18-12-HT***	25¼	641	44½	1130	37¼	946	68½	1740	49¼	1251	92½	2350
24	609	6	152	**(Prefix)-24-06-HT***	28¼	717	38½	978	40¼	1022	62½	1587	52¼	1327	86½	2197
		9	228	**(Prefix)-24-09-HT***	28¼	717	41½	1054	40¼	1022	65½	1664	52¼	1327	89½	2273
		12	305	**(Prefix)-24-12-HT***	28¼	717	44½	1130	40¼	1022	68½	1740	52¼	1327	92½	2350
		18	457	**(Prefix)-24-18-HT***	28¼	717	50½	1283	40¼	1022	74½	1892	52¼	1327	98½	2502
30	762	6	152	**(Prefix)-30-06-HT***	31¼	794	38½	978	43¼	1098	62½	1587	55¼	1403	86½	2197
		9	228	**(Prefix)-30-09-HT***	31¼	794	41½	1054	43¼	1098	65½	1664	55¼	1403	89½	2273
		12	305	**(Prefix)-30-12-HT***	31¼	794	44½	1130	43¼	1098	68½	1740	55¼	1403	92½	2350
		18	457	**(Prefix)-30-18-HT***	31¼	794	50½	1283	43¼	1098	74½	1892	55¼	1403	98½	2502
		24	609	**(Prefix)-30-24-HT***	31¼	794	56½	1435	43¼	1098	80½	2045	55¼	1403	104½	2654
36	914	6	152	**(Prefix)-36-06-HT***	34¼	870	38½	978	46¼	1175	62½	1587	58¼	1480	86½	2197
		9	228	**(Prefix)-36-09-HT***	34¼	870	41½	1054	46¼	1175	65½	1664	58¼	1480	89½	2273
		12	305	**(Prefix)-36-12-HT***	34¼	870	44½	1130	46¼	1175	68½	1740	58¼	1480	92½	2350
		18	457	**(Prefix)-36-18-HT***	34¼	870	50½	1283	46¼	1175	74½	1892	58¼	1480	98½	2502
		24	609	**(Prefix)-36-24-HT***	34¼	870	56½	1435	46¼	1175	80½	2045	58¼	1480	104½	2654
		30	762	**(Prefix)-36-30-HT***	34¼	870	62½	1587	46¼	1175	86½	2197	58¼	1480	110½	2807

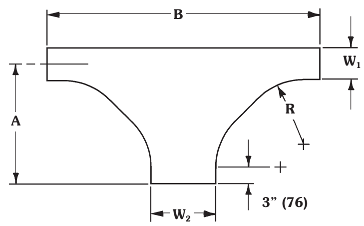
Horizontal Expanding Tee (HT)



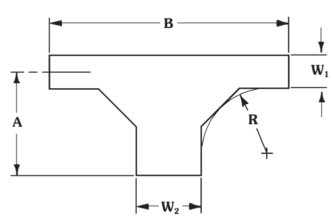
Two pair of splice plates with SS6 hardware included.

Prefix - 18 - 36 HT 24
- Radius
- Fitting
- Width2 W2
- Width1 W1
- To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.



Molded
(For dimensions, see chart on page FT-34)



Mitered
(For dimensions, see chart on page FT-34)

For 3" Fittings

(Radius 12" only
W1 tray widths - 6" thru 18"
W2 tray widths - 9" thru 24")
Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat
are all mitered

For 4" Fittings

(Radius 12", 24" & 36"
W1 tray widths - 6" thru 30")
W2 tray widths - 9" thru 36")
Polyester, Vinyl Ester - 12" & 24" radius are molded
36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

For 6" Fittings

(Radius 12", 24" & 36"
W1 tray widths - 6" thru 30")
W2 tray widths - 9" thru 36")
Polyester, Vinyl Ester - 12" radius are mitered
24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

For 8" Fittings

(Radius 12", 24" & 36"
W1 tray widths - 6" thru 30")
W2 tray widths - 9" thru 36")
Polyester, Vinyl Ester,
Zero Halogen, and Dis-Stat
are all mitered

Horizontal Expanding Tee (HT)

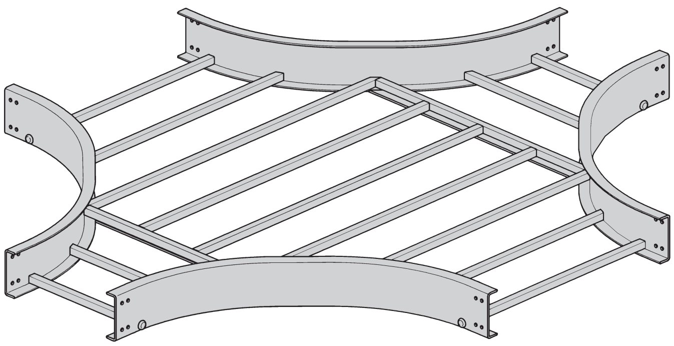
Molded Fittings

Tray Width				Catalog No.	12" Radius (305)				24" Radius (609)				36" Radius (914)			
W_1		W_2		* Insert radius (12", 24" or 36")	A		B		A		B		A		B	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
6	152	9	228	**(Prefix)-06-09-HT***	22¼	565	47½	1206	34¼	870	71½	1816	46¼	1175	95½	2426
		12	305	**(Prefix)-06-12-HT***	22¼	565	50½	1283	34¼	870	74½	1892	46¼	1175	98½	2502
		18	457	**(Prefix)-06-18-HT***	22¼	565	56½	1435	34¼	870	80½	2045	46¼	1175	104½	2654
		24	609	**(Prefix)-06-24-HT***	22¼	565	62½	1587	34¼	870	86½	2197	46¼	1175	110½	2807
		30	762	**(Prefix)-06-30-HT***	22¼	565	68½	1740	34¼	870	92½	2349	46¼	1175	116½	2959
		36	914	**(Prefix)-06-36-HT***	22¼	565	74½	1892	34¼	870	98½	2502	46¼	1175	122½	3111
9	228	12	305	**(Prefix)-09-12-HT***	23¾	603	50½	1283	35¾	908	74½	1892	47¾	1213	98½	2502
		18	457	**(Prefix)-09-18-HT***	23¾	603	56½	1435	35¾	908	80½	2045	47¾	1213	104½	2654
		24	609	**(Prefix)-09-24-HT***	23¾	603	62½	1587	35¾	908	86½	2197	47¾	1213	110½	2807
		30	762	**(Prefix)-09-30-HT***	23¾	603	68½	1740	35¾	908	92½	2349	47¾	1213	116½	2959
		36	914	**(Prefix)-09-36-HT***	23¾	603	74½	1892	35¾	908	98½	2502	47¾	1213	122½	3111
12	305	18	457	**(Prefix)-12-18-HT***	25¼	641	56½	1435	37¼	946	80½	2045	49¼	1251	104½	2654
		24	609	**(Prefix)-12-24-HT***	25¼	641	62½	1587	37¼	946	86½	2197	49¼	1251	110½	2807
		30	762	**(Prefix)-12-30-HT***	25¼	641	68½	1740	37¼	946	92½	2349	49¼	1251	116½	2959
		36	914	**(Prefix)-12-36-HT***	25¼	641	74½	1892	37¼	946	98½	2502	49¼	1251	122½	3111
18	457	24	609	**(Prefix)-18-24-HT***	28¼	717	62½	1587	40¼	1022	86½	2197	52¼	1327	110½	2807
		30	762	**(Prefix)-18-30-HT***	28¼	717	68½	1740	40¼	1022	92½	2349	52¼	1327	116½	2959
		36	914	**(Prefix)-18-36-HT***	28¼	717	74½	1892	40¼	1022	98½	2502	52¼	1327	122½	3111
24	609	30	762	**(Prefix)-24-30-HT***	31¼	794	68½	1740	43¼	1098	92½	2349	55¼	1403	116½	2959
		36	914	**(Prefix)-24-36-HT***	31¼	794	74½	1892	43¼	1098	98½	2502	55¼	1403	122½	3111
30	762	36	914	**(Prefix)-30-36-HT***	34¼	870	74½	1892	46¼	1175	98½	2502	58¼	1479	122½	3111

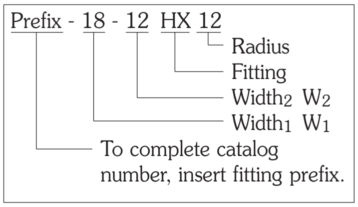
Mitered Fittings

Tray Width				Catalog No.	12" Radius (305)				24" Radius (609)				36" Radius (914)			
W_1		W_2		* Insert radius (12", 24" or 36")	A		B		A		B		A		B	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
6	152	9	228	**(Prefix)-06-09-HT***	19¼	489	41½	1054	31¼	794	65½	1664	43¼	1098	89½	2273
		12	305	**(Prefix)-06-12-HT***	19¼	489	44½	1130	31¼	794	68½	1740	43¼	1098	92½	2349
		18	457	**(Prefix)-06-18-HT***	19¼	489	50½	1283	31¼	794	74½	1892	43¼	1098	98½	2502
		24	609	**(Prefix)-06-24-HT***	19¼	489	56½	1435	31¼	794	80½	2045	43¼	1098	104½	2654
		30	762	**(Prefix)-06-30-HT***	19¼	489	62½	1587	31¼	794	86½	2197	43¼	1098	110½	2807
		36	914	**(Prefix)-06-36-HT***	19¼	489	68½	1740	31¼	794	92½	2349	43¼	1098	116½	2959
9	228	12	305	**(Prefix)-09-12-HT***	20¾	527	44½	1130	32¾	832	68½	1740	44¾	136	92½	2349
		18	457	**(Prefix)-09-18-HT***	20¾	527	50½	1283	32¾	832	74½	1892	44¾	136	98½	2502
		24	609	**(Prefix)-09-24-HT***	20¾	527	56½	1435	32¾	832	80½	2045	44¾	136	104½	2654
		30	762	**(Prefix)-09-30-HT***	20¾	527	62½	1587	32¾	832	86½	2197	44¾	136	110½	2807
		36	914	**(Prefix)-09-36-HT***	20¾	527	68½	1740	32¾	832	92½	2349	44¾	136	116½	2959
12	305	18	457	**(Prefix)-12-18-HT***	22¼	565	50½	1283	34¼	870	74½	1892	46¼	1175	98½	2502
		24	609	**(Prefix)-12-24-HT***	22¼	565	56½	1435	34¼	870	80½	2045	46¼	1175	104½	2654
		30	762	**(Prefix)-12-30-HT***	22¼	565	62½	1587	34¼	870	86½	2197	46¼	1175	110½	2807
		36	914	**(Prefix)-12-36-HT***	22¼	565	68½	1740	34¼	870	92½	2349	46¼	1175	116½	2959
18	457	24	609	**(Prefix)-18-24-HT***	25¼	641	56½	1435	37¼	946	80½	2045	49¼	1251	104½	2654
		30	762	**(Prefix)-18-30-HT***	25¼	641	62½	1587	37¼	946	86½	2197	49¼	1251	110½	2807
		36	914	**(Prefix)-18-36-HT***	25¼	641	68½	1740	37¼	946	92½	2349	49¼	1251	122½	3111
24	609	30	762	**(Prefix)-24-30-HT***	28¼	717	62½	1587	40¼	1022	86½	2197	52¼	1327	110½	2807
		36	914	**(Prefix)-24-36-HT***	28¼	717	68½	1740	40¼	1022	92½	2349	52¼	1327	116½	2959
30	762	36	914	**(Prefix)-30-36-HT***	31¼	794	68½	1740	43¼	1098	92½	2349	55¼	1403	116½	2959

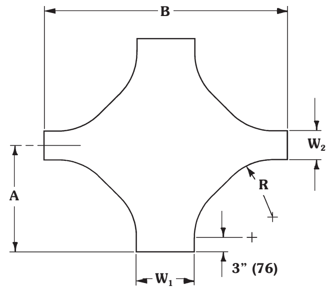
Horizontal Expanding/Reducing Cross (HX)



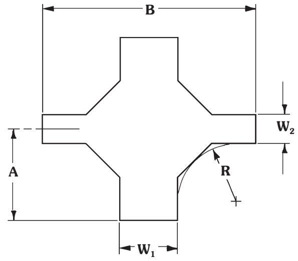
Three pair of splice plates with SS6 hardware included.



(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.



Molded
(For dimensions, see chart on page FT-36)



Mitered
(For dimensions, see chart on page FT-36)

For 3" Fittings

(Radius 12" only
W_1 tray widths - 9" thru 24"
W_2 tray widths - 6" thru 18")
Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat
are all mitered

For 4" Fittings

(Radius 12", 24" & 36"
W_1 tray widths - 9" thru 36")
W_2 tray widths - 6" thru 30")
Polyester, Vinyl Ester - 12" & 24" radius are molded
36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

For 6" Fittings

(Radius 12", 24" & 36"
W_1 tray widths - 9" thru 36")
W_2 tray widths - 6" thru 30")
Polyester, Vinyl Ester - 12" radius are mitered
24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

For 8" Fittings

(Radius 12", 24" & 36"
W_1 tray widths - 9" thru 36")
W_2 tray widths - 6" thru 30")
Polyester, Vinyl Ester,
Zero Halogen, and Dis-Stat
are all mitered

Horizontal Expanding/Reducing Cross (HX)

Molded Fittings

Tray Width				Catalog No.	12" Radius (305)				24" Radius (609)				36" Radius (914)			
W_1		W_2		* Insert radius (12", 24" or 36")	A		B		A		B		A		B	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
9	228	6	152	(Prefix)-09-06-HT*	22¼	565	47½	1206	34¼	870	71½	1816	46¼	1175	95½	2426
12	305	6	152	(Prefix)-12-06-HT*	22¼	565	50½	1283	34¼	870	74½	1892	46¼	1175	98½	2502
		9	228	(Prefix)-12-09-HT*	23¾	603	50½	1283	35¾	908	74½	1892	47¾	1213	98½	2502
18	457	6	152	(Prefix)-18-06-HT*	22¼	565	56½	1435	34¼	870	80½	2045	46¼	1175	104½	2654
		9	228	(Prefix)-18-09-HT*	23¾	603	56½	1435	35¾	908	80½	2045	47¾	1213	104½	2654
		12	305	(Prefix)-18-12-HT*	25¼	641	56½	1435	37¼	946	80½	2045	49¼	1251	104½	2654
24	609	6	152	(Prefix)-24-06-HT*	22¼	565	62½	1587	34¼	870	86½	2197	46¼	1175	110½	2807
		9	228	(Prefix)-24-09-HT*	23¾	603	62½	1587	35¾	908	86½	2197	47¾	1213	110½	2807
		12	305	(Prefix)-24-12-HT*	25¼	641	62½	1587	37¼	946	86½	2197	49¼	1251	110½	2807
		18	457	(Prefix)-24-18-HT*	28¼	717	62½	1587	40¼	1022	86½	2197	52¼	1327	110½	2807
30	762	6	152	(Prefix)-30-06-HT*	22¼	565	68½	1740	34¼	870	92½	2349	46¼	1175	116½	2959
		9	228	(Prefix)-30-09-HT*	23¾	603	68½	1740	35¾	908	92½	2349	47¾	1213	116½	2959
		12	305	(Prefix)-30-12-HT*	25¼	641	68½	1740	37¼	946	92½	2349	49¼	1251	116½	2959
		18	457	(Prefix)-30-18-HT*	28¼	717	68½	1740	40¼	1022	92½	2349	52¼	1327	116½	2959
		24	609	(Prefix)-30-24-HT*	31¼	794	68½	1740	43¼	1098	92½	2349	55¼	1403	116½	2959
36	914	6	152	(Prefix)-36-06-HT*	22¼	565	74½	1892	34¼	870	98½	2502	46¼	1175	122½	3112
		9	228	(Prefix)-36-09-HT*	23¾	603	74½	1892	35¾	908	98½	2502	47¾	1213	122½	3112
		12	305	(Prefix)-36-12-HT*	25¼	641	74½	1892	37¼	946	98½	2502	49¼	1251	122½	3112
		18	457	(Prefix)-36-18-HT*	28¼	717	74½	1892	40¼	1022	98½	2502	52¼	1327	122½	3112
		24	609	(Prefix)-36-24-HT*	31¼	794	74½	1892	43¼	1098	98½	2502	55¼	1403	122½	3112
		30	762	(Prefix)-36-30-HT*	34¼	870	74½	1892	46¼	1175	98½	2502	58¼	1479	122½	3112

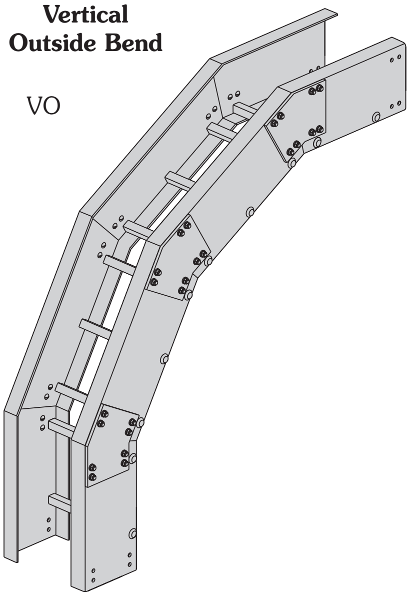
Mitered Fittings

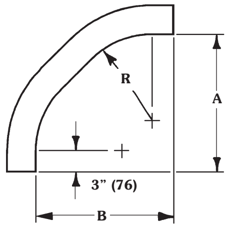
Tray Width				Catalog No.	12" Radius (305)				24" Radius (609)				36" Radius (914)			
W_1		W_2		* Insert radius (12", 24" or 36")	A		B		A		B		A		B	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
9	228	6	152	(Prefix)-09-06-HT*	19¼	489	41½	1054	31¼	794	65½	1664	43¼	1098	89½	2273
12	305	6	152	(Prefix)-12-06-HT*	19¼	489	44½	1130	31¼	794	68½	1740	43¼	1098	92½	2350
		9	228	(Prefix)-12-09-HT*	20¾	527	44½	1130	32¾	832	68½	1740	44¾	1136	92½	2350
18	457	6	152	(Prefix)-18-06-HT*	19¼	489	50½	1283	31¼	794	74½	1892	43¼	1098	98½	2502
		9	228	(Prefix)-18-09-HT*	20¾	527	50½	1283	32¾	832	74½	1892	44¾	1136	98½	2502
		12	305	(Prefix)-18-12-HT*	22¼	565	50½	1283	34¼	870	74½	1892	46¼	1175	98½	2502
24	609	6	152	(Prefix)-24-06-HT*	19¼	489	56½	1435	31¼	794	80½	2045	43¼	1098	104½	2654
		9	228	(Prefix)-24-09-HT*	20¾	527	56½	1435	32¾	832	80½	2045	44¾	1136	104½	2654
		12	305	(Prefix)-24-12-HT*	22¼	565	56½	1435	34¼	870	80½	2045	46¼	1175	104½	2654
		18	457	(Prefix)-24-18-HT*	25¼	641	56½	1435	37¼	946	80½	2045	49¼	1251	104½	2654
30	762	6	152	(Prefix)-30-06-HT*	19¼	489	62½	1587	31¼	794	86½	2197	43¼	1098	110½	2807
		9	228	(Prefix)-30-09-HT*	20¾	527	62½	1587	32¾	832	86½	2197	44¾	1136	110½	2807
		12	305	(Prefix)-30-12-HT*	22¼	565	62½	1587	34¼	870	86½	2197	46¼	1175	110½	2807
		18	457	(Prefix)-30-18-HT*	25¼	641	62½	1587	37¼	946	86½	2197	49¼	1251	110½	2807
		24	609	(Prefix)-30-24-HT*	28¼	717	62½	1587	40¼	1022	86½	2197	52¼	1327	110½	2807
36	914	6	152	(Prefix)-36-06-HT*	19¼	489	68½	1740	31¼	794	104½	2654	43¼	1098	128½	3264
		9	228	(Prefix)-36-09-HT*	20¾	527	68½	1740	32¾	832	104½	2654	44¾	1136	128½	3264
		12	305	(Prefix)-36-12-HT*	22¼	565	68½	1740	34¼	870	104½	2654	46¼	1175	128½	3264
		18	457	(Prefix)-36-18-HT*	25¼	641	68½	1740	37¼	946	104½	2654	49¼	1251	128½	3264
		24	609	(Prefix)-36-24-HT*	28¼	717	68½	1740	40¼	1022	104½	2654	52¼	1327	128½	3264
		30	762	(Prefix)-36-30-HT*	31¼	794	68½	1740	43¼	1098	104½	2654	55¼	1403	128½	3264

Vertical Bends 90° (VO) (VI)

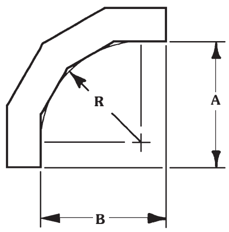
Vertical Outside Bend

VO





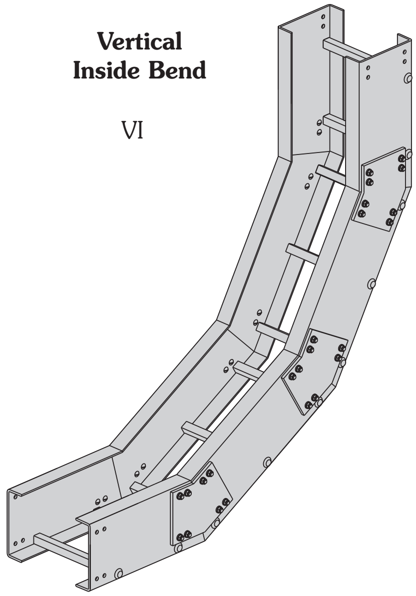
90˚ (VO) Molded

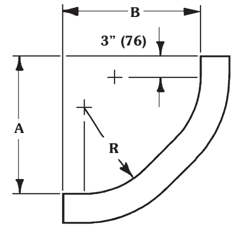


90˚ (VO) Mitered

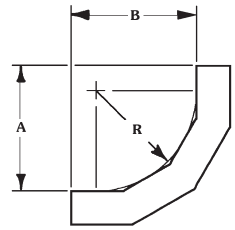
Vertical Inside Bend

VI





90˚ (VI) Molded



90˚ (VI) Mitered

One pair of splice plates with SS6 hardware included.

Prefix - 06 - 90 VO 24
Radius
Fitting
Angle
Width
To complete catalog number, insert fitting prefix.

Prefix - 06 - 90 VI 24
Radius
Fitting
Angle
Width
To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.

For 3" Fittings

(Radius 12" only • Tray widths - 6" thru 24")

Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat are all mitered

For 6" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester - 12" radius are mitered
24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

For 4" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester - 12" & 24" radius are molded
36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

For 8" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester,
Zero Halogen, and Dis-Stat
are all mitered

Vertical Bends 90° (VO) (VI)

- R - Bend Radius in.	mm	Tray Width in.	mm	Catalog No.	90˚ Molded Vertical Outside Bend A in.	mm	B in.	mm	Vertical Inside Bend A in.	mm	B in.	mm
		6	152	**(Prefix)-06-90(*)12**								
		9	228	**(Prefix)-09-90(*)12**								
		12	305	**(Prefix)-12-90(*)12**								
12	305	18	457	**(Prefix)-18-90(*)12**	19¼	489	19¼	489	19¼	489	19¼	489
		24	609	**(Prefix)-24-90(*)12**								
		30	762	**(Prefix)-30-90(*)12**								
		36	914	**(Prefix)-36-90(*)12**								
		6	152	**(Prefix)-06-90(*)24**								
		9	228	**(Prefix)-09-90(*)24**								
		12	305	**(Prefix)-12-90(*)24**								
24	609	18	457	**(Prefix)-18-90(*)24**	31¼	794	31¼	794	31¼	794	31¼	794
		24	609	**(Prefix)-24-90(*)24**								
		30	762	**(Prefix)-30-90(*)24**								
		36	914	**(Prefix)-36-90(*)24**								
		6	152	**(Prefix)-06-90(*)36**								
		9	228	**(Prefix)-09-90(*)36**								
		12	305	**(Prefix)-12-90(*)36**								
36	914	18	457	**(Prefix)-18-90(*)36**	43¼	1098	43¼	1098	43¼	1098	43¼	1098
		24	609	**(Prefix)-24-90(*)36**								
		30	762	**(Prefix)-30-90(*)36**								
		36	914	**(Prefix)-36-90(*)36**								

(*) Insert 'VO' for Vertical Outside Bend or 'VI' for Vertical Inside Bend.

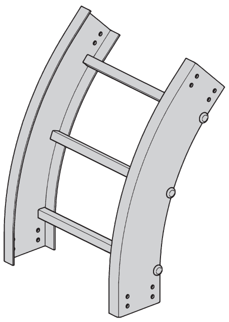
- R - Bend Radius in.	mm	Tray Width in.	mm	Catalog No.	90˚ Mitered Vertical Outside Bend A in.	mm	B in.	mm	Vertical Inside Bend A in.	mm	B in.	mm
		6	152	**(Prefix)-06-90(*)12**								
		9	228	**(Prefix)-09-90(*)12**								
		12	305	**(Prefix)-12-90(*)12**								
12	305	18	457	**(Prefix)-18-90(*)12**	20⅝	524	20⅝	524	20⅝	524	20⅝	524
		24	609	**(Prefix)-24-90(*)12**								
		30	762	**(Prefix)-30-90(*)12**								
		36	914	**(Prefix)-36-90(*)12**								
		6	152	**(Prefix)-06-90(*)24**								
		9	228	**(Prefix)-09-90(*)24**								
		12	305	**(Prefix)-12-90(*)24**								
24	609	18	457	**(Prefix)-18-90(*)24**	28 31/32	735	28 31/32	735	28 31/32	735	28 31/32	735
		24	609	**(Prefix)-24-90(*)24**								
		30	762	**(Prefix)-30-90(*)24**								
		36	914	**(Prefix)-36-90(*)24**								
		6	152	**(Prefix)-06-90(*)36**								
		9	228	**(Prefix)-09-90(*)36**								
		12	305	**(Prefix)-12-90(*)36**								
36	914	18	457	**(Prefix)-18-90(*)36**	37 15/16	963	37 15/16	963	37 15/16	963	37 15/16	963
		24	609	**(Prefix)-24-90(*)36**								
		30	762	**(Prefix)-30-90(*)36**								
		36	914	**(Prefix)-36-90(*)36**								

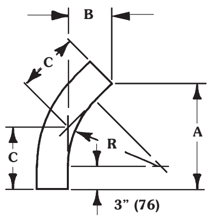
(*) Insert 'VO' for Vertical Outside Bend or 'VI' for Vertical Inside Bend.

Vertical Bends 45° (VO) (VI)

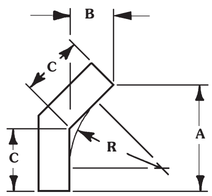
Vertical Outside Bend

VO





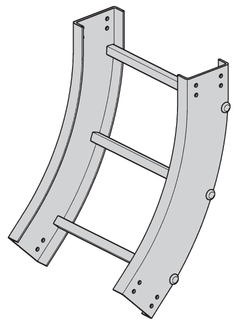
45˚ (VO) Molded

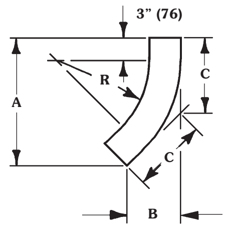


45˚ (VO) Mitered

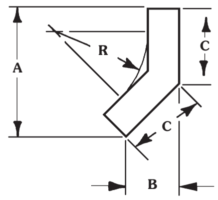
Vertical Inside Bend

VI





45˚ (VI) Molded



45˚ (VI) Mitered

One pair of splice plates with SS6 hardware included.

Prefix - 06 - 45 VO 24
- Radius
- Fitting
- Angle
- Width
- To complete catalog number, insert fitting prefix.

Prefix - 06 - 45 VI 24
- Radius
- Fitting
- Angle
- Width
- To complete catalog number, insert fitting prefix.

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.

For 3" Fittings

(Radius 12" only • Tray widths - 6" thru 24")

Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat are all mitered

For 6" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester - 12" radius are mitered
24" & 36" radius are molded
Zero Halogen, and Dis-Stat - all radius are mitered

For 4" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester - 12" & 24" radius are molded
36" radius are mitered
Zero Halogen, and Dis-Stat - all radius are mitered

For 8" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester,
Zero Halogen, and Dis-Stat
are all mitered

Vertical Bends 45° (VO) (VI)

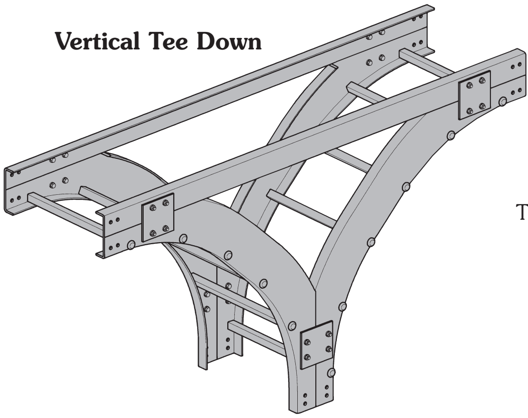
- R - Bend Radius		Tray Width		Catalog No.	45° Molded											
					Vertical Outside Bend						Vertical Inside Bend					
					A		B		C		A		B		C	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
		6	152	(Prefix)-06-45(*)12												
		9	228	(Prefix)-09-45(*)12												
		12	305	(Prefix)-12-45(*)12												
12	305	18	457	(Prefix)-18-45(*)12	13 5/8	346	5 5/8	143	8	203	16 7/16	417	6 13/16	173	9 5/8	244
		24	609	(Prefix)-24-45(*)12												
		30	762	(Prefix)-30-45(*)12												
		36	914	(Prefix)-36-45(*)12												
		6	152	(Prefix)-06-45(*)24												
		9	228	(Prefix)-09-45(*)24												
		12	305	(Prefix)-12-45(*)24												
24	609	18	457	(Prefix)-18-45(*)24	22 1/16	560	9 1/8	232	12 15/16	328	26 5/16	668	10 7/8	276	15 7/16	392
		24	609	(Prefix)-24-45(*)24												
		30	762	(Prefix)-30-45(*)24												
		36	914	(Prefix)-36-45(*)24												
		6	152	(Prefix)-06-45(*)36												
		9	228	(Prefix)-09-45(*)36												
		12	305	(Prefix)-12-45(*)36												
36	914	18	457	(Prefix)-18-45(*)36	30 9/16	776	12 11/16	322	17 15/16	455	34 13/16	884	14 7/16	367	20 3/8	517
		24	609	(Prefix)-24-45(*)36												
		30	762	(Prefix)-30-45(*)36												
		36	914	(Prefix)-36-45(*)36												

- R - Bend Radius		Tray Width		Catalog No.	45° Mitered											
					Vertical Outside Bend						Vertical Inside Bend					
					A		B		C		A		B		C	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
		6	152	(Prefix)-06-45(*)12												
		9	228	(Prefix)-09-45(*)12												
		12	305	(Prefix)-12-45(*)12												
12	305	18	457	(Prefix)-18-45(*)12	20 1/2	521	8 1/2	216	12	305	26 5/32	664	10 27/32	275	15 5/16	389
		24	609	(Prefix)-24-45(*)12												
		30	762	(Prefix)-30-45(*)12												
		36	914	(Prefix)-36-45(*)12												
		6	152	(Prefix)-06-45(*)24												
		9	228	(Prefix)-09-45(*)24												
		12	305	(Prefix)-12-45(*)24												
24	609	18	457	(Prefix)-18-45(*)24	28 31/32	736	12	305	16 31/32	431	36 1/16	916	14 15/16	379	21 1/8	537
		24	609	(Prefix)-24-45(*)24												
		30	762	(Prefix)-30-45(*)24												
		36	914	(Prefix)-36-45(*)24												
		6	152	(Prefix)-06-45(*)36												
		9	228	(Prefix)-09-45(*)36												
		12	305	(Prefix)-12-45(*)36												
36	914	18	457	(Prefix)-18-45(*)36	37 7/16	951	15 1/2	394	21 15/16	557	46	1168	19 1/32	483	26 15/16	684
		24	609	(Prefix)-24-45(*)36												
		30	762	(Prefix)-30-45(*)36												
		36	914	(Prefix)-36-45(*)36												

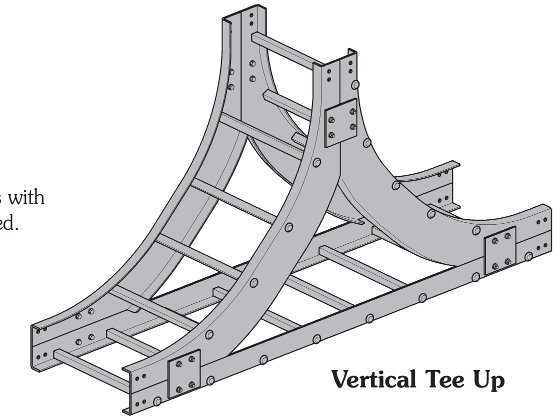
(*) Insert 'VO' for Vertical Outside Bend or 'VI' for Vertical Inside Bend.
60° and 30° vertical bends available in mitered construction.

Vertical Tee Up (VTU)
Vertical Tee Down (VT)

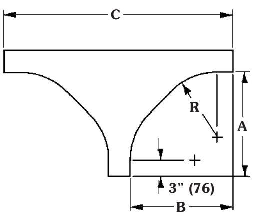
Vertical Tee Down



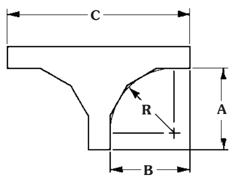
Two pair of splice plates with SS6 hardware included.



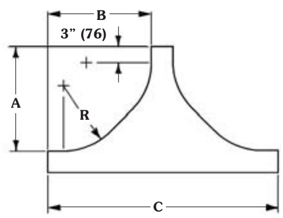
Vertical Tee Up



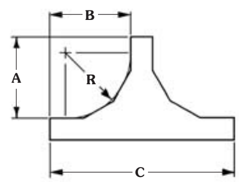
(VT) Molded



(VT) Mitered



(VTU) Molded



(VTU) Mitered

C Dimension =
2 x B + Side Rail Height

Prefix - 06 - VT 24
- Radius
- Fitting
- Width
- To complete catalog number, insert fitting prefix.

C Dimension =
2 x B + Side Rail Height

(Prefix) See page FT-25 for catalog number prefix.
Dimensions for reference only, when critical contact factory.

For 3" Fittings

(Radius 12" only • Tray widths - 6" thru 24")

Polyester, Vinyl Ester, Zero Halogen, and Dis-Stat are all mitered

For 6" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester - 12" radius are mitered thru 30" wide
24" & 36" radius are molded thru 36" wide
Zero Halogen, and Dis-Stat - all radius are mitered

For 4" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester - 12" & 24" radius are molded thru 36" wide
36" radius are mitered thru 30" wide
Zero Halogen, and Dis-Stat - all radius are mitered

For 8" Fittings

*(Radius 12", 24" & 36"
Tray widths - 6" thru 36")*

Polyester, Vinyl Ester - 12" radius are mitered thru 30" wide
24" & 36" radius are molded thru 36" wide
Zero Halogen, and Dis-Stat - all radius are mitered

Vertical Tee Up (VTU)
Vertical Tee Down (VT)

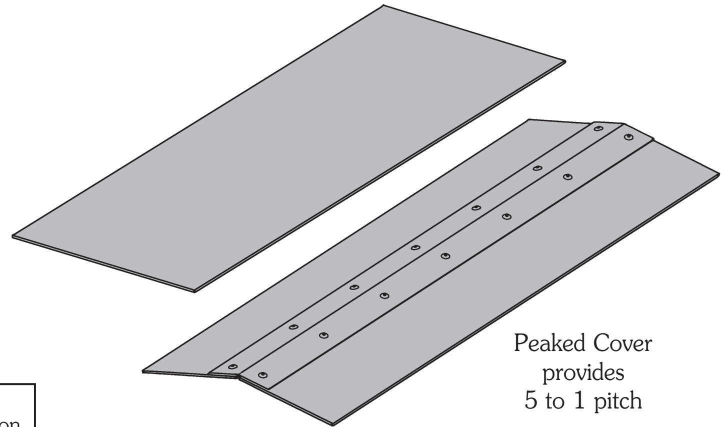
- R - Bend Radius in.	mm	Tray Width in.	mm	Catalog No.	Molded Vertical Tee Down A in.	mm	B in.	mm	Vertical Tee Up A in.	mm	B in.	mm
12	305	6	152	(Prefix)-06-(*)12	19¼	489	19¼	489	19¼	489	19¼	489
		9	228	(Prefix)-09-(*)12								
		12	305	(Prefix)-12-(*)12								
		18	457	(Prefix)-18-(*)12								
		24	609	(Prefix)-24-(*)12								
		30	762	(Prefix)-30-(*)12								
		36	914	(Prefix)-36-(*)12								
24	609	6	152	(Prefix)-06-(*)24	31¼	794	31¼	794	31¼	794	31¼	794
		9	228	(Prefix)-09-(*)24								
		12	305	(Prefix)-12-(*)24								
		18	457	(Prefix)-18-(*)24								
		24	609	(Prefix)-24-(*)24								
		30	762	(Prefix)-30-(*)24								
		36	914	(Prefix)-36-(*)24								
36	914	6	152	(Prefix)-06-(*)36	43¼	1098	43¼	1098	43¼	1098	43¼	1098
		9	228	(Prefix)-09-(*)36								
		12	305	(Prefix)-12-(*)36								
		18	457	(Prefix)-18-(*)36								
		24	609	(Prefix)-24-(*)36								
		30	762	(Prefix)-30-(*)36								
		36	914	(Prefix)-36-(*)36								

- R - Bend Radius in.	mm	Tray Width in.	mm	Catalog No.	Mitered Vertical Tee Down A in.	mm	B in.	mm	Vertical Tee Up A in.	mm	B in.	mm
12	305	6	152	(Prefix)-06-(*)12	20⅝	524	20⅝	524	20⅝	524	20⅝	524
		9	228	(Prefix)-09-(*)12								
		12	305	(Prefix)-12-(*)12								
		18	457	(Prefix)-18-(*)12								
		24	609	(Prefix)-24-(*)12								
		30	762	(Prefix)-30-(*)12								
24	609	6	152	(Prefix)-06-(*)24	29	736	29	736	29	736	29	736
		9	228	(Prefix)-09-(*)24								
		12	305	(Prefix)-12-(*)24								
		18	457	(Prefix)-18-(*)24								
		24	609	(Prefix)-24-(*)24								
		30	762	(Prefix)-30-(*)24								
36	914	6	152	(Prefix)-06-(*)36	37 15/16	963	37 15/16	963	37 15/16	963	37 15/16	963
		9	228	(Prefix)-09-(*)36								
		12	305	(Prefix)-12-(*)36								
		18	457	(Prefix)-18-(*)36								
		24	609	(Prefix)-24-(*)36								
		30	762	(Prefix)-30-(*)36								

(*) Insert 'VT' for Vertical Tee Down or 'VTU' for Vertical Tee Up.

Fiberglass - Covers & Cover Accessories

Covers



Peaked Cover provides 5 to 1 pitch

Material Thickness: ⅛" (3)
Cover Length: 10' (3m)
Standard Mounting Hardware: (10 each)
#10 x ½" stainless, self drilling screws provided with each section

Covers F - C - 24 - 120

- F = Material
- C = Rail design
- 24 = Width
- 120 = Length or fitting description

● F - C - 24 - 120	=	Flat polyester
● FV - C - 24 - 120	=	Flat vinyl ester
● FT - C - 24 - 120	=	Flat zero halogen
● FD - C - 24 - 120	=	Flat Dis-Stat
● FP - C - 24 - 120	=	Peaked polyester
● FVP - C - 24 - 120	=	Peaked vinyl ester
● FTP - C - 24 - 120	=	Peaked zero halogen
● FDP - C - 24 - 120	=	Peaked Dis-Stat

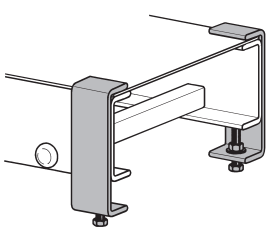
Peaked covers available for straight sections only.

Quantity of Standard Cover Clamps Required	
Straight Section 60" or 72"	4 pcs.
Straight Section 120" or 144"	6 pcs.
Horizontal/Vertical Bends	4 pcs.
Tees	6 pcs.
Crosses	8 pcs.

Note: When using the Heavy Duty Cover Clamp, only one-half the number of clamps stated above is required.

Standard Cover Clamp

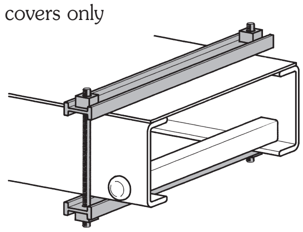
- Used to splice to existing cable tray systems.
- Furnished in pairs with hardware.



Catalog No.	Side Rail Height in.	Side Rail Height mm
9(Δ)-9013	4	101
9(Δ)-9014	5	127
9(Δ)-9016	6	152

Heavy Duty Cover Clamp

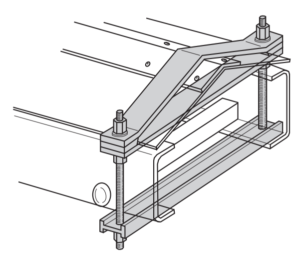
Recommended for outdoor service.
- W = tray width
- Heavy duty cover clamp available for flat covers only



Catalog No.	Side Rail Height in.	Side Rail Height mm
9(Δ)-W-9034	3	76
9(Δ)-W-9044	4	101
9(Δ)-W-9064	6	152
9(Δ)-W-9084	8	203

Peaked Cover Clamp

- W = tray width



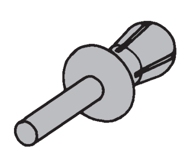
Catalog No.	Side Rail Height in.	Side Rail Height mm
9(Δ)-W-9034P	3	76
9(Δ)-W-9044P	4	101
9(Δ)-W-9064P	6	152
9(Δ)-W-9084P	8	203

Material Designations

(Δ) Insert one of the following material designations when required.
- ● F = Polyester Resin (Example: 9F-9013)
- ● FV = Vinyl Ester Resin (Example: 9FV-9013)
- ● FT = Zero Halogen Resin (Example: 9FT-9013)
- ● FD = Dis-Stat Resin (Example: 9F-9013)

Thermo Plastic Drive Rivet

Shipped in packages of 25 pcs.



Catalog No.	● TPDR

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Part Number with Hardware Explanation

Examples: **9F-0000*** **polyester resin** or **9FV-0000*** **vinyl ester resin** or **9FT-0000*** **zero halogen resin** or **9FD-0000*** **dis-stat resin**

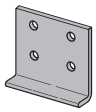
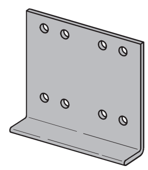
* indicates that additional information must be furnished to specify the type of hardware

Hardware Option	316 Stainless Steel	Monel	Silicon Bronze	Fiberglass
replace * with	SS6	MO	SB	FR

Example: 9F-4003: pair of 4-hole splice plates for 3" (76) system without hardware
9F-4004 SS6: pair of 4-hole splice plates for 4" (101) system with stainless steel hardware
9FV-8006 SB: pair of 8-hole vinyl ester splice plates for 6" (152) system with silicon bronze hardware

Standard Lay-In Splice Plates

Included in needed quantities with tray section.
- Furnished in pairs
- Order only pairs of splice plates needed for field fabrication.
- SS6 hardware supplied as standard - use SS6 suffix.
- Other hardware available, specify by hardware suffix. Hardware other than SS6 is considered special.

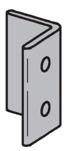
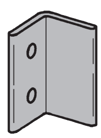
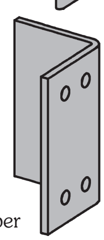
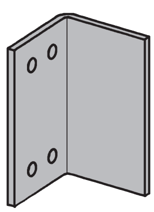



Material	Height	Catalog No.
Fiberglass	3" (76)	9(Δ)-4003*
	4" (101)	9(Δ)-4004*
	6" (152)	9(Δ)-8006*
	8" (203)	9(Δ)-8008*

* hardware suffix needed to complete part number

Tray to Box Splice Plates

These plates are used to attach the end of a tray run to a distribution box or control center.
- Furnished in pairs

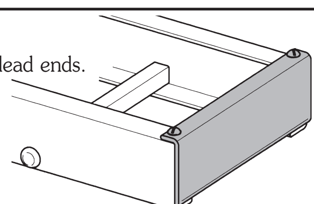
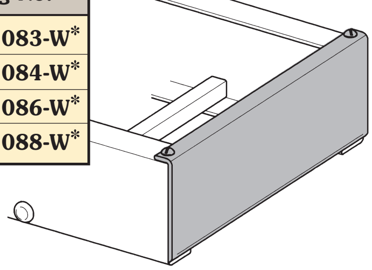





Material	Height	Catalog No.
Fiberglass	3" (76)	9(Δ)-4053*
	4" (101)	9(Δ)-4054*
	6" (152)	9(Δ)-8056*
	8" (203)	9(Δ)-8058*

* hardware suffix needed to complete part number

Blind End Plate

This plate forms a closure for any tray that dead ends.
- Furnished as one plate
- W = tray width

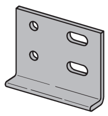
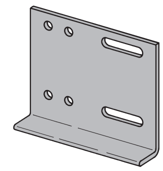



Material	Height	Catalog No.
Fiberglass	3" (76)	9(Δ)-1083-W*
	4" (101)	9(Δ)-1084-W*
	6" (152)	9(Δ)-1086-W*
	8" (203)	9(Δ)-1088-W*

* hardware suffix needed to complete part number

Expansion Splice Plate

L-shaped, lay-in style
- Furnished in pairs

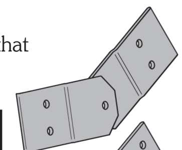
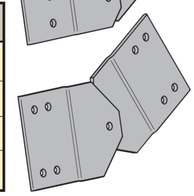



Material	Height	Catalog No.
Fiberglass	3" (76)	9(Δ)-4013*
	4" (101)	9(Δ)-4014*
	6" (152)	9(Δ)-8016*
	8" (203)	9(Δ)-8018*

* hardware suffix needed to complete part number

Vertical Adjustable Splice Plates

These plates provide for changes in elevation that do not conform to standard vertical fittings.
- Furnished in pairs

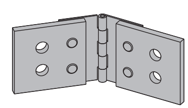
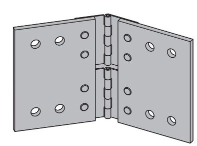



Material	Height	Catalog No.
Fiberglass	3" (76)	9(Δ)-4023*
	4" (101)	9(Δ)-4024*
	6" (152)	9(Δ)-8026*
	8" (203)	9(Δ)-8028*

* hardware suffix needed to complete part number

Horizontal Adjustable Splice Plates

These plates provide for changes in the horizontal direction that do not conform to standard fittings.
- Furnished in pairs
- Stainless steel hinges, FRP body

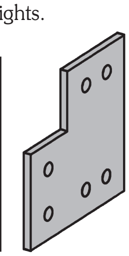



Material	Height	Catalog No.
Fiberglass	3" (76)	9(Δ)-4033*
	4" (101)	9(Δ)-4034*
	6" (152)	9(Δ)-8036*
	8" (203)	9(Δ)-8038*

* hardware suffix needed to complete part number

Step Down Splice Plates

These splice plates provide for changes in side rail heights.
- Furnished in pairs



Material	Height	Catalog No.
Fiberglass	8" to 6" (203 to 152)	9(Δ)-8086*
	8" to 4" (203 to 101)	9(Δ)-8084*
	6" to 3" (152 to 76)	9(Δ)-8063*
	6" to 4" (152 to 101)	9(Δ)-8064*
	4" to 3" (101 to 76)	9(Δ)-4043*

* hardware suffix needed to complete part number

Fiberglass

(Δ) See page FT-43 for material selection

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Dimensions shown in parentheses are in millimeters, unless otherwise specified.

Horizontal and Vertical Splice Plates

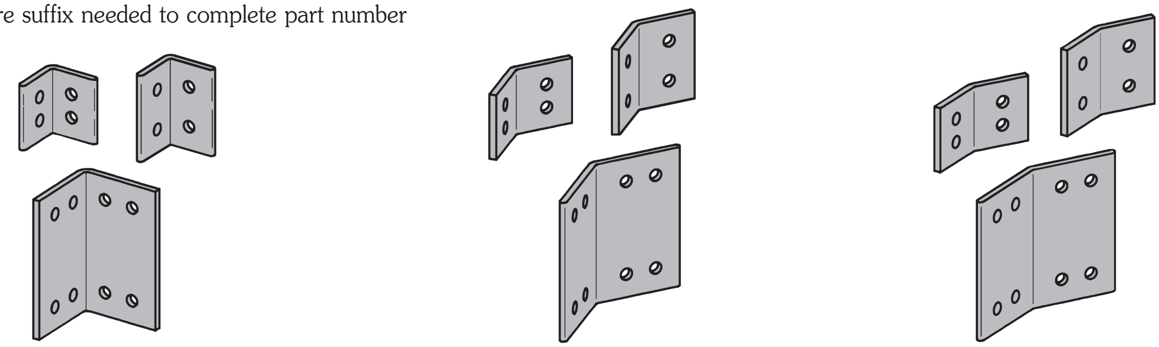
* Hardware suffix needed to complete part number
All splice plate hardware is 3/8".

Hardware Suffix:
SS6 - 316SS
MO - Monel
SB - Silicon Bronze
FR - Fiberglass

Horizontal Splice Plates

- Furnished in pairs

* Hardware suffix needed to complete part number

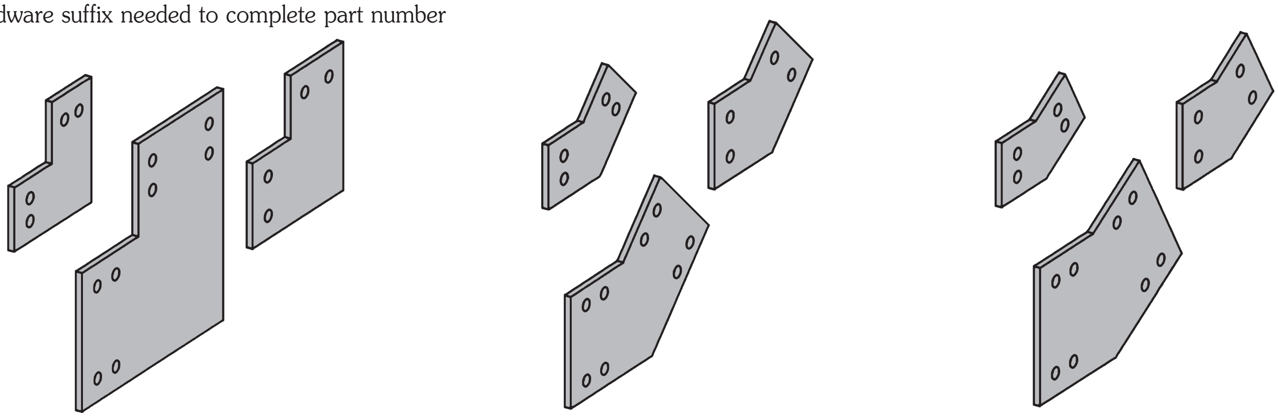


Catalog No. 90°	Catalog No. 45°	Catalog No. 30°
9(Δ)-4903H*	9(Δ)-4453H*	9(Δ)-4303H*
9(Δ)-4904H*	9(Δ)-4454H*	9(Δ)-4304H*
9(Δ)-8906H*	9(Δ)-8456H*	9(Δ)-8306H*
9(Δ)-8908H*	9(Δ)-8458H*	9(Δ)-8308H*

Vertical Splice Plates

- Furnished in pairs

* Hardware suffix needed to complete part number



Catalog No. 90°	Catalog No. 45°	Catalog No. 30°
9(Δ)-4903V*	9(Δ)-4453V*	9(Δ)-4303V*
9(Δ)-4904V*	9(Δ)-4454V*	9(Δ)-4304V*
9(Δ)-8906V*	9(Δ)-8456V*	9(Δ)-8306V*
9(Δ)-8908V*	9(Δ)-8458V*	9(Δ)-8308V*

Standard lay-in splice plates with SS6 hardware included with tray sections.
Splice Plates are available in pairs and are a separate order item. They are not automatically supplied with tray sections.

(Δ) See page FT-43 for material selection

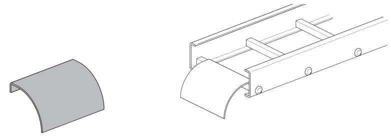
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Ladder Drop-Out

Specially-designed Ladder Drop-Outs provide a rounded surface with adequate radius to protect cable as it exits from the tray, preventing damage to insulation.

- 4" (101) radius
- W = tray width

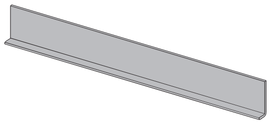
Catalog No.
9(Δ)-1104-W



Barriers

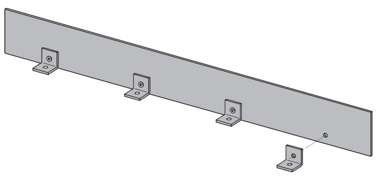
- Furnished with #10 x ½" self-drilling stainless steel screws

Catalog No.	Side Rail Height in.	mm
72(Δ)-120	3"	(76)
73(Δ)-120	4"	(101)
75(Δ)-120	6"	(152)
77(Δ)-120	8"	(203)



Flexible Horizontal Barrier Kit

One kit allows up to a 38" (965) radius position of the barrier. For larger than 38" (965) radius barrier position, two kits are required.



Catalog No.	Side Rail Height in.	mm
72(Δ)-90HBFL	3"	(76)
73(Δ)-90HBFL	4"	(101)
75(Δ)-90HBFL	6"	(152)
77(Δ)-90HBFL	8"	(203)

Kit Contents:

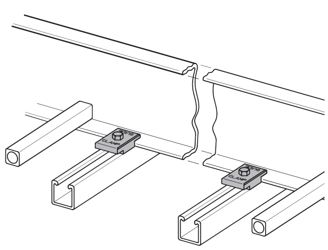
1 pc — 72" (1829) Straight Barrier
4 pc — 9F-9002 Barrier Strip Clip
8 pc — Thermo Plastic Drive Rivet
4 pc — #10 x ¾" Stainless Steel Self-Drilling Screw

Assembly required — directions included.

Clamp/Guide - Fiberglass

Nonmetallic

- Designed for ⅜" hardware - not included
- Combination hold down clamp and guide
- Material: Glass reinforced polyurathane



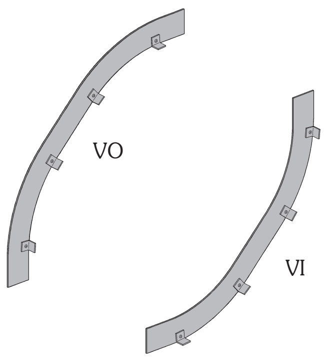
Catalog No.
9F-1208

Vertical Bend Barriers

7* (Δ) - 90 VO 24

- 24 — Radius
- VO — VI or VO
- 90 — Angle
- (Δ) — Material
- 7* — Barrier Size

* Insert 2 for 3" (76) siderail height
3 for 4" (101) siderail height
5 for 6" (152) siderail height



Resin Seal Kit

To reseal fiberglass after field modifications.

- 1 pint (473ml)

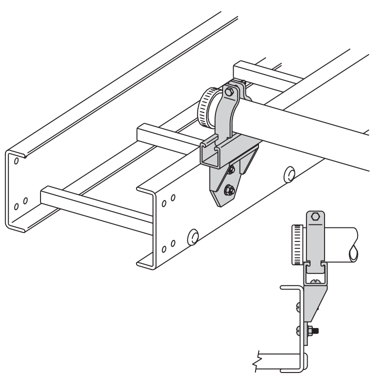
Contents: Sealant and Applicator.

Catalog No.
RSK-010

Fiberglass Conduit to Cable Tray Adapter

- For rigid or PVC conduit
- Standard hardware is 316 stainless steel
- Add 'N' to end of part number if non-metallic hardware is preferred

Catalog No.	Conduit Size in.	mm
9(Δ)-2008	0.50	15
9(Δ)-2009	0.75	20
9(Δ)-2010	1.00	25
9(Δ)-2011	1.25	32
9(Δ)-2012	1.50	40
9(Δ)-2013	2.00	50
9(Δ)-2014	2.50	65
9(Δ)-2015	3.00	80
9(Δ)-2016	3.50	90
9(Δ)-2017	4.00	100



Dimensions shown in parentheses are in millimeters, unless otherwise specified.

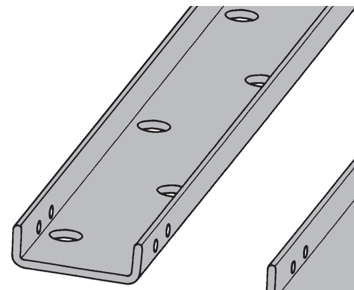
(Δ) See page FT-43 for material selection

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

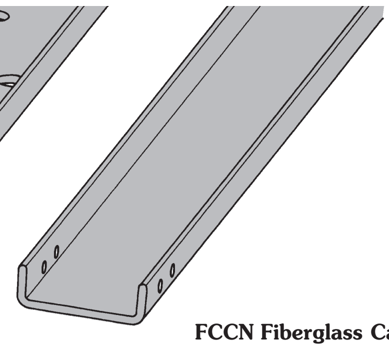
Fiberglass - Cable Channel & Fittings

Straight Section

- Load data was interpolated from CSA testing.
- Loads shown are for FCCN series.
- Loads shown are for 6 ft. (1.83m) span with deflection of .7 (18.26) inches.



FCC Fiberglass Cable Channel Ventilated



FCCN Fiberglass Cable Channel Non-Ventilated

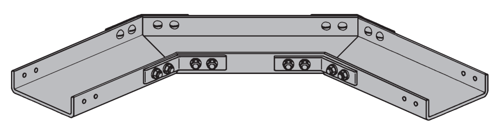
One pair of splice plates included with each straight section.

Catalog No.		Width		Length		Height		Load	
Ventilated	Non-Ventilated	in.	mm	ft.	m	in.	mm	Lbs/Ft	kg/m
(*)-03-120	**(*)N-03-120**	3	76	10	3	1	25	8	12
(*)-03-240	**(*)N-03-240**	3	76	20	6				
(*)-04-120	**(*)N-04-120**	4	101	10	3	1⅛	28	12	18
(*)-04-240	**(*)N-04-240**	4	101	20	6				
(*)-06-120	**(*)N-06-120**	6	152	10	3	1⅝	35	58	86
(*)-06-240	**(*)N-06-240**	6	152	20	6				
(*)-08-120	**(*)N-08-120**	8	203	10	3	2³⁄₁₆	55	87	129
(*)-08-240	**(*)N-08-240**	8	203	20	6				

(*) Insert material type straight sections
- ● FCC for Polyester Resin
- ● FCCV for Vinyl Ester Resin
- ● FCCT for Zero Halogen Resin
- ● FCCD for Dis-Stat Resin

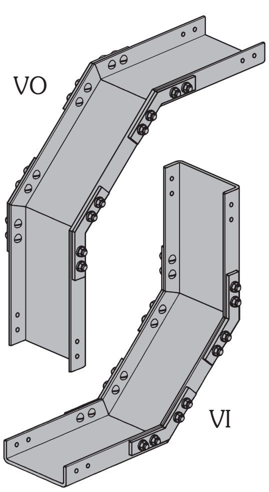
Cable Channel Fittings

All fittings are of mitered construction with 12" (305) radius.



One pair of splice plates included.

Horizontal	3" series	4" series	6" series	8" series
90˚	**(†)N-03-90HB12**	**(†)N-04-90HB12**	**(†)N-06-90HB12**	**(†)N-08-90HB12**
45˚	**(†)N-03-45HB12**	**(†)N-04-45HB12**	**(†)N-06-45HB12**	**(†)N-08-45HB12**



Vertical	3" series	4" series	6" series	8" series
90˚	**(†)N-03-90V*12**	**(†)N-04-90V*12**	**(†)N-06-90V*12**	**(†)N-08-90V*12**
45˚	**(†)N-03-45V*12**	**(†)N-04-45V*12**	**(†)N-06-45V*12**	**(†)N-08-45V*12**

One pair of splice plates included.

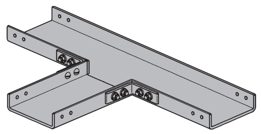
(†) Insert material type for fittings
- ● FCC for Polyester Resin
- ● FCCV for Vinyl Ester Resin
- ● FCCT for Zero Halogen Resin
- ● FCCD for Dis-Stat Resin

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cable Channel Fittings

All fittings are of mitered construction with 12" (305) radius.

Horizontal Tees

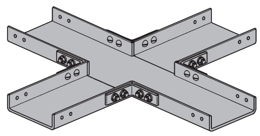


Catalog No.	Width in.	Width mm
FCC(†)N-03-HT12	3	76
FCC(†)N-04-HT12	4	101
FCC(†)N-06-HT12	6	152
FCC(†)N-08-HT12	8	203

Two pair of splice plates included.

(†) See page fitting material selection bottom of page FT-47

Horizontal Crosses



Catalog No.	Width in.	Width mm
FCC(†)N-03-HX12	3	76
FCC(†)N-04-HX12	4	101
FCC(†)N-06-HX12	6	152
FCC(†)N-08-HX12	8	203

Three pair of splice plates included.

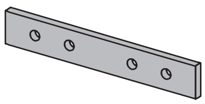
(†) See page fitting material selection bottom of page FT-47

Cable Channel Splice Plates

Splice Plates

(pairs)

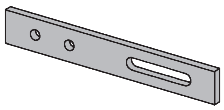
Included with tray sections.



Catalog No.
9(Δ)-1001 SS6

Expansion Splice Plates

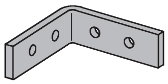
(pairs)



Catalog No.
9(Δ)-1013 SS6

Horizontal 90˚ Splice Plates

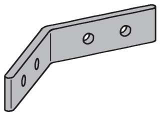
(pairs)



Catalog No.
9(Δ)-1901H SS6

Horizontal 45˚ Splice Plates

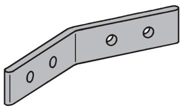
(pairs)



Catalog No.
9(Δ)-1451H SS6

Horizontal 30˚ Splice Plates

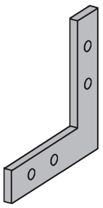
(pairs)



Catalog No.
9(Δ)-1301H SS6

Vertical 90˚ Splice Plates

(pairs)



Catalog No.
9(Δ)-1901V SS6

Splice plates included with cable channel sections.
Standard hardware for splice plates is 1/4"-20 (316SS).

(Δ) See page FT-43 for material selection

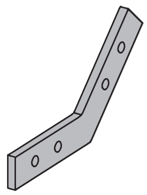
Fiberglass

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cable Channel Splice Plates

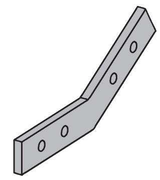
Vertical 45° Splice Plates
(pairs)

Catalog No.
9(Δ)-1451V SS6

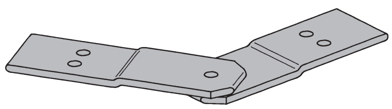


Vertical 30° Splice Plates
(pairs)

Catalog No.
9(Δ)-1301V SS6



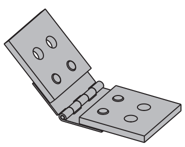
Horizontal Adjustable Splice Plates



Catalog No.
9(Δ)-1023 SS6

Uses 3/8"-16 hardware.

Vertical Adjustable Splice Plates



Stainless steel hinge FRP body

Catalog No.
9(Δ)-1033 SS6

Uses 3/8"-16 hardware.

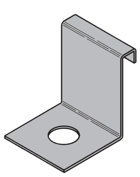
Splice plates included with cable channel sections.
Standard hardware for splice plates is 1/4"-20 (316SS). Hardware for adjustable splice plates is 3/8"-16 (316SS).

(Δ) See page FT-43 for material selection

Cable Channel Clamps

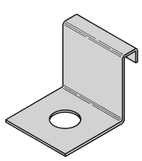
Expansion Guide Clamp
(one clamp)
• Order 1/2" hardware separately

Catalog No.	Width in.	Width mm
● 9SS6-1248-3	3	76
● 9SS6-1248-4	4	101
● 9SS6-1248-6	6	152
● 9SS6-1248-8	8	203



Hold-Down Clamp
(one clamp)
• Order 1/2" hardware separately

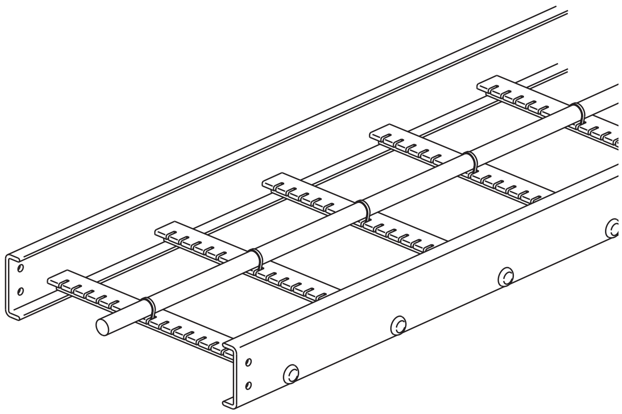
Catalog No.	Width in.	Width mm
● 9SS6-1247-3	3	76
● 9SS6-1247-4	4	101
● 9SS6-1247-6	6	152
● 9SS6-1247-8	8	203



● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Marine Rung Cable Tray/Fiberglass

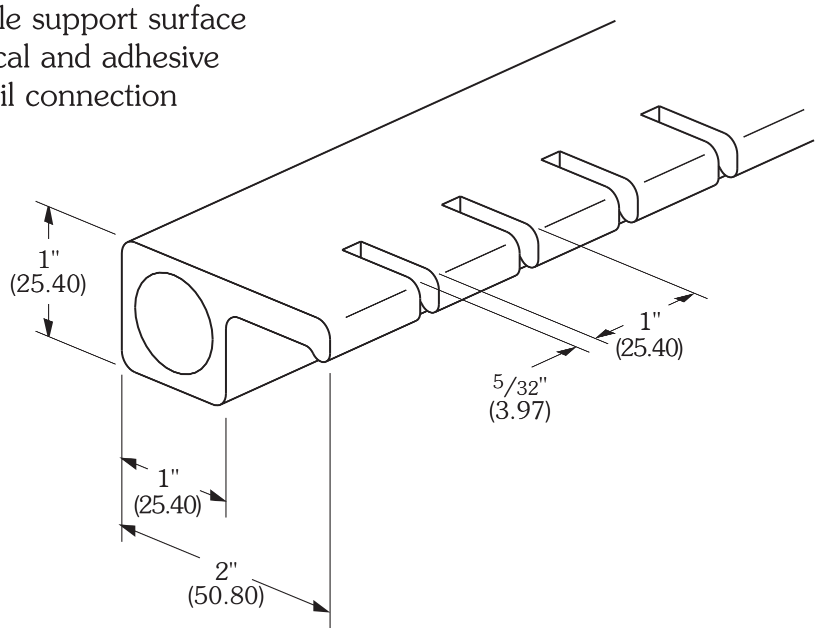
Patent Pending



Features:

- For Coast Guard Requirements
  - Allows stainless steel banding of cables
  - 5/32" (15.88) slots 1 inch (25.40) on centers
  - Accommodates up to 5/8" (.625) banding
- Has applications on land
  - Vertical installation
  - Any location where extra cable positioning is required
- Designed for B-Line Fiberglass Series Cable Trays
- Part Number Indication
  - Add MR after rung spacing
  - Example: 46F09MR-36-240

Rung design provides:
- 2" (50.80) cable support surface
- Both mechanical and adhesive rung to side rail connection



● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cable Fixing

How The Service Advisor Works

B-Line knows that your time is important! That's why the color-coding system in this catalog is designed to help you select products that fit your service needs. Products are marked to indicate the typical lead time for orders of 50 pieces or less.

Customer: How do I select my straight sections. covers, or fittings so that I get the quickest turnaround?

Service Advisor: Each part of our selection chart is shown in colors. If any section of a part number is a different color, the part will typically ship with the longer lead time represented by the colors.

- ● Green = Fastest shipped items (normally 3 to 5 working days)
- ● Black = Normal lead-time items (normally 5 to 10 working days)
- ● Red = Normally long lead-time items (15 working days minimum)

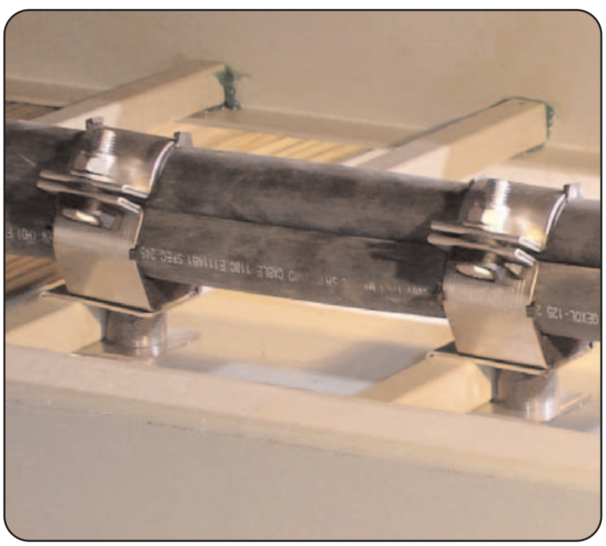
Example: (from page CF-4)	**9SS6 - CC2328** ●	**Part will typically ship in 15 days minimum.**
Lead time(days)	15	

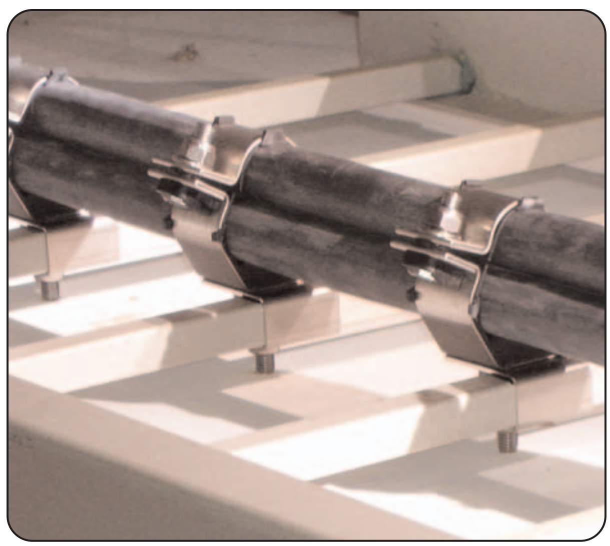
Emperor Trefoil Cable Cleats

Vulcan Cable Cleats

Emperor Trefoil Cable Cleats with LSF Liner
Emperor cable cleats are recommended for installations where the highest levels of short circuit withstand are required. Emperor cable cleats are independently certified to BS EN 50368:2003, Category-2 resistance to electromechanical forces during short circuits (i.e. cable and cleats are intact and reusable after two successive short circuit tests). To protect and cushion cables, Emperor cleats incorporate an integral low smoke, low fume, zero halogen liner in its unique patented design. Recommended fixing methods include one bolt, two bolts, weld stud or framing strut mounting. Optional bases are available to mount Emperor cable cleats to non-performed ladder tray rungs.

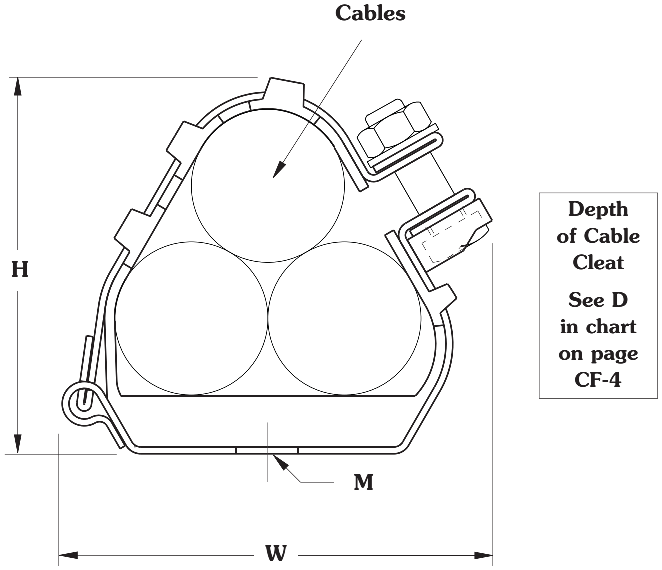
Vulcan Cable Cleats with LSF Liner
Vulcan cable cleats are recommended for installations where moderate levels of short circuit withstand are required. Vulcan cable cleats are designed for trefoil, single and triplex cable installations. Vulcan cable cleats are independently certified to BS EN 50368:2003. To protect and cushion cables, each Vulcan cleat incorporates an integral low smoke, low fume, zero halogen liner in its unique patented design. Recommended fixing methods include one bolt, two bolts, weld stud or framing strut mounting.





BS EN 50368:2003 (Cable Cleats for Electric Installations) Classification	
	Emperor
Cleat Type	Composite
Operating Temperature Range	-40°C to +60°C
Resistance to Electromechanical Force (See kVA Strategies for Details)	Category-1: 235kA$_{peak}$ / 109kArms Category-2: 178kA$_{peak}$ / 83kArms
Laterial Load Test	Refer to kVA Strategies
Axial Load Test	650N
Impact Resistance	Very Heavy (>6.7kg @ 300mm)
Needle Flame Test	>120 seconds

Technical Specifications	
	Emperor
Frame	50mm Wide x 2mm Thick Marine Grade, Non-magnetic 316L Stainless Steel (BS EN 10088)
Closure Hardware	316L Stainless Steel M12 Bolt, Nyloc Nut & Flat Washer (BS 3692)
Integral LSF Liner	Low Smoke, Low Fume Zero Halogen Polymer
Tools Required	3/4" or 19mm
Installation Features	Captive Closure Bolt 1 or 2 Bolt Mounting (3/8" Max. Dia.)



Emperor Trefoil Cable Cleat Dimensional Drawing

Cable Fixing

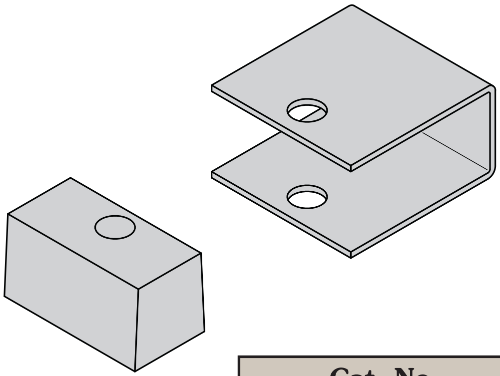
Clamp Type	Catalog Number	Trefoil Confrigurationᅟ Min. Cable Dia. in.	mm	Max. Cable Dia. in.	mm
● Emperor	9SS6-CC2328*	0.906	23	1.102	28
	9SS6-CC2732*	1.063	27	1.260	32
	9SS6-CC3035*	1.181	30	1.378	35
	9SS6-CC3338*	1.299	33	1.496	38
	9SS6-CC3642*	1.417	36	1.654	42
	9SS6-CC4046*	1.575	40	1.811	46
	9SS6-CC4450*	1.732	44	1.969	50
	9SS6-CC4855*	1.890	48	2.165	55

Clamp Type	Catalog Number	Dimensions: H (Height) in.	mm	W (Width) in.	mm	D (Depth) in.	mm	M (Hole Dia.) in.	mm	Weight Each lbs.	kg
● Emperor (Trefoil Cleats)	9SS6-CC2328*	3.27	83	3.78	96	2.00	51	0.465	12	0.935	0.43
	9SS6-CC2732*	3.46	88	3.82	97	2.00	51	0.465	12	0.968	0.44
	9SS6-CC3035*	3.58	91	3.90	99	2.00	51	0.465	12	1.001	0.46
	9SS6-CC3338*	3.74	95	4.06	103	2.00	51	0.465	12	1.012	0.46
	9SS6-CC3642*	3.94	100	4.88	124	2.00	51	0.465	12	1.342	0.61
	9SS6-CC4046*	4.17	106	4.92	125	2.00	51	0.465	12	1.342	0.61
	9SS6-CC4450*	4.61	117	5.12	130	2.00	51	0.465	12	1.386	0.63
	9SS6-CC4855*	4.76	121	5.20	132	2.00	51	0.465	12	1.408	0.64

* Leave blank for marine rung / strut rung applications. Order mounting hardware separately: 3/8" x 1" HHCS (SS6) and N228WO (SS6).
* Add SR for standard rung applications.

Cable Cleat Mounting Bracket

- Clamps around Cooper B-Line's standard cable tray rungs.
- Bracket welded to bottom of Emperor Cleat when "SR" suffix is added to cleat part number..
- Order 3/8" x 1 1/2" HHCS SS6 and 3/8" SFHN SS6 hardware separately.
- Material: 316L Stainless Steel



Cat. No.
● 9SS6-CCMB

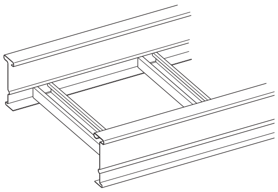
● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Cable Fixing

Appendix - Bottom Design Options

These options are in addition to the Standard Ladder Rungs, Ventilated Trough and Solid Trough type Cable Trays.

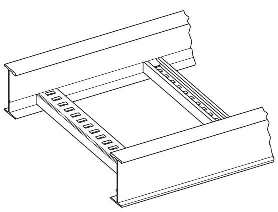
Ladder with Strut Rungs



- B44 strut installed as rungs.
- Strut orientation may be channel opening up, channel opening down, or alternating - standard is alternating unless specified otherwise.
- Strut may be solid back or with slotted hole pattern "SH".
- The Cooper B-Line strut rung system offers additional cable clamping options relative to the chosen slot orientation.

Examples: 248G09B44-12-144
Strut rung on 9" centers with alternating slot orientation.
248G12B44SHDN-12-144
"SH" Strut rung on 12" centers with channel opening down (Note: replace "DN" with "UP" for channel opening up.)

Marine Rung (Available in Aluminum, HDGAF Steel and Stainless Steel)



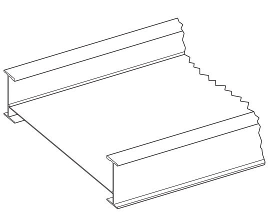
(Aluminum Shown)

- Designed for Series 3 or heavier systems.
- Special rung design to accommodate stainless steel banding of cables (U.S. Coast Guard requirement) with .25" x .69" slots.
- Has applications on land, vertical installation, any location where extra cable positioning/attachment is required.
- Rung strength - Aluminum supports 499 lbs. per rung on 36" wide system with a 1.5 safety factor. Steel supports 755 lbs. per rung on 36" wide system with a 1.5 safety factor.
- New design provides combination of strut fastening and marine rung fastening.

Example: 46A12MR-36-288 or 464G12MR-36-288

Special Rung Spacings: 4" & 18" rung spacing available upon request.

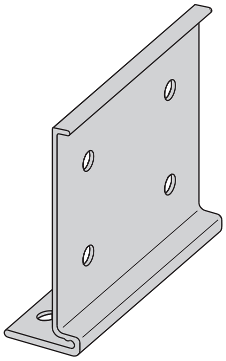
Non-Ventilated



- Solid flat sheet welded into the Cable Tray above the rungs.
- Standard rung spacing is 12 inches.
- The flat sheet may be installed under the rungs, if preferred.
- The flat sheet may be installed over B54 rungs “slot down”.

Examples: 24ASB-36-144
Flat sheet bottom over standard rung on 12" spacing.
24ASBB54-36-144
Flat sheet bottom over B54 strut rung slot down on 12" spacing.

B-Line's 9A-6006 and 9A-6007 Aluminum Mid-Span Splice



Features

- Standard for H46A, H47A and 57A straight sections.
- Allows random splice location.
- Six bolt design 1/2" Stainless Steel Type 316 hardware standard.
- Available on ladder bottoms only.
  - 09" and 12" rung spacing.

Tray Series	Catalog No.
H46A	**9A-6006**
H47A	**9A-6007**
57A	**9A-6007**

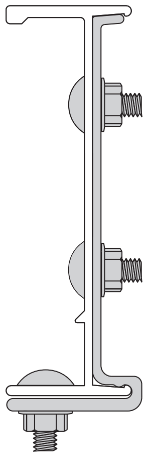
The Cable Tray:

H46A

Tested to:
- 167 lbs/ft (safety factor 1.5)
- 125 lbs/ft (safety factor 2.0)
- 20 ft. simple beam test
  - 12" rung spacing • 36" wide

H47A

Tested to:
- 149 lbs/ft (safety factor 1.5)
- 112 lbs/ft (safety factor 2.0)
- 20 ft. simple beam test
  - 12" rung spacing • 36" wide



The Splice:

9A-6006

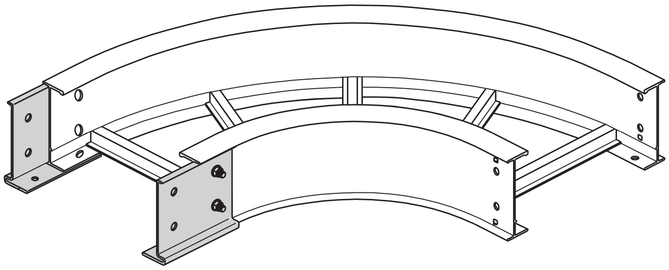
Tested to:
- 135 lbs/ft (safety factor 1.5)
- 101 lbs/ft (safety factor 2.0)
- 20 ft. simple beam test
  - mid-span splice

9A-6007

Tested to:
- 143 lbs/ft (safety factor 1.5)
- 107 lbs/ft (safety factor 2.0)
- 20 ft. simple beam test
  - mid-span splice

Options: The 9A-6006 and 9A-6007 splice is also available with B-Line's 46A and 47A series cable tray systems

- Available on ladder bottoms only (09" and 12" rung spacing).
- Available on 240" (20') or longer span straight sections.
- To order add "MS" to part number: Ex. 46AMS09-24-288.
- For standard 6A or 7A fittings with H46A or H47A systems an additional pair of standard splice plates is required (9A-1006 or 9A-1007).



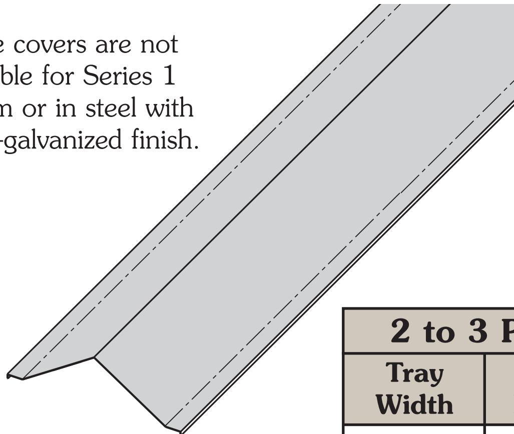
One pair 9A-6006 or 9A-6007 included.

Also available:
H6A and H7A Fittings

- Ladder bottom only (09" RS).
- Incorporates the 9A-6006 or 9A-6007 splice.
- Example: H6A-12-90HB24 or H7A-12-90HB24

Special Purpose 2 to 3 Pitch Peaked Covers

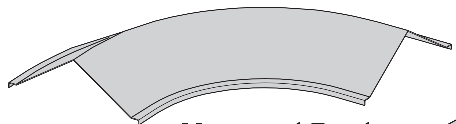
These covers are not available for Series 1 system or in steel with a pre-galvanized finish.



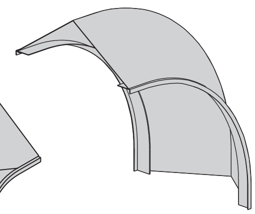
Features

- 33° slope to shed precipitants.
- Heavy construction - made for the industrial environment.
- Available in aluminum and steel; hot dip galvanized after fabrication (HDGAF ASTM A-123), 304 stainless and 316 stainless.
- Available in flanged design only.
- Fittings are in multiple piece welded construction.

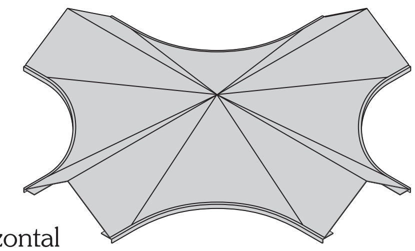
2 to 3 Pitch	
Tray Width	**Peak Height**
6"	2"
9"	3"
12"	4"
18"	6"
24"	8"
30"	10"
36"	12"



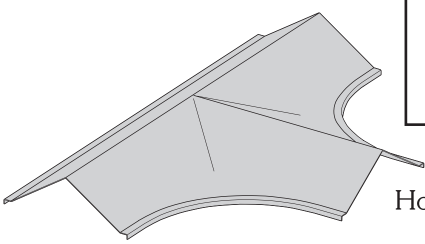
Horizontal Bend



Vertical Outside Bend



Horizontal Cross



Horizontal Tee

Catalog Number Selector

Example: 83 7 A 80 - 24 - 144

Cover Type
- 83 = 2 to 3 Pitch Peaked

Detail
- 7 = Flanged Aluminum
- 2 = Flanged Steel (248, 258, 268 straight sections & fittings
- 3 = Flanged Steel (All straight sections except 248, 258, 268)

Material
- A = Aluminum
- G = HDGAF ASTM A-123
- SS4 = 304 Stainless Steel
- SS6 = 316 Stainless Steel

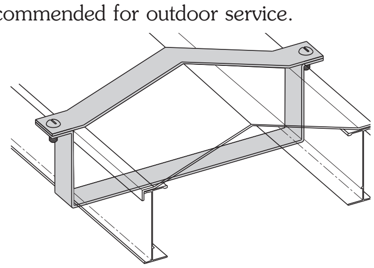
Material Thickness
- 80 = .080 Aluminum straight section
- 125 = .125 Aluminum fittings
- 16 = 16 Ga. Steel straight sections.
- 18 = 18 Ga. Steel fittings.

Tray Width
- 06 = 6"
- 09 = 9"
- 12 = 12"
- 18 = 18"
- 24 = 24"
- 30 = 30"
- 36 = 36"

Item Description
- 144 = 12 ft. (3.66 m)
- 120 = 10 ft. (3.05 m)
- 72 = 6 ft. (1.83 m)
- 60 = 5 ft. (1.52 m)

2 to 3 Pitch Cover Clamp

- Recommended for outdoor service.



Side Rail Height in.	mm	Catalog No. Aluminum	Catalog No. Steel	Catalog No. Stainless Steel
4	101	● 9A-(‡)-9P44	● 9G-(‡)-9P44	● 9**-(‡)-9P44
5	127	● 9A-(‡)-9P54	● 9G-(‡)-9P54	● 9**-(‡)-9P54
6	152	● 9A-(‡)-9P64	● 9G-(‡)-9P64	● 9**-(‡)-9P64
7	178	● 9A-(‡)-9P74	● 9G-(‡)-9P74	● 9**-(‡)-9P74

(‡) Insert tray width (**) Insert SS4 or SS6

● Green = Fastest shipped items (normally 3 to 5 working days)
● Black = Normal lead-time items (normally 5 to 10 working days)
● Red = Normally long lead-time items (15 working days minimum)

Reference Material - Methods Permitted

Wiring methods permitted in cable tray per the 2005 NEC®

1. Armored cable .... (Article 320)
2. Electrical metallic tubing .... (Article 358)
3. Electrical nonmetallic tubing .... (Article 362)
4. Fire alarm cables .... (Article 760)
5. Flexible metal conduit .... (Article 348)
6. Flexible metallic tubing .... (Article 360)
7. Instrumentation tray cable .... (Article 727)
8. Intermediate metal conduit .... (Article 342)
9. Liquidtight flexible metal conduit .... (Article 350)
10. Liquidtight flexible nonmetallic conduit .... (Article 356)
11. Metal-clad cable .... (Article 330)
12. Mineral-insulated, metal-sheathed cable .... (Article 332)
13. Multiconductor service-entrance cable .... (Article 338)
14. Multiconductor underground feeder and branch-circuit cable .... (Article 340)
15. Multipurpose and communications cables .... (Article 800)
16. Nonmetallic-sheathed cable .... (Article 334)
17. Power and control tray cable .... (Article 336)
18. Power-limited tray cable .... (Section 725.61(C) and 725.71(E)
19. Optical fiber cables .... (Article 770)
20. Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays
21. Rigid metal conduit .... (Article 344)
22. Rigid nonmetallic conduit .... (Article 352)

Reference Material - Formulas

Formulas

- Allowable load: $w = \dfrac{F96Sx}{L^2}$

- Deflection: $\Delta = \dfrac{5WL^3}{384EIx} = \dfrac{5wL^4}{4608EIx}$

- Stress: $F = \dfrac{wL^2}{96Sx}$

- Deflection Multiplier (K) $= \dfrac{\text{deflection}}{w} = \dfrac{5L^4}{4608EIx}$

- Max. Working Load $= \dfrac{\text{Max. deflection}}{\text{Deflection Multiplier}}$

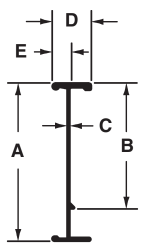
Legend		
w	=	load (lbs/ft)
W	=	total load across span (lbs)
F	=	design stress (lbs/in^2)
L	=	span (inches)
Sx	=	section modulus for 2 rails (in^3) (see page A-5 for Sx values)
E	=	10 million for Alum. (lb/in.^{2}) 29 million for Steel (lb/in.^{2})
Ix	=	moment of inertia for 2 rails (in^4) (see page A-5 for Ix values)

Appendix

Cable Tray Side Rails

Design Data For One Rail

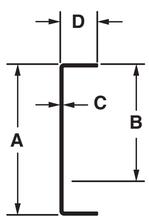
Aluminum Side Rails



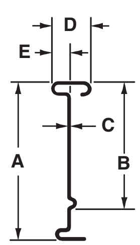
A - Side Rail Height
B - Loading Depth
C - Web Thickness
D - Flange Width

B-Line Series	Side Rail Height	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	Sx ($in.^3$)	Ix ($in.^4$)	Area ($in.^2$)	Weight (lbs./ft.)
24	4	4.12	3.05	.060	1.75	.740	.67	1.43	.525	.62
M24	4	4.18	3.09	.080	1.75	.760	.84	1.93	.750	.83
34	4	4.20	3.08	.100	1.75	.750	1.05	2.49	.902	1.06
25	5	5.00	3.93	.068	1.75	.748	.90	2.31	.620	.72
35	5	5.06	3.96	.090	1.75	.745	1.18	3.19	.857	.98
26	6	6.12	5.04	.065	2.00	.745	1.26	3.95	.698	.82
36	6	6.17	5.06	.075	2.00	.725	1.68	5.42	.903	1.05
46	6	6.19	5.08	.085	2.00	.650	1.79	6.09	.989	1.17
M46	6	6.20	5.09	.100	2.00	.750	1.89	6.36	1.116	1.30
H46	6	6.24	5.09	.130	2.00	.750	2.67	8.65	1.473	1.74
37	7	7.14	6.05	.075	2.00	.750	1.88	6.75	.904	1.06
47	7	7.24	6.13	.100	2.00	.675	2.47	8.94	1.189	1.40
H47	7	7.24	6.09	.125	2.00	.675	3.05	11.46	1.520	1.77
57	7	7.40	6.23	.160	2.00	.875	3.86	16.43	2.114	2.46
S8A	8	8.00	6.17	.170	3.00	1.000	7.69	27.67	2.754	3.20

Steel Side Rails



Series One Rail Only



All Other Steel Rails

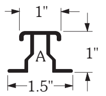
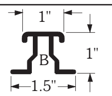
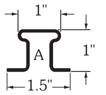
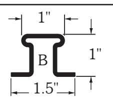
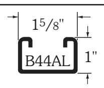
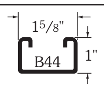
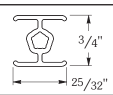
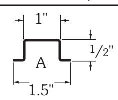
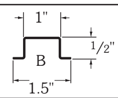
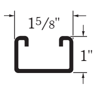
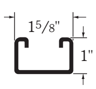
A - Side Rail Height
B - Loading Depth
C - Web Thickness
D - Flange Width

B-Line Series	Side Rail Height	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	Sx ($in.^3$)	Ix ($in.^4$)	Area ($in.^2$)	Weight (lbs./ft.)
148	4	3.625	3.125	.048	.875	--	.25	.45	.251	.84
156	5	4.188	3.688	.060	.875	--	.36	.76	.340	1.16
166	6	5.188	4.688	.060	.750	--	.46	1.20	.385	1.31
176	7	6.188	5.688	.060	.750	--	.64	1.90	.444	1.52
248	4	4.188	3.14	.048	1.000	.392	.32	.72	.313	1.17
346	4	4.188	3.13	.060	1.500	.655	.48	1.11	.449	1.64
444	4	4.188	3.11	.075	1.500	.670	.64	1.47	.561	2.02
258	5	5.188	4.14	.048	1.000	.392	.45	1.22	.361	1.34
356	5	5.188	4.13	.060	1.500	.655	.66	1.86	.509	1.86
454	5	5.188	4.11	.075	1.500	.670	.87	2.48	.636	2.29
268	6	6.188	5.14	.048	1.000	.392	.59	1.90	.409	1.52
368	6	6.188	5.13	.048	1.500	.643	.71	2.39	.457	1.70
366	6	6.188	5.14	.060	1.500	.655	.85	2.87	.569	2.08
464	6	6.188	5.11	.075	1.500	.670	1.14	3.83	.711	2.56
378	7	7.188	6.14	.048	1.500	.643	.89	3.45	.505	1.88
476	7	7.188	6.13	.060	1.500	.655	1.07	4.15	.629	2.30
574	7	7.188	6.11	.075	1.500	.670	1.43	5.55	.792	2.83

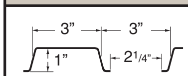
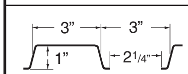
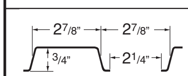
Design Factors: Ix = Moment of Inertia, Sx = Section Modulus

Cable Tray Bottom Members

Ladder Type Rungs

Rung Type	Design Factors	Material Type	Single Rung Uniform Load Capacity (in Lbs.) with safety factor of 1.5						
			Tray Width						
			6	9	12	18	24	30	36
	Ix = .0361 in.⁴ Sx = .0707 in.³	Aluminum				766	575		
	Ix = .0432 in.⁴ Sx = .0877 in.³	Aluminum						594	495
	Ix = .0249 in.⁴ Sx = .0528 in.³	Steel	2912	1941	1456	971	728		
	Ix = .0312 in.⁴ Sx = .0661 in.³	Steel						749	624
	Ix = .0450 in.⁴ Sx = .0787 in.³	Aluminum Strut Rung	3328	2219	1664	1109	832	666	555
	Ix = .0445 in.⁴ Sx = .0782 in.³	Steel Strut Rung	5172	3448	2586	1724	1293	1034	862
	Ix = .0130 in.⁴ Sx = .0344 in.³	Redi-Rail	1480	987	740	493	370	296	224
	Ix = .0039 in.⁴ Sx = .0134 in.³	Steel Series 1	981	654	491	327	245		
	Ix = .0047 in.⁴ Sx = .0164 in.³	Steel Series 1						230	192
	Ix = .0353 in.⁴ Sx = .0708 in.³	Aluminum Marine Rung	2996	1997	1498	999	749	599	499
	Ix = .0347 in.⁴ Sx = .0685 in.³	Steel Marine Rung	4530	3020	2265	1510	1133	906	755

Corrugated Bottoms (Ventilated and Solid)

Bottom Type	Design Factors	Material Type	Single Rung Load Capacity (in Lbs.) with safety factor of 1.5						
			Tray Width						
			6	9	12	18	24	30	36
 Trough	Ix = .0455 in.⁴ Sx = .0898 in.³	Aluminum	3141	2029	1491	970	726	660	594
 Trough	Ix = .0348 in.⁴ Sx = .0667 in.³	Steel	2973	1946	1445	955	711	650	590
 Trough	Ix = .0185 in.⁴ Sx = .0503 in.³	Series 148 Steel	2645	1763	1323	881	661		

Appendix

Series 1

Steel Side Rail Weights

Tray Series		148	156	166	176
Weight for 2 Side Rails	lbs/ft	1.68	2.32	2.62	3.03
	kg/m	2.50	3.45	3.90	4.51

Example:
Weight for 148P09-12-144
= 1.68 lbs/ft + .51 lbs/ft = 2.19 lbs/ft
= (2.19 lbs/ft) (12 ft) = 26.28 lbs.

Tray Bottom Weights

Tray Width (inches)			6	9	12	18	24	30	36
All Series 1 Steel	6" Spacing Rung Weight	lbs/ft	0.38	0.57	0.76	1.14	1.52	2.25	2.70
		kg/m	0.57	0.85	1.13	1.70	2.26	3.35	4.02
	9" Spacing Rung Weight	lbs/ft	0.25	0.38	0.51	0.76	1.01	1.50	1.80
		kg/m	0.38	0.57	0.75	1.13	1.51	2.23	2.68
	12" Spacing Rung Weight	lbs/ft	0.19	0.29	0.38	0.57	0.76	1.13	1.35
		kg/m	0.29	0.43	0.57	0.85	1.13	1.68	2.01
Series 148 Steel	Vented Trough Weight	lbs/ft	0.48	0.72	0.95	1.43	1.91	2.39	2.86
		kg/m	0.71	1.06	1.42	2.13	2.84	3.55	4.26
	Solid Trough Weight	lbs/ft	0.60	0.90	1.20	1.80	2.39	2.99	3.59
		kg/m	0.89	1.34	1.78	2.67	3.56	4.45	5.34
Series 156, 166 & 176 Steel	4" Vented Rung Weight	lbs/ft	0.57	0.86	1.14	1.71	2.28	3.37	3.42
		kg/m	0.85	1.27	1.70	2.54	3.39	5.02	5.09
	Solid Bottom Weight	lbs/ft	1.01	1.51	2.01	3.02	4.02	5.20	6.25
		kg/m	1.50	2.24	2.99	4.49	5.98	7.74	9.29

When using steel tray that is hot dip galvanized after fabrication add 9.6% to weights.

Series 2, 3, 4 or 5

Aluminum Side Rail Weights

Tray Series		24	M24	34	25	35	26	36	46	M46	H46	37	47	H47	57
Weight for 2 Side Rails	lbs/ft	1.23	1.66	2.12	1.44	1.96	1.64	2.09	2.33	2.60	3.47	2.12	2.80	3.54	4.92
	kg/m	1.83	2.47	3.15	2.14	2.92	2.44	3.11	3.47	3.87	5.16	3.15	4.16	5.27	7.32

Steel Side Rail Weights

Tray Series		248	346	444	258	356	454	268	368	366	464	378	476	574
Weight for 2 Side Rails	lbs/ft	2.34	3.28	4.04	2.68	3.72	4.58	3.04	3.40	4.16	5.12	3.76	4.60	5.66
	kg/m	3.48	4.88	6.01	3.99	5.54	6.82	4.52	5.06	6.19	7.62	5.59	6.84	8.42

Series 2, 3, 4 or 5 weights continued on page AP-8.

Appendix

Series 2, 3, 4 or 5

Tray Bottom Weights

Tray Width (inches)			6	9	12	18	24	30	36	42
All Series 2,3,4 Aluminum	6" Spacing Rung Weight	lbs/ft	0.30	0.44	0.59	0.89	1.18	1.70	2.04	2.38
		kg/m	0.44	0.66	0.88	1.32	1.76	2.53	3.04	3.54
	9" Spacing Rung Weight	lbs/ft	0.20	0.29	0.39	0.59	0.78	1.13	1.36	1.58
		kg/m	0.29	0.44	0.58	0.87	1.16	1.68	2.02	2.35
	12" Spacing Rung Weight	lbs/ft	0.15	0.22	0.29	0.44	0.58	0.85	1.02	1.19
		kg/m	0.22	0.32	0.43	0.65	0.86	1.26	1.52	1.77
	18" Spacing Rung Weight	lbs/ft	0.10	0.15	0.20	0.30	0.40	0.57	0.68	0.80
		kg/m	0.15	0.22	0.30	0.45	0.60	0.85	1.02	1.19
	Vented Trough Weight	lbs/ft	0.25	0.38	0.50	0.75	1.00	1.25	1.50	1.75
		kg/m	0.37	0.56	0.74	1.12	1.49	1.86	2.23	2.60
	Solid Trough Weight	lbs/ft	0.31	0.46	0.61	0.92	1.22	1.53	1.83	2.14
		kg/m	0.45	0.68	0.91	1.36	1.82	2.27	2.72	3.18
All Series 2,3,4,5 Steel	6" Spacing Rung Weight	lbs/ft	0.62	0.92	1.23	1.85	2.46	3.67	4.40	5.14
		kg/m	0.92	1.37	1.83	2.75	3.66	5.46	6.55	7.65
	9" Spacing Rung Weight	lbs/ft	0.41	0.62	0.82	1.23	1.64	2.45	2.94	3.43
		kg/m	0.61	0.92	1.22	1.83	2.44	3.65	4.37	5.10
	12" Spacing Rung Weight	lbs/ft	0.31	0.47	0.62	0.93	1.24	1.84	2.21	2.58
		kg/m	0.46	0.69	0.92	1.38	1.85	2.74	3.29	3.83
	18" Spacing Rung Weight	lbs/ft	0.21	0.31	0.41	0.62	0.82	1.22	1.46	1.71
		kg/m	0.31	0.46	0.61	0.92	1.22	1.82	2.18	2.54
	Vented Trough Weight	lbs/ft	0.53	0.80	1.06	1.59	2.12	2.65	3.18	3.71
		kg/m	0.79	1.18	1.58	2.37	3.15	3.94	4.73	5.52
	Solid Trough Weight	lbs/ft	0.67	1.00	1.33	2.00	2.66	3.33	3.99	4.66
		kg/m	0.99	1.48	1.98	2.97	3.96	4.95	5.94	6.93

When using steel tray that is hot dip galvanized after fabrication add 9.6% to weights.

Fiberglass

Fiberglass Side Rail Weights

Tray Series		13	24	36	46	H46	48
Weight for 2 Side Rails	lbs/ft	1.40	1.78	2.82	3.72	3.72	4.66
	kg/m	2.08	2.65	4.20	5.54	5.54	6.93

Fiberglass Bottom Weights

Tray Width (inches)			6	9	12	18	24	30	36
All Series Fiberglass	6" Spacing Rung Weight	lbs/ft	0.54	0.81	1.08	1.62	2.16	2.70	3.23
		kg/m	0.80	1.20	1.60	2.41	3.21	4.01	4.81
	9" Spacing Rung Weight	lbs/ft	0.35	.053	0.70	1.05	1.40	1.75	2.10
		kg/m	0.52	0.78	1.04	1.56	2.09	2.61	3.13
	12" Spacing Rung Weight	lbs/ft	0.27	0.40	0.54	0.81	1.08	1.35	1.62
		kg/m	0.40	0.60	0.80	1.20	1.60	2.01	2.41
	18" Spacing Rung Weight	lbs/ft	0.19	0.28	0.38	0.57	0.75	0.94	1.13
		kg/m	0.28	0.42	0.56	0.84	1.12	1.40	1.68
	6" Spacing Marine Rung Wt.	lbs/ft	0.75	1.12	1.49	2.24	2.98	3.73	4.48
		kg/m	1.11	1.67	2.,22	3.33	4.44	5.55	6.66
	9" Spacing Marine Rung Wt.	lbs/ft	0.48	0.73	0.97	1.45	1.94	2.42	2.91
		kg/m	0.,72	1.08	1.44	2.16	2.89	3.61	4.33
	12" Spacing Marine Rung Wt.	lbs/ft	0.37	0.56	0.75	1.12	1.49	1.87	2.24
		kg/m	0.56	0.83	1.11	1.67	2.22	2.78	3.33
	18" Spacing Marine Rung Wt.	lbs/ft	0.26	0.39	0.52	0.78	1.04	1.31	1.57
		kg/m	0.39	0.58	0.78	1.17	1.55	1.94	2.33

Metric Conversion Chart

To Convert From	To	Multiply By
Angle		
degree	radian (rad)	0.01745329
radian (rad)	degree	57.295780
Area		
foot^2	square meter (m^2)	0.09290304
inch^2	square meter (m^2)	0.0064516 x 10^{-2}
circular mil	square meter (m^2)	0.00005067075 x 10^{-5}
sq. centimeter (cm^2)	square inch (in^2)	0.15500030
square meter (m^2)	foot^2	10.763910
square meter (m^2)	inch^2	1550.0030
square meter (m^2)	circular mil	1973523000.0
Temperature		
degree Fahrenheit	degree Celsius	$t°C = (t°F - 32) / 1.8$
degree Celsius	degree Fahrenheit	$t°F = 1.8t°C + 32$
Force		
pounds - force (lbf)	newtons (N)	4.4482220
Length		
foot (ft)	meter (m)	0.30480
inch (in)	meter (m)	0.02540
mil	meter (m)	0.002540 x 10^{-3}
inch	micrometer (μm)	25400.0
millimeters	inch (in)	0.039370
meter (m)	foot (ft)	3.280840
meter (m)	inch (in)	39.370080
meter (m)	mil	39370.0080
micrometer (μm)	inch (in)	0.039370080 x 10^{-3}
Volume		
foot^3	cubic meter (m^3)	0.028316850
inch^3	cubic meter (m^3)	0.016387060 x 10^{-3}
cubic centimeter (cm^3)	cubic inch (in^3)	0.061023740
cubic meter (m^3)	foot^3	35.314660
cubic meter (m^3)	inch^3	61023.760
gallon (U.S. liquid)	cubic meter (m^3)	0.0037854120
Section Properties		
section modulus S (in^3)	S (m^3)	0.016387060 x 10^{-3}
moment of inertia I (in^4)	I (m^4)	0.00041623140 x 10^{-3}
modulus of elasticity E (psi)	E (Pa)	6894.7570
section modulus S (m^3)	S (in^3)	61023.740
moment of inertia I (m^4)	I (in^4)	2402510.0
modulus of elasticity E (Pa)	E (psi)	0.014503770 x 10^{-2}

Metric Conversion Chart (Cont.)

To Convert From	To	Multiply By
Bending Moment or Torque		
lbf • ft	newton meter (N•m)	1.3558180
lbf • in	newton meter (N•m)	0.11298480
N•m	lbf • ft	0.73756210
N•m	lbf • in	8.8507480
Mass		
ounce (avoirdupois)	kilogram (kg)	0.028349520
pound (avoirdupois)	kilogram (kg)	0.45359240
ton (short, 2000 lb)	kilogram (kg)	907.18470
ton (long, 2240 lb)	kilogram (kg)	1016.0470
kilogram (kg)	ounce (avoirdupois)	35.273960
kilogram (kg)	pound (avoirdupois)	2.2046220
kilogram (kg)	ton (short, 2000 lb)	0.0011023110
kilogram (kg)	ton (long, 2240 lb)	$0.98420640 \times 10^{-3}$
Mass Per Unit Length		
lb/ft	kilogram per meter (kg/m)	1.4881640
lb/in	kilogram per meter (kg/m)	17.857970
kilogram per meter (kg/m)	lb/ft	0.67196890
kilogram per meter (kg/m)	lb/in	0.55997410
Mass Per Unit Volume		
lb/ft^3	kilogram per cubic meter (kg/m^3)	16.018460
lb/in^3	kilogram per cubic meter (kg/m^3)	27679.90
kilogram per cubic meter (kg/m^3)	lb/ft^3	0.062427970
kilogram per cubic meter (kg/m^3)	lb/in^3	$0.03612730 \times 10^{-3}$
lb/ft^3	lb/in^3	1728.0
Mass Per Unit Area		
lb/ft^2	kilogram per square meter (kg/m^2)	4.8824280
kg/m^2	pound per square foot (lb/ft^2)	0.20481610
Pressure or Stress		
lbf/in^2 (psi)	pascal (Pa)	6894.7570
kip/in^3 (ksi)	pascal (Pa)	6894757.0
lbf/in^2 (psi)	megapascals (MPa)	0.0068947570
pascal (Pa)	pound-force per square inch (psi)	$0.0014503770 \times 10^{-1}$
pascal (Pa)	kip per square inch (ksi)	$0.0014503770 \times 10^{-4}$
megapascals (MPa)	lbf/in^2 (psi)	145.03770

Metric Symbols

m = meter
cm = centimeter
mm = millimeter
µm = micrometer
kg = kilogram

N = newton
kN = kilonewton
Pa = pascal
MPa = megapascal

SECTION 16114
CABLE TRAYS

PART I - GENERAL

1.01 SECTION INCLUDES

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, tests and services to install complete cable tray systems as shown on the drawings.

B. Cable tray systems are defined to include, but are not limited to straight sections of [ladder type] [trough type] [solid bottom type] [channel type] cable trays, bends, tees, elbows, drop-outs, supports and accessories.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

B. ASTM A123 - Specification for Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.

C. ASTM A653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process, Structural (Physical) Quality.

D. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High Strength Low Alloy with Improved Formability.

E. ASTM A1008 - Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

F. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

G. NEMA VE 1 - Metallic Cable Tray Systems.

H. NEMA VE 2 - Cable Tray Installation Guidelines.

1.03 DRAWINGS

A. The drawings which constitute a part of these specifications indicate the general route of the cable tray systems. Data presented on these drawings is as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification of all dimensions, routing, etc., is required.

B. Specifications and drawings are for assistance and guidance, but exact routing, locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings.

1.04 SUBMITTALS

A. Submittal Drawings: Submit drawings of cable tray and accessories including clamps, brackets, hanger rods, splice plate connectors, expansion joint assemblies, and fittings, showing accurately scaled components.

B. Product Data: Submit manufacturer's data on cable tray including, but not limited to, types, materials, finishes, rung spacings, inside depths and fitting radii. For side rails and rungs, submit cross sectional properties including Section Modulus (Sx) and Moment of Inertia (Ix).

1.05 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of cable trays and fittings of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. NEMA Compliance: Comply with NEMA Standards Publication Number VE 1, "Cable Tray Systems".

C. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable tray and cable channel systems (Article 392, NEC).

D. UL Compliance: Provide products which are UL classified and labeled.

E. NFPA Compliance: Comply with NFPA 70B, "Recommended Practice for Electrical Equipment Maintenance" pertaining to installation of cable tray systems.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver cable tray systems and components carefully to avoid breakage, denting and scoring finishes. Do not install damaged equipment.

B. Store cable trays and accessories in original cartons and in clean dry space; protect from weather and construction traffic.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with these specifications, cable tray and cable channel, systems to be installed shall be as manufactured by Cooper B-Line, Inc. [or engineer approved equal.]

2.02 CABLE TRAY SECTIONS AND COMPONENTS

A. General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features.

B. Materials and Finish: Material and finish specifications for each tray type are as follows:

1. Aluminum: Straight section and fitting side rails and rungs shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052.
2. Pre-Galvanized Steel: Straight sections, fitting side rails, rungs, and covers shall be made from structural quality steel meeting the minimum mechanical properties and mill galvanized in accordance with ASTM A653 SS, Grade 33, coating designation G90. Covers for all steel trays will also be furnished from mill galvanized steel in accordance with ASTM A653 G90.
3. Hot Dip Galvanized Steel: Straight section and fitting side rails and rungs shall be made from structural quality steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 for 14 gauge and heavier, ASTM A1008, Grade 33, Type 2 for 16 gauge and lighter, and shall be hot dip galvanized after fabrication in accordance with ASTM A123. All covers and splice plates must also be hot dip galvanized after fabrication; mill galvanized covers are not acceptable for hot dipped galvanized cable tray. All hot dip galvanized after fabrication steel cable trays must be returned to point of manufacture after coating for inspection and removal of all icicles and excess zinc. Failure to do so can cause damage to cables and/or injury to installers.
4. Stainless Steel: Straight section and fitting side rails and rungs shall be made of AISI Type 304 or Type 316 stainless steel. Transverse members (rungs) shall be welded to the side rails with Type 316 stainless steel welding wire.

2.03 TYPE OF TRAY SYSTEM

A. Ladder type trays shall consist of two longitudinal members (side rails) with transverse members (rungs) welded to the side rails. Rungs shall be spaced [6] [9] [12] inches on center. Spacing in radiused fittings shall be 9 inches and measured at the center of the tray's width. Rungs shall have a minimum cable bearing surface of $^7/_8$" with radiused edges. No portion of the rungs shall protrude below the bottom plane of the side rails.** Each rung must be capable of supporting the cable load, with a safety factor of 1.5, and a 200 lb. concentrated load when tested in accordance with NEMA VE 1, section 5.4.

***Omit text for Series 1 cable tray systems.*

B. Ventilated trough type trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2^3/_4$" and shall be spaced on 6" centers. To provide ventilation in the tray, the valleys of the corrugated bottom shall have $2^1/_4$" x 4" rectangular holes punched along the width of the bottom.

C. Non-Ventilated bottom trough type trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of 2$^3/_4$" and shall be spaced on 6" centers.

D. Tray Sizes shall have [3] [4] [5] [6] inch minimum usable load depth, or as noted on the drawing.

E. Straight tray sections shall have side rails fabricated as I-Beams. All straight sections shall be supplied in standard [10] [12] [20] [24] foot lengths, except where shorter lengths are permitted to facilitate tray assembly lengths as shown on drawings.

F. Tray widths shall be [6] [9] [12] [18] [24] [30] [36] inches or as shown on drawings.

G. All fittings must have a three inch tangent and a minimum radius of [12] [24] [36] [48] inches.

H. Splice plates shall be the bolted type made as indicated below for each tray type. The resistance of fixed splice connections between an adjacent section of tray shall not exceed .00033 ohm. Splice plate construction shall be such that a splice may be located anywhere within a continuously supported span without diminishing rated loading capacity of the cable tray.

1. Aluminum Tray - Splice plates shall be made of 6063-T6 aluminum, using four square neck carriage bolts and serrated flange locknuts. Hardware shall be zinc plated in accordance with ASTM B633, SC1. If aluminum cable tray is to be used outdoors, then hardware shall be Type 316 stainless steel.
2. Steel (including Pre-Galvanized and Hot Dip Galvanized) - Splice plates shall be manufactured of high strength steel, meeting the minimum mechanical properties of ASTM A1011 HSLAS, Grade 50, Class 1. Each splice plate shall be attached with ribbed neck carriage bolts and serrated flange locknuts. Hardware shall be zinc plated in accordance with ASTM B633 SC1 for pre-galvanized cable trays, or Chromium Zinc in accordance with ASTM F-1136-88 for hot dip galvanized cable trays.

Splice plates shall be furnished with straight sections and fittings.

I. Cable Tray Supports: Shall be placed so that the support spans do not exceed the maximum span indicated on drawings. Supports shall be constructed from 12 gauge steel formed shape channel members 1$^5/_8$" x 1$^5/_8$" with necessary hardware such as Trapeze Support Kits (9G-55XX-22SH) as manufactured by Cooper B-Line, Inc. [or engineer approved equal]. Cable trays installed adjacent to walls shall be supported on wall mounted brackets such as B409 as manufactured by Cooper B-Line, Inc. [or engineer-approved equal].

J. Trapeze hangers and center hung supports shall be supported by $^1/_2$" (minimum) diameter rods.

K. Barrier Strips: Shall be placed as specified on drawings and be fastened into the tray with self drilling screws.

L. Accessories: Special accessories shall be furnished as required to protect, support, and install a cable tray system. Accessories shall consist of, but are not limited to; section splice plates, expansion plates, blind-end plates, specially-designed ladder drop-outs, barriers, etc.

2.04 LOADING CAPACITIES

A. Cable tray shall be capable of carrying a uniformly distributed load of _______ lbs./ft. on a ________ ft. support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1, section 5.2. **In addition to the uniformly distributed load the cable tray shall support 200 lbs. concentrated load at mid-point of span.** Load and safety factors specified are applicable to both the side rails and rung capacities. Cable tray shall be made to manufacturing tolerances as specified by NEMA.

***Omit text for Series 1 cable tray systems.*

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install cable trays as indicated; in accordance with equipment manufacturer's instructions, and with recognized industry practices (NEMA VE 2), to ensure that the cable tray equipment complies with requirements of NEC, and applicable portions of NFPA 70B and NECA's "Standards of Installation" pertaining to general electrical installation practices.

B. Coordinate cable tray with other electrical work as necessary to properly interface installation of cable tray work with other work.

C. Provide sufficient space encompassing cable trays to permit access for installing and maintaining cables.

3.02 TESTING

A. Test cable trays to ensure electrical continuity of bonding and grounding connections, and to demonstrate compliance with specified maximum grounding resistance. See NFPA 70B, Chapter 18, for testing and test methods.

B. Manufacturer shall provide test reports witnessed by an independent testing laboratory of the "worst case" loading conditions outlined in this specification and performed in accordance with the latest revision of NEMA VE 1.

END OF SECTION

Additional Cable Tray Sizing Requirements

AMPACITY:

Multiconductor Cables (2000V or Less)

Cable ampacities shall comply with Tables 310.16 and 310.18 of the NEC® subject to the provisions below:

1. If there are more than 3 current carrying conductors in a cable, derate cable ampacity per section 310.15(B)(2)(A).
2. If tray has solid covers, use 95% of the ampacity values shown in Tables 310.16 and 310.18.
3. If cables are placed in a single layer, with a maintained spacing of not less than 1 cable diameter between cables, the ampacity of the cables shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables with not more than 3 insulated conductors in free air in accordance with Section 310.15(C) and Table B.310.3. You must use the ambient ampacity correction factors, found below Table B.310.3, for ambient temperatures other than 40°C (104°F).

Multiconductor Cables (2001 Volts and over) Type MV and Type MC Cables

1. Where cable trays are covered for more than 6 ft. with solid, unventilated covers, use not more than 95% of the ampacity values of Tables 310.75 and 310.76.
2. Where cables are installed in a single layer in uncovered trays with a maintained spacing of not less than one cable diameter between cables, you can use the ampacity values listed in Tables 310.71 and 310.72.

Single Conductor Cables

Ampacity of Cables Rated 2000 Volts or Less in Cable Tray (single conductor cables)

Cable Sizes	Solid Unventilated Cable Tray Cover ?	Applicable Ampacity Tables (*)	Mult. Amp. Table Values By	Special Conditions
600 kcmil and Larger	No (**)	310.17 and 310.19	0.75	
600 kcmil and Larger	Yes	310.17 and 310.19	0.70	
1/0 AWG through 500 kcmil	No (**)	310.17 and 310.19	0.65	
1/0 AWG through 500 kcmil	Yes	310.17 and 310.19	0.60	
1/0 AWG & Larger In Single Layer	No (**)	310.17 and 310.19	1.00	Maintained Spacing Of One Cable Diameter
Single Conductors In Triangle Config. 1/0 AWG and Larger	No (**)	310.20 [See NEC Section 310.15(B)]	1.00	Spacing Of 2.15 x One Conductor O.D. Between Cables

Ampacity of Type MV and Type MC Cables (2001 volts or over) in Cable Trays (single conductor cables)

Cable Sizes	Solid Unventilated Cable Tray Cover ?	Applicable Ampacity Tables (*)	Mult. Amp. Table Values By	Special Conditions
1/0 AWG and Larger	No (**)	310.69 and 310.70	0.75	
1/0 AWG and Larger	Yes	310.69 and 310.70	0.70	
1/0 AWG & Larger In Single Layer	No (**)	310.69 and 310.70	1.00	Maintained Spacing Of One Cable Diameter
Single Conductors In Triangle Config. 1/0 AWG and Larger	No (**)	310.67 and 310.68	1.05	Spacing Of 2.15 x One Conductor O.D. Between Cables

(*) The ambient ampacity correction factors must be used.
(**) At a specific position, where it is determined that the tray cables require mechanical protection, a single cable tray cover of six feet or less in length can be installed.

Cable Fill in Hazardous (Classified) Locations:

Section 392.3 of the NEC regulates the use of cable tray wiring systems in hazardous (classified) locations. This section states that if cable tray wiring systems are installed in hazardous (classified) locations, the cables that they support must be suitable for installation in those hazardous (classified) locations. The cable carries the installation restriction, not the cable tray except that the cable tray installation must comply with Section 392.4.

Some hazardous (classified) locations require special spacing of the cables. When installing Type MC, MI & TC cables in cable tray in Class II, Division 2 Hazardous (classified) areas, (combustible dusts), the cables are limited to a single layer with spacing between cables equal to the diameter of the largest adjacent cable. This is the only hazardous (classified) location where the spacing of the cables is required although it is recommended that this wiring method also be employed in Class III, Division I, and Class III, Division 2 (Ignitable Fibers & Flyings). Please note that this will alter the cable tray sizing information obtained from the sizing flow chart on page CTS-20 & CTS-21 of this catalog.

Please reference NEMA VE 2, metal cable tray installation guideline, for more complete information.
www.cabletrays.com/technica.htm

Supports - Cooper B-Line Cable Tray shall be sized and installed as a complete cable support system appropriate for the cable types installed. Recommended cable tray support locations are as shown below. Do not exceed the maximum support spacing and design load as printed on the side rail label. Refer to Canadian Electrical Code (CEC) section 12-2202 for minimum cable tray clearances.

Splice Plates - Use factory supplied splice plates only. Splice plates located at the quarter span between supports are preferred. Avoid placing splices at midspan and directly above supports. Torque all splice plate fasteners to 19 ft. - lbs. for 3/8" and 50 ft. - lbs. for 1/2". Expansion splice plate fasteners should be loosened 1/2 turn after reaching full torque to allow for travel. Set the side rail gap for expansion plates according to the chart on page CTS-8 and ensure that a support is located within 2 feet on each side of the expansion splice.

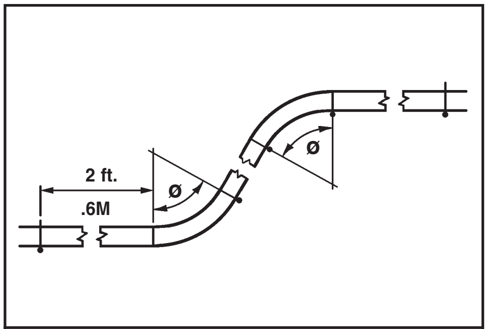
Conductors - The Cable Tray system installation shall be completed prior to pulling conductors. Cable support distances for conductor size should be referenced in CEC Part 1, Table 21. Single conductor cables placed one diameter or more apart in ventilated or ladder type tray are allowed to use the free air rating per the CEC. Any conductor in vertical runs of cable tray and all single conductor cables must be fastened to the rungs with nylon cable ties or stainless steel clamps. Carbon steel cable clamps should not be used due to induction heating, per CEC section 12-2204 (5).

Covers - Vertical cable trays which penetrate dry floors must be covered for 2m (two meter) above the floor level. All cable tray dead ends must be closed with blind ends per CEC sec 12-2202(6).

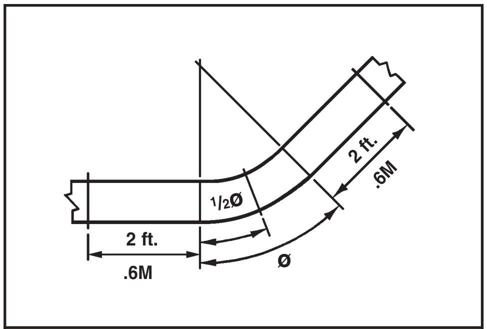
Handling - Cable tray is shipped without exterior crating, therefore careful material handling practices should be used. Cable tray straight sections should be lifted with wide slings and an overhead crane. If a crane is not available and a fork lift is to be used, only single bundles should be lifted. Ensure that each bundle is properly centered. Cable tray fittings that are not crated should be unbanded and off-loaded by hand.

Storage - All cable tray materials are subject to storage stain (white rust) if improperly stored. If cable tray is stored as shipped, it must be stored indoors. If the cable tray material must be stored outside, it must be unbanded and loosely stacked on an angle to minimize the components' contact area as well as provide for adequate drainage.

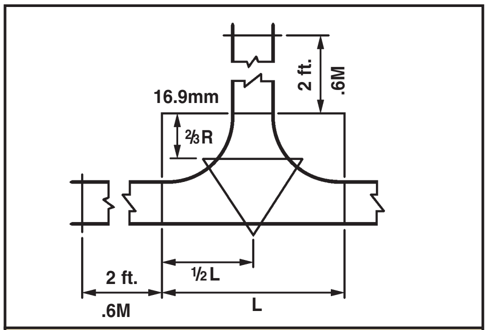
NEMA RECOMMENDED SUPPORT LOCATIONS FOR FITTINGS



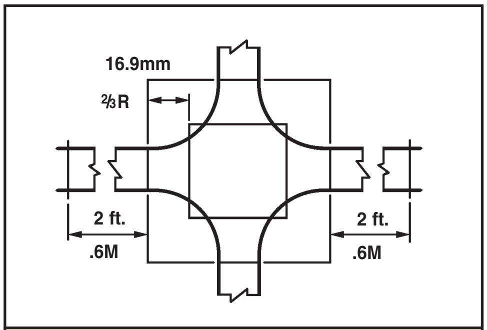
Vertical Elbows



Horizontal Elbows



Horizontal Tee



Horizontal Cross

Support Channels & Channel Nuts

Channel Sizes & Hole Patterns Selection Chart

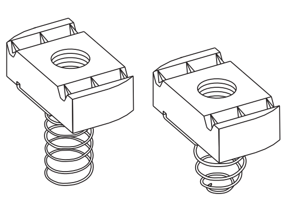
Channel Type	Channel Dimensions Height	Channel Dimensions Width	Material & Thickness: 1 Steel	2 Aluminum	Stainless Steel: 3 Type 304	Stainless Steel: 4 Type 316	Channel Hole Patterns **: SH	S	H17/8	TH
B11	3 1/4"	1 5/8"	12 Ga.	--	--	--	1	1	1	--
B12	2 7/16"	1 5/8"	12 Ga.	.105	--	--	1,2	1	1,2	--
B22	1 5/8"	1 5/8"	12 Ga.	.105	12 Ga.	12 Ga.	1,2,3,4	1	1,2,3,4	1
B24	1 5/8"	1 5/8"	14 Ga.	.080	14 Ga.	14 Ga.	1,2,3,4	1	1,2,3,4	--
B32	1 3/8"	1 5/8"	12 Ga.	--	12 Ga.	--	1,3	1	1,3	--
B42	1 "	1 5/8"	12 Ga.	--	12 Ga.	--	1,3	1	1,3	--
B52	13/16"	1 5/8"	12 Ga.	--	12 Ga.	--	1,3	1	1,3	--
B54	13/16"	1 5/8"	14 Ga.	.080	14 Ga.	14 Ga.	1,2,3,4	1	1,2,3,4	--

Available Finishes on Steel: Plain (Oil Coated), Dura-Green Epoxy, Pre-Galvanized, and Hot Dip Galvanized are standard.

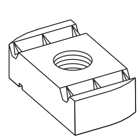
** 1 - Steel
2 - Aluminum
3 - Type 304 Stainless Steel
4 - Type 316 Stainless Steel

Channel Nuts

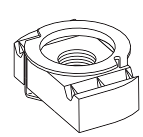
With Spring: B11 B12	With Spring: B22 B24 B32	With Spring: B42 B52 B54	Without Spring: B11 B22 B12 B24 B32	Without Spring: B42 B52 B54	Twirl Nut: B11 B22 B12 B24 B32	Twirl Nut: B42 B52 B54	FN228 E-Z Twirl FN228	Thread Size	Thickness
N728	**N228**	**N528**	**N228WO**	**N228WO**	**TN228**	**TN228**	3/8"	3/8"-16	3/8" for all nuts
N725	**N225**	**N525**	**N225WO**	**N525WO**	**TN225**	**TN525**		1/2"-13	1/2" for N725,N225,N225WO,TN225 3/8" for N525,N525WO,TN525
N755	**N255**	**N555**	**N255WO**	**N555WO**	--	--		5/8"-11	1/2" for N755,N255,N255WO 3/8" for N555,N555WO



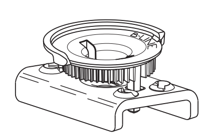
Channel Nut With Spring



Channel Nut Without Spring



Twirl Nut



FN228

For other channels, channel nuts, and fittings see B-Line Strut Systems Catalog.

Concrete Inserts & Threaded Rod

Continuous Concrete Insert

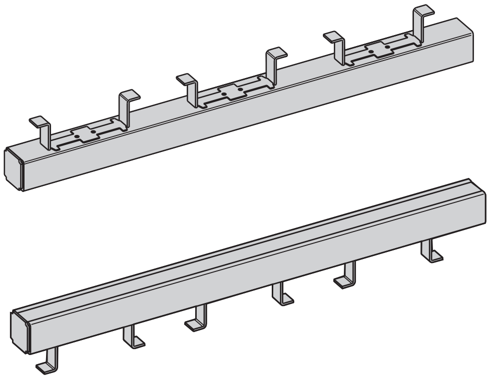
Catalog Number for 120" (10 ft.)	Catalog Number for 240" (20 ft.)	Channel Size	Channel Depth	Maximum Load
B22I-120	**B22I-240**	B22	1 5/8"	2000 lbs./ft.
B32I-120	**B32I-240**	B32	1 3/8"	2000 lbs./ft.
B52I-120	**B52I-240**	B52	13/16"	1500 lbs./ft.

Safety factor of 3 on loading.

Other lengths available upon request.

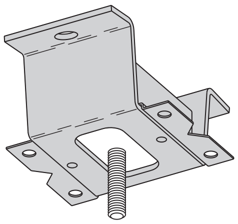
Furnished with end caps and styrofoam filler installed.

Standard finishes:
- Plain (Oil Coated)
- Dura Green Epoxy
- Pre-Galvanized
- Hot Dip Galvanized

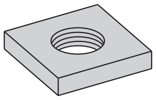


B2500 Spot Insert & N2500 Insert Nut

Standard Finish: Zinc Plated



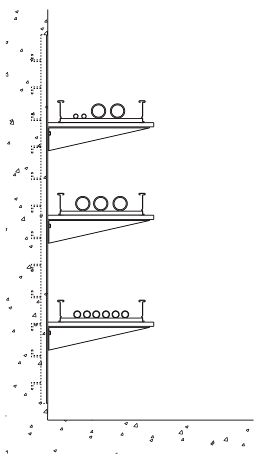
B2500 Insert



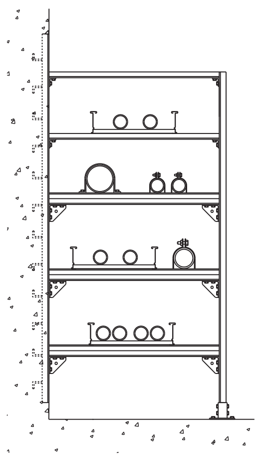
N2500 Insert Nut
Insert rod size behind part number.

Square Nuts for Spot Inserts

Concrete Insert Applications

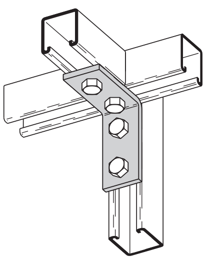


Continuous inserts used vertically are ideal mounting bases for cable tray brackets.

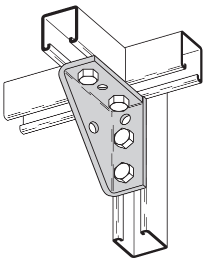


For multi-tiered tray assemblies, inserts function as the anchors for each stanchion.

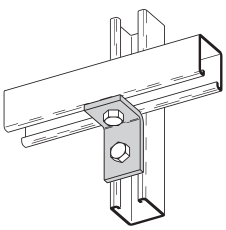
Angle Fittings



B104



B844



B101

Notes

2005

CABLE TRAY MANUAL

Based on the 2005 National Electrical Code®

COOPER B-Line

Table of Contents

INTRODUCTION

The Cooper B-Line Cable Tray Manual was produced by Cooper B-Line's technical staff. Cooper B-Line has recognized the need for a complete cable tray reference source for electrical engineers and designers. The following pages address the 2005 ***National Electric Code***® requirements for cable tray systems as well as design solutions from practical experience. The information has been organized for use as a reference guide for both those unfamiliar and those experienced with cable tray.

Nearly every aspect of cable tray design and installation has been explored for the use of the reader. If a topic has not been covered sufficiently to answer a specific question or if additional information is desired, contact the engineering department at Cooper B-Line. We sincerely hope you will find the Cooper B-Line Cable Tray Manual a helpful and informative addition to your technical library.

Cooper B-Line, Inc.
509 West Monroe Street
Highland, IL 62249-0326
Tel: (800) 851-7415
Fax: (618) 654-5499

WHY CABLE TRAY?

BECAUSE A CABLE TRAY WIRING SYSTEM PROVIDES SAFE AND DEPENDABLE WAYS TO SAVE NOW AND LATER

Large numbers of electrical engineers have limited detail knowledge concerning wiring systems. There is the tendency by engineers to avoid becoming involved in the details of wiring systems, leaving the wiring system selection and design to designers or contractors. Certain decisions must be made for any wiring system installation, and these decisions should be made in the design and construction activities' chain where maximum impact is achieved at the lowest possible cost. Deferring design decisions to construction can result in increased costs and wiring systems incompatible with the owner's future requirements. Early in the project's design life, the costs and features of various applicable wiring systems should be objectively evaluated in detail. Unfortunately, such evaluations are often not made because of the time and money involved. It is important to realize that these initial evaluations are important and will save time and money in the long run. The evaluation should include the safety, dependability, space and cost requirements of the project. Many industrial and commercial electrical wiring systems have excessive initial capital costs, unnecessary power outages and require excessive maintenance. Moreover, the wiring system may not have the features to easily accommodate system changes and expansions, or provide the maximum degree of safety for the personnel and the facilities.

Cable tray wiring systems are the preferred wiring system when they are evaluated against equivalent conduit wiring systems in terms of safety, dependability, space and cost. To properly evaluate a cable tray wiring system vs. a conduit wiring system, an engineer must be knowledgeable of both their installation and the system features. The advantages of cable tray installations are listed below and explained in the following paragraphs.

- Safety Features
- Dependability
- Space Savings
- Cost Savings
- Design Cost Savings
- Material Cost Savings
- Installation Cost & Time Savings
- Maintenance Savings

CABLE TRAY SAFETY FEATURES

A properly engineered and installed cable tray wiring system provides some highly desirable safety features that are not obtainable with a conduit wiring system.

• Tray cables do not provide a significant path for the transmission of corrosive, explosive, or toxic gases while conduits do. There have been explosions in industrial facilities in which the conduit systems were a link in the chain of events that set up the conditions for the explosions. These explosions would not have occurred with a cable tray wiring system since the explosive gas would not have been piped into a critical area. This can occur even though there are seals in the conduits. There does have to be some type of an equipment failure or abnormal condition for the gas to get into the conduit, however this does occur. Conduit seals prevent explosions from traveling down the conduit (pressure piling) but they do not seat tight enough to prevent moisture or gas migration until an explosion or a sudden pressure increase seats them. The October 6, 1979 Electrical Substation Explosion at the Cove Point, Maryland Columbia Liquefied Natural Gas Facility is a very good example of where explosive gas traveled though a two hundred foot long conduit with a seal in it. The substation was demolished, the foreman was killed and an operator was badly burned. This explosion wouldn't have occurred if a cable tray wiring system had been installed instead of a conduit wiring system. A New Jersey chemical plant had the instrumentation and electrical equipment in one of its control rooms destroyed in a similar type incident.

• In addition to explosive gases, corrosive gases and toxic gases from chemical plant equipment failures can travel through the conduits to equipment or control rooms where the plant personnel and the sensitive equipment will be exposed to the gases.

• In facilities where cable tray may be used as the equipment grounding conductor in accordance with **NEC**® Sections 392.3(C) & 392.7, the grounding equipment system components lend themselves to visual inspection as well as electrical continuity checks.

CABLE TRAY DEPENDABILITY

A properly designed and installed cable tray system with the appropriate cable types will provide a wiring system of outstanding dependability for the control, communication, data handling, instrumentation, and power systems. The dependability of cable tray wiring systems has been proven by a 40 year track record of excellent performance.

• Cable tray wiring systems have an outstanding record for dependable service in industry. It is the most common industrial wiring system in Europe. In continuous process systems, an electrical system failure can cost millions of dollars and present serious process safety problems for the facility, its personnel and the people in the surrounding communities. A properly designed and installed cable tray system with the appropriate cable types will provide a wiring system of outstanding dependability for process plants.

• Television broadcast origination facilities and studios make use of cable tray to support and route the large volumes of cable needed for their operations with a high degree of dependability. It would be impossible to have the wiring system flexibility they need with a conduit wiring system.

• Large retail and warehouse installations use cable tray to support their data communication cable systems. Such systems must be dependable so that there are no outages of their continuous inventory control systems.

• Cable tray wiring systems have been widely used to support cabling in both commercial and industrial computer rooms overhead and beneath the floor to provide orderly paths to house and support the cabling. These types of installations need a high degree of dependability which can be obtained using cable tray wiring systems.

CABLE TRAY SPACE SAVINGS

When compared to a conduit wiring system, an equivalent cable tray wiring system installation requires substantially less space.

Increasing the size of a structure or a support system to handle a high space volume conduit wiring system is unnecessary when this problem can be avoided by the selection of a cable tray wiring system.

• Facilities with high density wiring systems devoted to control, instrumentation, data handling and branch circuit wiring have the choice of selecting cable tray or conduit wiring systems. A conduit wiring system is often a poor choice because large conduit banks require significant space, competing with other systems and equipment. Choosing a cable tray wiring system greatly reduces this problem.

• Financial institutions with large computer installations have high density wiring systems under floors or in overhead plenum areas that are best handled by cable tray wiring systems.

• Airport facilities have extensive cable tray wiring systems to handle the ever expanding needs of the airline industry.

• Cable tray is used in many facilities because of the ever present need of routing more and more cables in less space at lower costs.

• Large health care facilities have high density wiring systems that are ideal candidates for cable tray.

CABLE TRAY WIRING SYSTEM COST SAVINGS

Usually, the initial capital cost is the major factor in selecting a project's wiring system when an evaluation is made comparing cable tray wiring systems and conduit wiring systems. Such an evaluation often covers just the conductors, material, and installation labor costs. The results of these initial cost evaluations usually show that the installed cable tray wiring system will cost 10 to 60 percent less than an equivalent conduit wiring system. The amount of cost savings depends on the complexity and size of the installation.

There are other savings in addition to the initial installation cost savings for cable tray wiring systems over conduit wiring systems. They include reduced engineering costs, reduced maintenance costs, reduced expansion costs, reduced production losses due to power outages, reduced environmental problems due to continuity of power and reduced data handling system costs due to the continuity of power. The magnitudes of many of these costs savings are difficult to determine until the condition exists which makes them real instead of potential cost savings.

DESIGN COST SAVINGS

• Most projects are roughly defined at the start of design. For projects that are not 100 percent defined before design start, the cost of and time used in coping with continuous changes during the engineering and drafting design phases will be substantially less for cable tray wiring systems than for conduit wiring systems. A small amount of engineering is required to change the width of a cable tray to gain additional wiring space capacity. Change is a complex problem when conduit banks are involved.

• The final drawings for a cable tray wiring system may be completed and sent out for bid or construction more quickly than for a conduit wiring system. Cable tray simplifies the wiring system design process and reduces the number of details.

• Cable tray wiring systems are well suited for computer aided design drawings. A spread sheet based wiring management program may be used to control the cable fills in the cable tray. While such a system may also be used for controlling conduit fill, large numbers of individual conduits must be monitored. For an equal capacity wiring system, only a few cable tray runs would have to be monitored.

• Dedicated cable tray installation zones alert other engineering disciplines to avoid designs that will produce equipment and material installation conflicts in these areas. As more circuits are added, the cable tray installation zone will increase only a few inches; the space required for the additional conduits needed would be much greater.

• **<u>The fact that a cable can easily enter and exit cable tray anywhere along its route</u>**, allows for some unique opportunities that provide highly flexible designs.

• Fewer supports have to be designed and less coordination is required between the design disciplines for the cable tray supports compared to conduit supports.

Cable Tray Manual

MATERIAL COST SAVINGS

• Excluding conductors, the cost of the cable trays, supports, and miscellaneous materials will provide a savings of up to 80% as compared to the cost of the conduits, supports, pull boxes, and miscellaneous materials. An 18 inch wide cable tray has an allowable fill area of 21 square inches. It would take 7 - 3 inch conduits to obtain this allowable fill area (7 x 2.95 square inches = 20.65 square inches).

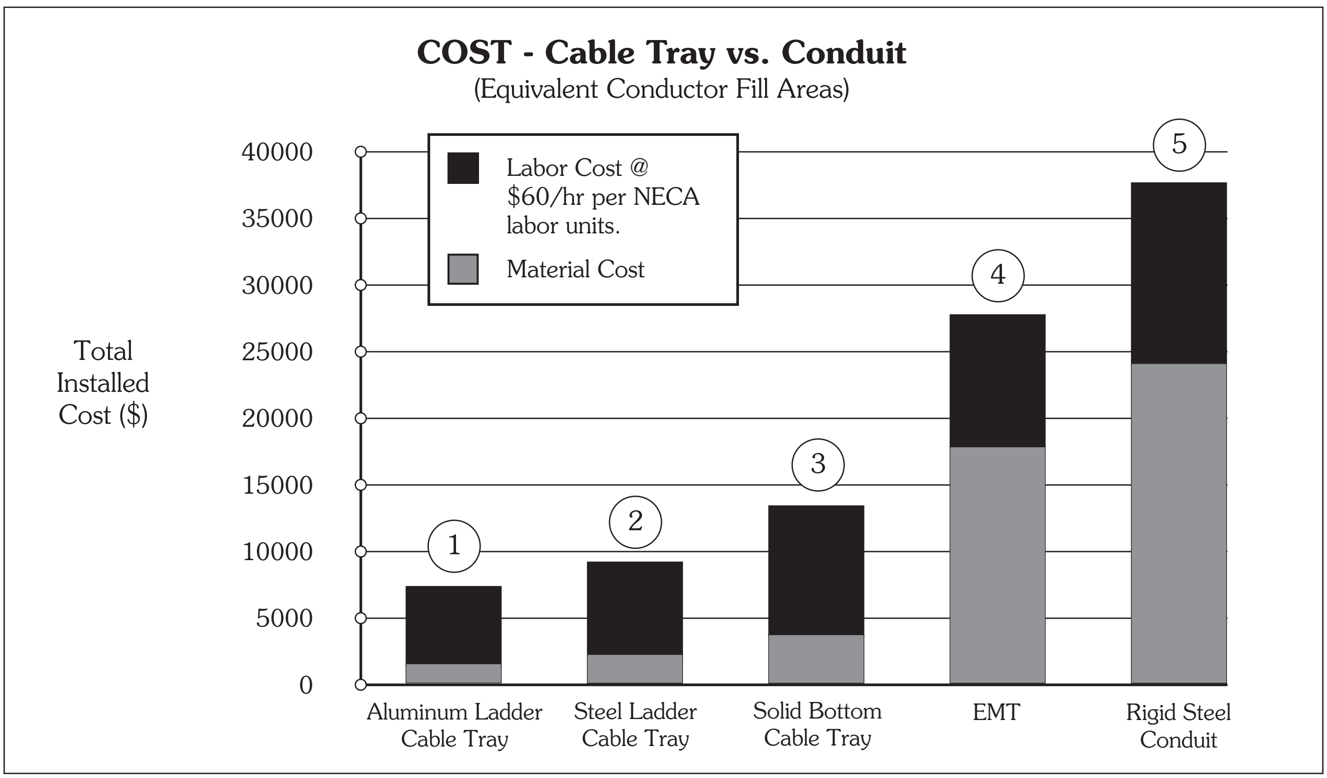
• The cost of 600 volt insulated multiconductor cables listed for use in cable tray is greater than the cost of 600 volt insulated individual conductors used in conduit. The cost differential depends on the insulation systems, jacket materials and cable construction.

• For some electrical loads, parallel conductors are installed in conduit and the conductors must be derated, requiring larger conductors to make up for the deration. If these circuits were installed in cable tray, the conductor sizes would not need to be increased since the parallel conductor derating factors do not apply to three conductor or single conductor cables in cable tray.

• Typical 300 volt insulated multiconductor instrumentation tray cables (ITC) and power limited tray cables (PLTC) cost the same for both cable tray and conduit wiring systems. This applies for instrumentation circuits, low level analog and digital signal circuits, logic input/output (I/O) circuits, etc. There are other cable tray installations which require a higher cost cable than the equivalent conduit installation. Such installations are limited to areas where low smoke emission and/or low flame spread ITC or PLTC cables must be used.

• Conduit banks often require more frequent and higher strength supports than cable trays. 3 inch and larger rigid metal conduits are the only sizes allowed to be supported on 20 foot spans [**National Electrical Code**® (**NEC**®) Table 344.30(B)(2)].

• When a cable tray width is increased 6 inches, the cable tray cost increase is less than 10 percent. This substantially increases the cable tray's wiring capacity for a minimal additional cost. To obtain such an increase in capacity for a conduit wiring system would be very costly.



Installation: 200 linear feet of cable supported with four 90° direction changes and all trapeze supports on 8 ft. spans.

1. Aluminum, 18" wide, ladder cable tray (9" rung spacing) with all hardware.
2. Hot dip galvanized steel, 18" wide, ladder cable tray (9" rung spacing) with all hardware.
3. Hot dip galvanized steel, 18" wide, solid bottom cable tray and all hardware.
4. 7 parallel runs of 3" diameter EMT with concentric bends.
5. 7 parallel runs of 3" diameter galvanized conduit with concentric bends.

Note: Above costs do not include cable and cable pulling costs. Cable costs differ per installation and cable/conductor pulling costs have been shown to be considerably less for cable tray than for conduit.

INSTALLATION COST AND TIME SAVINGS

- Depending on the complexity and magnitude of the wiring system, the total cost savings for the initial installation (labor, equipment and material) may be up to 75 percent for a cable tray wiring system over a conduit wiring system. When there are banks of conduit to be installed that are more than 100 feet long and consist of four or more 2 inch conduits or 12 or more smaller conduits, the labor cost savings obtained using cable tray wiring systems are very significant.

- Many more individual components are involved in the installation of a conduit system and its conductors compared to the installation of a cable tray system and its cables. This results in the handling and installing of large amounts of conduit items vs. small amounts of cable tray items for the same wiring capacity.

- The higher the elevation of the wiring system, the more important the number of components required to complete the installation. Many additional man-hours will be required just moving the components needed for the conduit system up to the work location.

- Conduit wiring systems require pull boxes or splice boxes when there is the equivalent of more than 360 degrees of bends in a run. For large conductors, pull or junction boxes may be required more often to facilitate the conductor's installation. Cable tray wiring systems do not require pull boxes or splice boxes.

- Penetrating a masonry wall with cable tray requires a smaller hole and limited repair work.

- More supports are normally required for rigid steel conduit due to the requirements of **NEC**® Table 344.30(B)(2).

- Concentric conduit bends for direction changes in conduit banks are very labor intensive and difficult to make. However if they are not used, the installation will be unattractive. The time required to make a concentric bend is increased by a factor of 3-6 over that of a single shot bend. This time consuming practice is eliminated when cable tray wiring systems are used.

- Conductor pulling is more complicated and time consuming for conduit wiring systems than for cable tray wiring systems. Normally, single conductor wire pulls for conduit wiring systems require multiple reel setups. For conduit wiring systems, it is necessary to pull from termination equipment enclosure to termination equipment enclosure. Tray cables being installed in cable trays do not have to be pulled into the termination equipment enclosures. Tray cable may be pulled from near the first termination enclosure along the cable tray route to near the second termination enclosure. Then, the tray cable is inserted into the equipment enclosures for termination. For projects with significant numbers of large conductors terminating in switchgear, this may be a very desirable feature that can save hours of an electrician's time. Unnecessary power outages can be eliminated since tray cable pulls may be made without de-energizing the equipment. For conduit installations, the equipment will have to be de-energized for rubber safety blanketing to be installed, otherwise the conductor pulls might have to be made on a weekend or on a holiday at premium labor costs to avoid shutting down production or data processing operations during normal working hours.

- Conductor insulation damage is common in conduits since jamming can occur when pulling the conductors. Jamming is the wedging of conductors in a conduit when three conductors lay side by side in a flat plane. This may occur when pulling around bends or when the conductors twist. Ninety-two percent of all conductor failures are the result of the conductor's insulation being damaged during the conductor's installation. Many common combinations of conductors and conduits fall into critical jam ratio values. Critical jam ratio (J.R.= Conduit ID/Conductor OD) values range from 2.8 to 3.2. The J. R. for 3 single conductor THHN/THWN insulated 350 kcmil conductors in a $2^1/2$ inch conduit would be 3.0 (2.469 inches/ 0.816 inches). If conductor insulation damage occurs, additional costs and time are required for replacing the conductors. This cannot occur in a cable tray wiring system.

- Smaller electrician crews may be used to install the equivalent wiring capacity in cable tray. This allows for manpower leveling, the peak and average crew would be almost the same number, and the electrician experience level required is lower for cable tray installations.

- Since the work is completed faster there is less work space conflict with the other construction disciplines. This is especially true if installations are elevated and if significant amounts of piping are being installed on the project.

MAINTENANCE SAVINGS

- One of the most important features of cable tray is that tray cable can easily be installed in existing trays if there is space available. Cable tray wiring systems allow wiring additions or modifications to be made quickly with minimum disruption to operations. Any conceivable change that is required in a wiring system can be done at lower cost and in less time for a cable tray wiring system than for a conduit wiring system.

- Moisture is a major cause of electrical equipment and material failures. Breathing due to temperature cycling results in the conduits accumulating relatively large amounts of moisture. The conduits then pipe this moisture into the electrical equipment enclosures which over a period of time results in the deterioration of the equipment insulation systems and their eventual failure. Also, moisture may become a factor in the corrosion failure of some of the critical electrical equipment's metallic components. Conduit seals are not effective in blocking the movement of moisture. The conduit systems may be designed to reduce the moisture problems but not to completely eliminate it. Few designers go into the design detail necessary to reduce the effects of moisture in the conduit systems. Tray cables do not provide internal moisture paths as do conduits.

• In the event of external fires in industrial installations, the damage to the tray cable and cable tray is most often limited to the area of the flame contact plus a few feet on either side of the flame contact area. For such a fire enveloping a steel conduit bank, the steel conduit is a heat sink and the conductor insulation will be damaged for a considerable distance inside the conduit. Thermoplastic insulation may be fused to the steel conduit and the conduit will need to be replaced for many feet. This occurred in an Ohio chemical plant and the rigid steel conduits had to be replaced for 90 feet. Under such conditions, the repair cost for fire damage would normally be greater for a conduit wiring system than for cable tray and tray cable. In the Ohio chemical plant fire, there were banks of conduits and runs of cable tray involved. The cable tray wiring systems were repaired in two days. The conduit wiring systems were repaired in six days and required a great deal more manpower.

• In the event of an external fire, the conduit becomes a heat sink and an oven which decreases the time required for the conductor insulation systems to fail. The heat decomposes the cable jackets and the conductor insulation material. If these materials contain PVC as do most cables, hydrogen chloride vapors will come out the ends of the conduits in the control rooms. These fumes are very corrosive to the electronic equipment. They are also hazardous to personnel. A flame impingement on a cable tray system will not result in the fumes going into the control room as there is no containment path for them. They will be dispersed into the atmosphere.

IN MOST CASES AN OBJECTIVE EVALUATION OF THE REQUIREMENTS FOR MOST HIGH DENSITY WIRING SYSTEMS WILL SHOW THAT A CABLE TRAY WIRING SYSTEM PROVIDES A WIRING SYSTEM SUPERIOR TO A CONDUIT WIRING SYSTEM.

Abandoned Cables

Easily identified, marked, or removed - all possible from an open Cable Tray System

For the 2002 *National Electrical Code*, several proposals were submitted to the NFPA to revise the 1999 **NEC**® for Articles 300, 640, 645, 725, 760, 770, 800, 820, and 830 to require all abandoned cables to be removed from plenum spaces.

The purpose of the proposals is to remove the cables as a source of excess combustibles from plenums and other confined spaces such as raised floors and drop ceilings. All of the Code Making Panels agreed that this should be acceptable practice except Code Making Panel 3, which oversees Article 300.

Because Article 300 is exempt from this requirement only low-voltage and communication cables are affected.

Each Article adopted a definition of abandoned cables and the rule for removal. The general consensus is that abandoned cable is cable that is not terminated at equipment or connectors and is not identified for future use with a tag. Please refer to each individual **NEC**® Article for specifics.

Having to tag, remove, or rearrange cables within an enclosed raceway can be a time consuming and difficult job. Without being able to clearly see the cables and follow their exact routing throughout a facility, identifying abandoned cables would be very difficult and expensive.

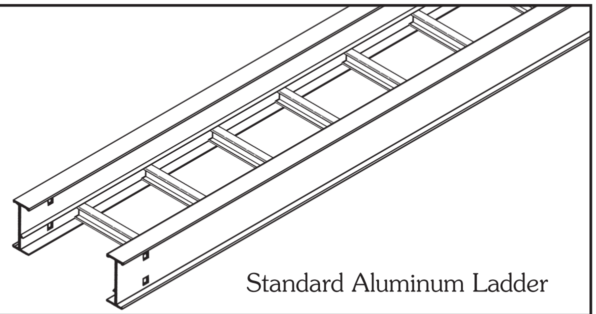
With the open accessibility of cable tray, these changes can be implemented with ease. Abandoned cables can be identified, marked, rearranged, or removed with little or no difficulty.

AN IN-DEPTH LOOK AT 2005 *NEC*®
ARTICLE 392 - CABLE TRAY

(The following code explanations are to be used with a copy of the 2005 NEC®.)

To obtain a copy of the **NEC**® contact:
National Fire Protection Association®
1 Batterymarch Park • P.O. Box 9101
Quincy, Massachusetts 02269-9101
1-800-344-3555

392.1. Scope.



Standard Aluminum Ladder

Of the types of cable trays listed in this section, ladder cable tray is the most widely used type of cable tray due to several very desirable features.

• The rungs provide a convenient anchor for tying down cables in vertical runs or where the positions of the cables must be maintained in horizontal runs.

• Cables may exit or enter through the top or the bottom of the tray.

• A ladder cable tray without covers provides for the maximum free flow of air, dissipating heat produced in current carrying conductors.

• Moisture cannot accumulate in ladder cable trays and be piped into electrical equipment as happens in conduit systems.

• Ladder cable tray cannot pipe hazardous or explosive gasses from one area to another as happens with conduit systems.

• In areas where there is the potential for dust to accumulate, ladder cable trays should be installed. The dust buildup in ladder cable trays will be less than the dust buildup in ventilated trough or solid bottom cable trays.

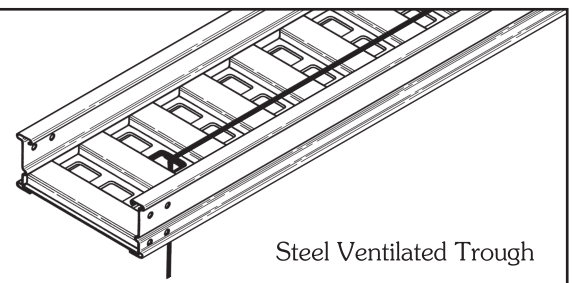
Ladder cable trays are available in widths of 6, 9, 12, 18, 24, 30, 36, and 42 inches with rung spacings of 6, 9, 12, or 18 inches. Wider rung spacings and wider cable tray widths decrease the overall strength of the cable tray. Specifiers should be aware that some cable tray manufacturers do not account for this load reduction in their published cable tray load charts. Cooper B-Line uses stronger rungs in wider cable trays to safely bear the loads published.

With one exception, the specifier selects the rung spacing that he or she feels is the most desirable for the installation. The exception is that 9 inches is the maximum allowable rung spacing for a ladder cable tray supporting any 1/0 through 4/0 single conductor cables [See Section 392.3(B)(1)(a)].

Where the ladder cable tray supports small diameter multiconductor control and instrumentation cables; 6, 9, or 12 inch rung spacings should be specified. Quality Type TC, Type PLTC, or Type ITC small diameter multiconductor control and instrumentation cables will not be damaged due to the cable tray rung spacing selected, but the installation may not appear neat if there is significant drooping of the cables between the rungs.

For ladder cable trays supporting large power cables, 9 inch or wider rung spacings should be selected. For many installations, the cable trays are routed over the top of a motor control center (MCC) or switchgear enclosure. Cables exit out the bottom of the cable trays and into the top of the MCC or switchgear enclosure. For these installations, the cable manufacturer's recommended minimum bending radii for the specific cables must not be violated. If the rung spacing is too close, it may be necessary to remove some rungs in order to maintain the proper cable bending radii. This construction site modification can usually be avoided by selecting a cable tray with 12 or 18 inch rung spacing.

If you are still uncertain as to which rung spacing to specify, 9 inch rung spacing is the most common and is used on 80% of the ladder cable tray sold.

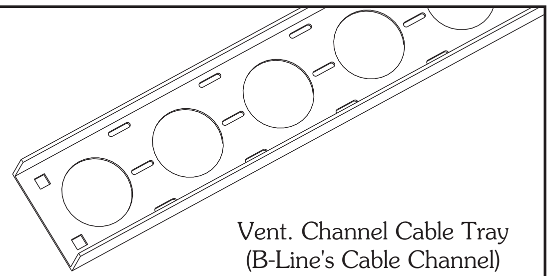


Steel Ventilated Trough

The 1999 **NEC**® added the word 'ventilated' in front of trough to clear up some confusion that solid trough is treated the same as ventilated trough. It is not. Solid trough is recognized as solid bottom cable tray.

Ventilated trough cable tray is often used when the specifier does not want to use ladder cable tray to support small diameter multiconductor control and instrumentation cables. As no drooping of the small diameter cables is visible, ventilated trough cable trays provide neat appearing installations. Small diameter cables may exit the ventilated trough cable tray through the bottom ventilation holes as well as out the top of the cable tray. For installations where the cables exit the bottom of the cable tray and the system is subject to some degree of vibration, it is advisable to use Cooper B-Line Trough Drop-Out Bushings (Cat. No. 99-1124). These snap-in bushings provide additional abrasion protection for the cable jackets. Just as for ladder cable tray, ventilated trough cable tray will not pipe moisture into electrical equipment.

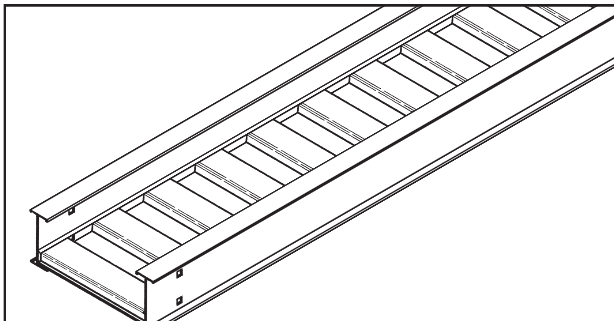
Standard widths for ventilated trough cable tray systems are 6, 9, 12, 18, 24, 30, and 36 inches. The standard bottom configuration for ventilated trough cable tray is a corrugated bottom with 2 7/8 inch bearing surfaces - 6 inches on centers and 2 1/4 inch x 4 inch ventilation openings. Since a corrugated bottom cannot be bent horizontally, the standard bottom configuration for horizontal bend fittings consists of rungs spaced on 4 inch centers. This difference in bottom construction may be objectionable to some owners, so be sure you are aware of the owner's sensitivity to aesthetics for the cable tray installation.



Vent. Channel Cable Tray
(B-Line's Cable Channel)

Channel cable tray systems (Cooper B-Line's cable channel) are available in 3, 4, and 6 inch widths with ventilated or solid bottoms. **The NEC® now recognizes solid bottom cable channel**. Prior to the 2002 Code, the **NEC®** did not have any specific provisions for the use of solid cable channel.

Instead of large conduits, cable channel may be used very effectively to support cable drops from the cable tray run to the equipment or device being serviced and is ideal for cable tray runs involving a small number of cables. Cable channel may also be used to support push buttons, field mounted instrumentation devices, etc. Small diameter cables may exit ventilated cable channel through the bottom ventilation holes, out the top or through the end. For installations where the cables exit through the ventilation openings and the cable channel or the cables are subject to some degree of vibration, it is advisable to use Cooper B-Line Cable Channel Bushings (Cat. No. 99-1125). These snap-in plastic bushings provide additional abrasion protection for the cable jackets.

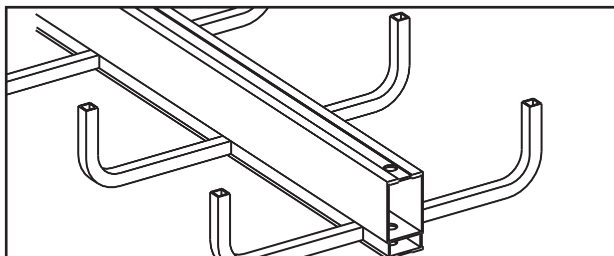


Aluminum Solid Bottom Trough

Some specifiers prefer solid bottom cable tray to support large numbers of small diameter control and multiconductor instrumentation cables. Solid bottom steel cable trays with solid covers and wrap around cover clamps can be used to provide EMI/RFI shielding protection for sensitive circuits.

Unlike ladder and ventilated trough cable trays, solid bottom cable trays can collect and retain moisture. Where they are installed outdoors or indoors in humid locations and EMI/RFI shielding protection is not required, it is recommended that 1/4 inch weep holes be drilled in their bottoms at the sides and in the middle every 3 feet to limit water accumulation.

The words "and other similar structures." were incorporated in Section 392.1 for future types of cable tray that might be developed, such as center supported type cable tray. All the technical information developed by the 1973 **NEC®** Technical Subcommittee on Cable Tray for Article 318 - Cable Trays was based on cable trays with side rails and this technical information is still the basis for the 2005 **NEC®** Article 392 - Cable Trays.



Center Supported Cable Tray
(B-Line's Cent-R-Rail System)

The standard lengths for cable trays are 10, 12, 20 and 24 feet (consult Cooper B-Line for the availability of nonstandard cable tray lengths). Selecting a cable tray length is based on several criteria. Some of these criteria include the required load that the cable tray must support, the distance between the cable tray supports, and ease of handling and installation. **One industry standard that is strongly recommended is that only one cable tray splice be placed between support spans** and, for long span trays, that they ideally be place at 1/4-span. This automatically limits the length of tray you choose, as the tray must be longer than or equal to the support span you have selected.

Matching the tray length to your support span can help ensure that your splice locations are controlled.

Cable trays can be organized into 4 categories: Short Span, Intermediate Span, Long Span, and Extra-Long Span.

Short Span trays, typically used for non-industrial indoor installations, are usually supported every 6 to 8 feet, while Intermediate Span trays are typically supported every 10 to 12 feet. A 10 or 12 foot cable tray is usually used for both of these types of installations. To keep from allowing two splices to occur between supports, a 12 foot tray should be used for any support span greater than 10 feet, up to 12 feet. Placing the cable tray splices at 1/4-span is not critical in a short or intermediate span application given that most trays have sufficiently strong splice plates.

In an indoor industrial installation 10 or 12 foot tray sections may be easier to handle and install as you may have piping or ducting to maneuver around. However, using 20 foot instead of 12 foot straight sections may provide labor savings during installation by reducing the number of splice joints. If this is done, the selected tray system should meet the loading requirements for the support span you are using. If you are interested in supporting 100 lbs/ft and you are buying 20 foot tray sections while supporting it every 12 feet, it isn't necessary to specify a NEMA 20C tray (100 lbs/ft on a 20 foot span). A NEMA 20A tray (50 lbs/ft on a 20 foot span) will support over 130 lbs/ft when supported on a 12 ft span with a safety factor of 1.5. Specifying a 20C tray is not an economical use of product. If you desire to use 20 foot sections of cable tray, it makes more sense to increase your support span up to 20 feet. This not only saves labor by decreasing the number of splices, but also by decreasing the number of supports that must be installed.

Long Span trays are typically supported anywhere from 14 to 20 foot intervals with 20 feet being the most popular. In long span situations, the placement of the splice locations at 1/4-span becomes much more important. Matching the tray length to your support span can help control your splice locations.

Extra-Long Span trays are supported on spans exceeding 20 feet. Some outdoor cable tray installations may have to span anywhere from 20 to 30 feet to cross roads or to reduce the number of expensive outdoor supports. The distance between supports affects the tray strength exponentially; therefore the strength of the cable tray system selected should be designed around the specific support span chosen for that run.

[See Section 392.5(A) on page M16 for additional information on cable tray strength and rigidity.]

Cooper B-Line has many cataloged fittings and accessory items for ladder, ventilated trough, ventilated channel, and solid bottom cable trays which eliminate the need for the costly field fabrication of such items. When properly selected and installed, these factory fabricated fittings and accessories improve the appearance of the cable tray system in addition to reducing labor costs.

Cable Tray Materials

Metallic cable trays are readily available in aluminum, pregalvanized steel, hot-dip galvanized after fabrication, and stainless steel. Aluminum cable tray should be used for most installations unless specific corrosion problems prohibit its use. Aluminum's light weight significantly reduces the cost of installation when compared to steel.

A fine print note is included in the 2005 **NEC**® that references the National Electrical Manufacturers Association (NEMA) documents for further information on cable tray. These documents: ANSI/NEMA VE-1, Metal Cable Tray Systems; NEMA VE-2, Cable Tray Installation Guidelines; and NEMA FG-1, Non Metallic Cable Tray Systems, are an excellent industry resource in the application, selection, and installation of cable trays both metallic and non metallic. Contact Cooper B-Line for more information concerning these helpful documents.

392.2. Definition. Cable Tray System.

This section states that cable tray is a rigid structural support system used to securely fasten or support cables and raceways. Cable trays are not raceways. Cable trays are mechanical supports just as strut systems are mechanical supports. **NEC**® Article 392 - Cable Trays is an article dedicated to a type of mechanical support. <u>It is very important that the personnel involved with engineering and installing cable tray utilize it as a mechanical support system and not attempt to utilize it as a raceway system</u>. There are items in the **NEC**® that apply to raceways and not to cable tray. There are also items in the **NEC**® that apply to cable tray and not to raceways. These differences will be covered at the appropriate locations in this manual.

392.3. Uses Permitted. Cable tray installations shall not be limited to industrial establishments.

The text in Section 392.3 clearly states that cable tray may be used in non-industrial establishments. The use of cable tray should be based on sound engineering and economic decisions.

For clarity, the **NEC**® now lists all types of circuits to explicitly permit their use in cable trays. These circuit types include: services, feeders, branch circuits, communication circuits, control circuits, and signaling circuits.

The 2002 **NEC**® also added a new requirement that where cables in tray are exposed to the direct rays of the sun, they shall be identified as sunlight resistant for all occupancies, not just industrial.

392.3. Uses Permitted. (A) Wiring Methods.

This section identifies the 300 & 600 volt multiconductor cables that may be supported by cable tray. The "Uses Permitted" or "Uses Not Permitted" sections in the appropriate **NEC**® cable articles provide the details as to where that cable type may be used. Where the cable type may be used, cable tray may be installed to support it except as per Section 392.4 which states that cable trays shall not be installed in hoistways or where subject to severe physical damage. Where not subject to severe physical damage, <u>cable tray may be used in any hazardous (classified) area to support the appropriate cable types in accordance with the installation requirements of the various Articles that make up **NEC**® Chapter 5 or in any non-hazardous (unclassified) area.</u>

It should be noted that Section 300.8 of the NEC® states that cable trays containing electric conductors cannot contain any other service that is not electrical. This includes any pipe or tube containing steam, water, air, gas or drainage.

For commercial and industrial cable tray wiring systems: Type ITC, Type MC, Type TC, and Type PLTC multiconductor cables are the most commonly used cables. Type MI and Optical-Fiber cables are special application cables that are desirable cables for use in some cable tray wiring systems. The following paragraphs provide information and comments about these cable types.

Type MI Cable: *Mineral-Insulated, Metal Sheathed Cable (Article 332).* This cable has a liquid and gas tight continuous copper sheath over its copper conductors and magnesium oxide insulation. Developed in the late 1920's by the French Navy for submarine electrical wiring systems, properly installed MI cable is the safest electrical wiring system available. In Europe, Type MI cable has had a long, successful history of being installed (with PVC jackets for corrosion protection) in cable trays as industrial wiring systems. This cable may be installed in hazardous (classified) areas or in non-hazardous (unclassified) areas. The single limitation on the use of Type MI cable is that it may not be used where it is exposed to destructive corrosive conditions unless protected by materials suitable for the conditions. Type MI cable without overall nonmetallic coverings may be installed in ducts or plenums used for environmental air and in other space used for environmental air in accordance with Sections 300.22(B) and (C). Cable tray may be installed as a support for Type MI cable in any location except where the cable is installed in a hoistway. Section 332-30 states that MI cable shall be securely supported at intervals not exceeding 6 feet (1.83 m). Type MI cable has a UL two hour fire resistive rating when properly installed. An installation requirement for this rating is that the cable be securely supported every 3 feet. Steel or stainless steel cable trays should be used to support Type MI cable being used for critical circuit service. During severe fire conditions, steel or stainless steel cable tray will remain intact and provide support longer than aluminum or fiberglass reinforced plastic cable trays.

Type MC Cable: *Metal-clad cable (Article 330).* There are large amounts of Type MC cable installed in industrial plant cable tray systems. This cable is often used for feeder and branch circuit service and provides excellent service when it is properly installed. The metallic sheath may be interlocking metal tape or it may be a smooth or corrugated metal tube. A nonmetallic jacket is often extruded over the aluminum or steel sheath as a corrosion protection measure. Regular MC cable, without nonmetallic sheath, may be supported by cable tray in any hazardous (classified) area except Class I and Class II, Division 1 areas. For Type MC cables to qualify for installation in Class I and Class II Division I areas (Section 501-4(A) (1) (c&d), they must have a gas/vapor tight continuous corrugated aluminum sheath with a suitable plastic jacket over the sheath. They must also contain equipment grounding conductors and listed termination fittings must be used where the cables enter equipment. Type MC Cable employing an impervious metal sheath without overall nonmetallic coverings may be installed in ducts or plenums used for environmental air in accordance with Section 300.22(B) and may be installed in other space used for environmental air in accordance with Section 300.22(C). The maximum support spacing is 6 feet (1.83 m).

Type TC Cable: *Power and control tray cable (Article 336).* This cable type was added to the 1975 **NEC**® (as an item associated with the revision of Article 318-Cable Trays). Type TC cable is a multiconductor cable with a flame retardant nonmetallic sheath that is used for power, lighting, control, and signal circuits. It is the most common cable type installed in cable tray for 480 volt feeders, 480 volt branch circuits, and control circuits. Where Type TC cables comply with the crush and impact requirements of Type MC cable and is identified for such use, they are permitted as open wiring between a cable tray and the utilization equipment or device. In these instances where the cable exits the tray, the cable must be supported and secured at intervals not exceeding 6 feet (See Section 336.10(6)). The service record of UL listed Type TC cable where properly applied and installed has been excellent.

For those installations where the **NEC**® allows its use, a cost savings is realized by using Type TC cables instead of Type MC cables. Type TC cable may be installed in cable tray in hazardous (classified) industrial plant areas as permitted in Articles 392, 501, 502, 504 and 505 provided the conditions of maintenance and supervision assure that only qualified persons will service the installation [See Section 336.10(3)].

Where a cable tray wiring system containing Type TC cables will be exposed to any significant amount of hot metal splatter from welding or the torch cutting of metal during construction or maintenance activities, temporary metal or plywood covers should be installed on the cable tray in the exposure areas to prevent cable jacket and conductor insulation damage. It is desirable to use only quality Type TC cables that will pass the IEEE 383 and UL Vertical Flame Tests (70,000 BTU/hr). Type TC cable assemblies may contain optical fiber members as per the UL 1277 standard.

Type ITC Cable: Instrumentation Tray Cable (Article 727). Although this was a new cable article in the 1996 **NEC®**, it is not a new type of cable. Thousands of miles of ITC cable have been installed in industrial situations since the early 1960's. This is a multiconductor cable that most often has a nonmetallic jacket. The No. 22 through No. 12 insulated conductors in the cables are 300 volt rated. A metallic shield or a metallized foil shield with a drain wire usually encloses the cable's conductors. These cables are used to transmit the low energy level signals associated with the industrial instrumentation and data handling systems. These are very critical circuits that impact on facility safety and on product quality. Type ITC cable must be supported and secured at intervals not exceeding 6 feet [See Section 727.4].

Type ITC Cable may be installed in cable trays in hazardous (classified) areas as permitted in Articles 392, 501, 502, 504 and 505. It states in Article 727 that Type ITC cables that comply with the crush and impact requirements of Type MC cable and are identified for such use, are permitted as open wiring in lengths not to exceed 50 ft. between a cable tray and the utilization equipment or device. Where a cable tray wiring system containing Type ITC cables will be exposed to any significant amount of hot metal splatter from welding or the torch cutting of metal during construction or maintenance activities, temporary metal or plywood covers should be installed on the cable tray to prevent cable jacket or conductor insulation damage. It is desirable to use only quality Type ITC cables that will pass the IEEE 383 and UL Vertical Flame Tests (70,000BTU/hr).

Type PLTC Cable: *Power-Limited Tray Cable (Sections 725-61(C), and 725-71(E))*. This is a multiconductor cable with a flame retardant nonmetallic sheath. The No. 22 through No. 12 insulated conductors in the cables are 300 volt rated. A metallic shield or a metallized foil shield with drain wire usually encloses the cable's conductors. This cable type has high usage in communication, data processing, fire protection, signaling, and industrial instrumentation wiring systems.

There are versions of this cable with insulation and jacket systems made of materials with low smoke emission and low flame spread properties which make them desirable for use in plenums. In Industrial Establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable is not subject to physical damage Type PLTC cable may be installed in cable trays hazardous (classified) areas as permitted in Section 501.4(B), 502.4(B) and 504.20. Type PLTC cables that comply with the crush and impact requirements of Type MC cable and are identified for such use, are permitted as open wiring in lengths not to exceed a total of 50 ft. between a cable tray and the utilization equipment or device. In this situation, the cable needs to be supported and secured at intervals not exceeding 6 ft. Where a cable tray wiring system containing Type PLTC cables will be exposed to any significant amount of hot metal splatter from welding or the torch cutting of metal during construction or maintenance activities, temporary metal or plywood covers should be installed on the cable tray to prevent cable jacket and conductor insulation damage. It is desirable to use only quality Type PLTC cables that will pass the IEEE 383 and UL Vertical Flame Tests (70,000 BTU/hr). Type PLTC cable assemblies may contain optical fiber members as per the UL 1277 standard.

Optical Fiber Cables (Article 770). The addition of optical fiber cables in the Section 392.3(A) cable list for the 1996 NEC was not a technical change. Optical fiber cables have been allowed to be supported in cable trays as per Section 770.6. Optical fibers may also be present in Type TC cables as per UL Standard 1277.

For the 1999 **NEC®** code, Article 760 - Fire Alarm Cables and Articles 800 - Multipurpose and Communications Cables were added to the list of cables permitted to be installed in cable tray systems.

For the 1993 **NEC®**, the general statement in the 1990 **NEC®** which allowed all types of raceways to be supported by cable trays was replaced by individual statements for each of the ten specific raceway types that may now be supported by cable tray. The chances of any such installations being made are very low, since strut is a more convenient and economic choice than cable tray to support raceway systems.

392.3. Uses Permitted. (B) In Industrial Establishments.

This section limits the installation of single conductor cables and Type MV multiconductor cables in cable trays to qualifying industrial establishments as defined in this section.

Per the 2002 **NEC®** solid bottom cable trays are now permitted to support single conductor cables only in industrial establishments where conditions of maintenance and supervision ensure that only qualified persons will service the installed cable tray system. However, at this time, no fill rules for single conductor cables in solid bottom cable tray have been established. [see Section 392.3(B)]

392.3. Uses Permitted. (B) In Industrial Establishments. (1) Single Conductor.

Section 392.3(B)(1) covers 600 volt and Type MV single conductor cables.

There are several sections which cover the requirements for the use of single conductor cables in cable tray even though they only comprise a small percentage of cable tray wiring systems. Such installations are limited to qualifying industrial facilities [See Section 392.3(B)]. Many of the facility engineers prefer to use three conductor power cables. Normally, three conductor power cables provide more desirable electrical wiring systems than single conductor power cables in cable tray (See Section 392.8. Cable installation - three conductor vs. single conductor cables).

392.3(B)(1)(a)

Single conductor cable shall be No. 1/0 or larger and shall be of a type listed and marked on the surface for use in cable trays. Where Nos. 1/0 through 4/0 single conductor cables are used, the maximum allowable rung spacing for ladder cable tray is 9 inches.

392.3(B)(1)(b)

Welding cables shall comply with Article 630, Part IV which states that the cable tray must provide support at intervals not to exceed 6 inches. A permanent sign must be attached to the cable tray at intervals not to exceed 20 feet. The sign must read "CABLE TRAY FOR WELDING CABLES ONLY".

392.3(B)(1)(c)

This section states that single conductors used as equipment grounding conductors (EGCs) in cable trays shall be No. 4 or larger insulated, covered or bare.

The use of a single conductor in a cable tray as the EGC is an engineering design option. Section 300.3(B) states that all conductors of the same circuit and the EGC, if used, must be contained within the same cable tray.

The other options are to use multiconductor cables that each contain their own EGC or to use the cable tray itself as the EGC in qualifying installations [see Section 392.3(C)]

If an aluminum cable tray is installed in a moist environment where the moisture may contain materials that can serve as an electrolyte, a bare copper EGC should not be used. Under such conditions, electrolytic corrosion of the aluminum may occur. For such installations, it is desirable to use a low cost 600 volt insulated conductor and remove the insulation where connections to equipment or to equipment grounding conductors are made. (See Section 392.7. Grounding, for additional information on single conductors used as the EGC for cable tray systems).

392.3. Uses Permitted. (B) In Industrial Establishment (2) Medium Voltage.

Single and multiconductor type MV cables must be sunlight resistant if exposed to direct sunlight. Single conductors shall be installed in accordance with 392.3(B)(1)

392.3. Uses Permitted. (C) Equipment Grounding Conductors.

Cable tray may be used as the EGC in any installation where qualified persons will service the installed cable tray system. There is no restriction as to where the cable tray system is installed. The metal in cable trays may be used as the EGC as per the limitations of table 392.7(B)(2). See Section *392.7. Grounding* in this manual for additional information on the use of cable trays as the EGC.

392.3. Uses Permitted. (D) Hazardous (Classified) Locations.

This section states that if cable tray wiring systems are installed in hazardous (classified) areas, the cables that they support must be suitable for installation in those hazardous (classified) areas. The cable carries the installation restriction. <u>The installation restriction is not on the cable tray except that the cable tray installations must comply with Section 392.4</u>. The following is an explanation of the parts of the code which affect the use of cable tray in hazardous locations.

501.10. *Wiring Methods - Listed Termination Fittings. (A) Class I, Division 1 (Gases or Vapors). 501.10(A)(1)(b)* Type MI cable may be installed in cable tray in this type of hazardous (classified) area.

501.10(A)(1)(c) allows Type MC-HL cables to be installed in Class I, Division I areas if they have a gas/vapor tight continuous corrugated aluminum sheath with a suitable plastic jacket over the sheath. They must also contain equipment grounding conductors sized as per Section 250.122 and listed termination fittings must be used where the cables enter equipment.

501.10(A)(1)(d) allows Type ITC-HL cable to be installed in Class I, Division I areas if they have a gas/vapor tight continuous corrugated aluminum sheath with a suitable plastic jacket over the sheath and provided with termination fittings listed for the application.

501.10. *Wiring Methods. (B) Class I, Division 2 (Gases or Vapors).* Types ITC, PLTC, MI, MC, MV, or TC cables may be installed in cable tray in this type of hazardous (classified) area. Under the conditions specified in Section 501.15(E), Cable seals are required in Class 1, Division 2 areas. Cable seals should be used only when absolutely necessary.

501.15. *Sealing and Drainage. (E) Cable Seals, Class 1, Division 2. (1)* Cables will be required to be sealed only where they enter <u>certain</u> types of enclosures used in Class 1, Division 2 areas. Factory sealed push buttons are an example of enclosures that do not require a cable seal at the entrance of the cable into the enclosure.

501.15. *Sealing and Drainage. (E) Cable Seals, Class 1, Division 2. (2)* Gas blocked cables are available from some cable manufacturers but they have not been widely used. For gas to pass through the jacketed multiconductor cable's core, a pressure differential must be maintained from one end of the cable to the other end or to the point where there is a break in the cable's jacket. The existence of such a condition is extremely rare and would require that one end of the cable be in a pressure vessel or a pressurized enclosure and the other end be exposed to the atmosphere. The migration of any significant volume of gas or vapor though the core of a multiconductor cable is very remote. This is one of the safety advantages that cable tray wiring systems have over conduit wiring systems. There are documented cases of industrial explosions caused by the migration of gases and vapors through conduits when they came in contact with an ignition source. There are no known cases of cables in cable tray wiring systems providing a path for gases or vapors to an ignition source which produced an industrial explosion.

501.15. *Sealing and Drainage. (E) Cable Seals, Class 1, Division 2. (3)*

Exception: Cables with an unbroken gas/vapor-tight continuous sheath shall be permitted to pass through a Class 1, Division 2 location without seals.

<u>This is an extremely important exception stating that cable seals are not required when a cable goes from an unclassified area through a classified area then back to an unclassified area</u>.

501.15. *Sealing and Drainage. (E) Cable Seals, Class 1, Division 2. (4)*

If you do not have a gas/vapor-tight continuous sheath, cable seals are required at the boundary of the Division 2 and unclassified location.

The sheaths mentioned above may be fabricated of metal or a nonmetallic material.

502.10. *Wiring Methods. (A) Class II, Division 1 (Combustible Dusts).*

Type MI cable may be installed in cable tray in this type of hazardous (classified) area.

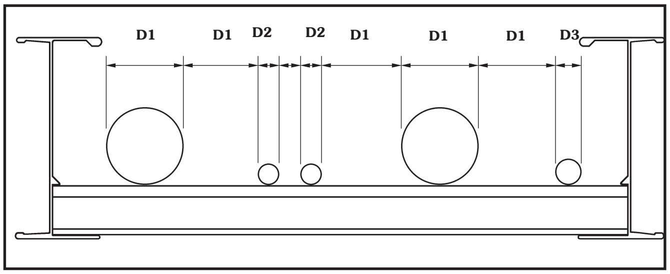
The Exception allows Type MC cables to be installed in Class II, Division 1 areas if they have a gas/vapor tight continuous corrugated aluminum sheath with a suitable plastic jacket over the sheath. They must also contain equipment grounding conductors sized as per Section 250.122 and listed termination fittings must be used where the cables enter equipment.

502.10. *Wiring Methods. (B) Class II, Division 2 (Combustible Dusts).*

This section states:

Type ITC and PLTC cables may be installed in ladder or ventilated cable trays following the same practices as used in non-hazardous (unclassified) areas. No spacing is required between the ITC or PLTC cables. This is logical as the ITC and PLTC cable circuits are all low energy circuits which do not produce any significant heat or heat dissipation problems.

Type MC, MI and TC [See Section 336.4(3)] cables may be installed in ladder, ventilated trough, or ventilated cable channel, but they are not allowed to be installed in solid bottom cable trays.



Required Spacing in Cable Trays for Type MC, MI & TC Cables in Class II, Division 2 Hazardous (Classified) Areas

Note 1. The cables are limited to a single layer with spacing between cables equal to the diameter of the largest adjacent cable. This means that the cables must be tied down at frequent intervals in horizontal as well as vertical cable trays to maintain the cable spacing. A reasonable distance between ties in the horizontal cable tray would be approximately 6 feet (See Section 392.8 Cable Installation - Tying cables to cable trays).

Note 2. Spacing the cables a minimum of 1 inch from the side rails to prevent dust buildup is recommended. This is not an NEC requirement but a recommended practice.

Where cable tray wiring systems with current carrying conductors are installed in a dust environment, ladder type cable trays should be used since there is less surface area for dust buildup than in ventilated trough cable trays. The spacing of the cables in dust areas will prevent the cables from being totally covered with a solid dust layer. In dusty areas, the top surfaces of all equipment, raceways, supports, or cable jacket surfaces where dust layers can accumulate will require cleanup housekeeping at certain time intervals. Good housekeeping is required for personnel health, personnel safety and facility safety. Excessive amounts of dust on raceways or cables will act as a thermal barrier which may not allow the power and lighting insulated conductors in a raceway or cable to safely dissipate internal heat. This condition may result in the accelerated aging of the conductor insulation. A cable tray system that is properly installed and maintained will provide a safe dependable wiring system in dust environments.

Exception: Type MC cable listed for use in Class II,Division I locations shall be permitted to be installed without the above spacing limitations. This was a new exception for the 1999 **NEC**® code.

For this type of wiring there is no danger of the cables being overheated when covered with dust. The current flow in these circuits is so low that the internally generated heat is insufficient to heat the cables and cable spacing is not a necessity. Even under such conditions, layers of dust should not be allowed to accumulate to critical depths as they may be ignited or explode as the result of problems caused by other than the electrical system.

502.10(B)(3). *Nonincendive Field Wiring*
Wiring in nonincendive circuits shall be permitted using any of the wiring methods suitable for wiring in ordinary locations.

503.10. *Wiring Methods. (A) Class III, Division 1 and (B) Class III, Division 2 (Ignitable Fibers or Flyings).* Type MI or MC cables may be installed in cable tray in these types of hazardous (classified) areas. The installations should be made using practices that minimize the build-up of materials in the trays. This can be done by using ladder cable tray with a minimum spacing between the cables equal to the diameter of the largest adjacent cable. In some cases, a greater spacing between cables than that based on the cable diameters might be desirable depending on the characteristics of the material that requires the area to be classified. Here again, it must be emphasized that good housekeeping practices are required for all types of wiring systems to insure the safety of the personnel and the facility.

504.20. *Wiring Methods.* This section allows intrinsically safe wiring systems to be installed in cable trays in hazardous (classified) areas. Section 504.30 specifies the installation requirements for intrinsically safe wiring systems that are installed in cable trays. Section 504.70 specifies the sealing requirements for cables that may be part of a cable tray wiring system. Section 504.80(B) states that cable trays containing intrinsically safe wiring must be identified with permanently affixed labels.

Cable trays are ideal for supporting both intrinsically safe and nonintrinsically safe cable systems as the cables may be easily spaced and tied in position or a standard metallic barrier strip may be installed between the intrinsically and nonintrinsically safe circuits.

505.15. *Wiring Methods.* This section was added to the 2002 **NEC**® to explicitly permit cable trays in hazardous areas classified by the international zone system, if the cables comply with the cable requirements for zone locations.

392.3. Uses Permitted. (E) Nonmetallic Cable Tray.

There are limited numbers of applications where nonmetallic cable trays might be preferred over metallic cable trays for electrical safety reasons and/or for some corrosive conditions. An example of an electrical safety application would be in an electrolytic cell room. Here, the amperages are very high and significant stray current paths are present. Under such conditions, there is the possibility for a high amperage short circuit if a low resistance metallic path (metallic cable tray or metallic raceway) is present [See information under Section 392.5(F) Nonmetallic Cable Trays].

392.4. Uses Not Permitted.

This is the only place in the **NEC**® where all the various types of cable tray have limitations on their place of use. No cable trays can be used in hoistways or where subject to severe physical damage. The designer must identify the zones of installation where a cable tray might be subjected to severe physical damage. Usually such areas are limited and provisions can be made to protect the cable tray by relocating it to a more desirable location or as a last resort to provide protection using the appropriate structural members.

The second sentence of Section 392.4 states that cable tray shall not be used in ducts, plenums, and other air-handling spaces except to support the wiring methods recognized for use in such spaces. This is not a restriction on cable tray as long as it is used as a support for the appropriate cable types.

Metallic cable trays may support cable types approved for installation in ducts, plenums, and other air-handling spaces as per Section 300.22(B) and the cable types approved for installation in Other Space Used for Environmental Air as per Section 300.22(C).

The second sentence of Section 300.22(C)(1) is as follows:

<u>Other types of cables and conductors shall be installed in</u> electrical metallic tubing, flexible metallic tubing, intermediate metal conduit, rigid metal conduit without an overall nonmetallic covering, flexible metal conduit, or, where accessible, surface metal raceway or metal wireway with metal covers or <u>solid bottom metal cable tray with solid metal covers</u>.

This part of Section 300.22(C) is confusing. The statement as underlined in the above paragraph leads some to assume, for installations in Other Spaces Used for Environmental Air, that the types of insulated single conductors which are installed in raceway installations may also be installed in solid bottom metal cable trays with metal covers. This is not so. Only the appropriate multiconductor cable types as per Section 392.3(A) may be installed in solid bottom cable trays.

Cable tray may be used to support data process wiring systems in air handling areas below raised floors as per Sections 300.22(D) and 800.52(D).

392.5. Construction Specifications. (A) Strength and Rigidity.

The designer must properly select a structurally satisfactory cable tray for their installation. This selection is based on the cable tray's strength, the cable tray loading and the spacing of the supports. The ANSI/NEMA Metallic Cable Tray Systems Standard Publication VE-1 contains the cable tray selection information and it is duplicated in Cooper B-Line's Cable Tray Systems Catalog.

The NEMA Standard provides for a static load safety factor of 1.5. A number (Span in Feet - the distance between supports) and letter (Load in lbs/ft) designation is used to properly identify the cable tray class on drawings, in specifications, in quotation requisitions, and in purchase requisitions to guarantee that the cable tray with the proper characteristics will be received and installed. The designer must specify the cable tray type, the material of construction, section lengths, minimum bend radius, width, rung spacing (for a ladder type cable tray), and the total loading per foot for the cables on a maximum support spacing (See page M-46 for cable tray specifications checklist). For many installations, the cable trays must be selected so that they are capable of supporting specific concentrated loads, the weight of any equipment or materials attached to the cable tray, ice and snow loading, and for some installations the impact of wind loading and/or earthquakes must be considered.

Most cable trays are utilized as continuous beams with distributed and concentrated loads. Cable trays can be subjected to static loads like cable loads and dynamic loads such as wind, snow, ice, and even earthquakes. The total normal and abnormal loading for the cable tray is determined by adding all the applicable component loads. The cable load + the concentrated static loads + ice load (if applicable) + snow load (if applicable) + wind load (if applicable) + any other logical special condition loads that might exist. This total load is used in the selection of the cable tray.

The following is an explanation of the 'historical' NEMA cable tray load classifications found in ANSI/NEMA VE-1.

There used to be four cable tray support span categories, 8, 12, 16, and 20 feet, which are coupled with one of three load designations, "A" for 50 lbs/ft, "B" for 75 lbs/ft, and "C" for 100 lbs/ft. For example, a NEMA class designation of 20B identifies a cable tray that is to be supported at a maximum of every 20 feet and can support a static load of up to 75 lbs/linear foot.

The cable load per foot is easy to calculate using the cable manufacturer's literature. If the cable tray has space available for future cable additions, a cable tray has to be specified that is capable of supporting the final future load. Although these historical load designations are still useful in narrowing down the choices of cable trays, NEMA has recently changed the VE-1 document. ANSI/NEMA VE-1 now requires the marking on the cable trays to indicate the exact rated load on a particular span. Trays are no longer limited to the four spans and three loads listed above. Now, for example, a tray may be rated for 150 lbs/ft on a 30 ft. span. It is recommended when specifying cable tray, to specify the required load, support span and straight section length to best match the installation.

Example of Cable Loading per foot:

10 - 3/C No. 4/0 (2.62 lbs/ft)
Total = 26.20 lbs/ft
3 - 3/C No. 250 kcmil (3.18 lbs/ft)
Total = 9.54 lbs/ft
4 - 3/C No. 500 kcmil (5.87 lbs/ft)
Total = 23.48 lbs/ft

Total Weight of the Cables = **59.22 lbs/ft**

These cables would fill a 30 inch wide cable tray and if a 36 inch wide cable tray were used there would be space available for future cables (See pages M-41 thru M-47 for information on calculating tray width.). To calculate the proper cable tray design load for the 36" wide cable tray multiply 59.22 lbs/ft x 36 inches/30 inches = 71.06 lbs/ft. If this cable tray is installed indoors, a load symbol "B" cable tray would be adequate. If there were additional loads on the cable tray or the cable tray were installed outdoors, it would be necessary to calculate all the additional potential loads. The potential load most often ignored is installation loads. The stresses of pulling large cables through cable trays can produce 3 times the stress of the cables' static load. If the installation load is not evaluated the cable tray may be damaged during installation. A 16C or 20C NEMA Class should be specified if large cables are to be pulled.

Even though walking on cable tray is not recommended by cable tray manufacturers and OSHA regulations, many designers will want to specify a cable tray which can support a 200 lb. concentrated load "just in case". A concentrated static load applied at the midspan of a cable tray is one of the most stressful conditions a cable tray will experience. To convert a static concentrated load at midspan to an equivalent distributed load take twice the concentrated load and divide it by the support span [(2 x 200 lbs.)/Span]. The strength of the rung is also a very important consideration when specifying a concentrated load. The rung must be able to withstand the load for any tray width, as well as additional stresses from cable installation. Excessive rung deflection can weaken the entire cable tray system. Cooper B-Line uses heavier rungs on their wider industrial trays as a standard. Most cable tray manufacturer's rungs are not heavy enough to withstand concentrated loads at 36" tray widths.

For outdoor installations a cable tray might be subject to ice, snow, and wind loading. Section 25 of the National Electrical Safety Code (published by the

Institute of Electrical and Electronic Engineers) contains a weather loading map of the United States to determine whether the installation is in a light, medium, or heavy weather load district. NESC Table 250-1 indicates potential ice thicknesses in each loading district as follows: 0.50 inches for a heavy loading district, 0.25 inches for a medium loading district, and no ice for a light loading district. To calculate the ice load use 57 pounds per cubic foot for the density of glaze ice. Since tray cables are circular and the cable tray has an irregular surface the resulting ice load on a cable tray can be 1.5 to 2.0 times greater than the glaze ice load on a flat surface.

Snow load is significant for a cable tray that is completely full of cables or a cable tray that has covers. The density of snow varies greatly due to its moisture content, however the minimum density that should be used for snow is 5 pounds per cubic foot. The engineer will have to contact the weather service to determine the potential snow falls for the installation area or consult the local building code for a recommended design load.

Usually cable trays are installed within structures such that the structure and equipment shelter the cable trays from the direct impact of high winds. If wind loading is a potential problem, a structural engineer and/or the potential cable tray manufacturer should review the installation for adequacy. To determine the wind speed for proper design consult the Basic Wind Speed Map of the United States in the NESC (Figure 250-2).

For those installations located in earthquake areas, design engineers can obtain behavioral data for Cooper B-Line cable trays under horizontal, vertical and longitudinal loading conditions. Testing done for nuclear power plants in the 1970's indicates that cable trays act like large trusses when loaded laterally and are actually stronger than when loaded vertically. Cable tray supports may still need to be seismically braced and designers should consult the Cooper B-Line Seismic Restraints Catalog for detailed design information.

The midspan deflection multipliers for all B-Line cable trays are listed in the Cable Tray Systems catalog. Simply pick your support span and multiply your actual load by the deflection multiplier shown for that span. The calculated deflections are for simple beam installations at your specified load capacity. If a deflection requirement will be specified, extra care needs to be taken to ensure that it does not conflict with the load requirement and provides the aesthetics necessary. Keep in mind that continuous beam applications are more common and will decrease the deflection values shown by up to 50%. Also, aluminum cable trays will deflect 3 times more than steel cable trays of the same NEMA class.

To complete the design, the standard straight section length and minimum bend radius must be chosen. When selecting the recommended length of straight sections, be sure that the standard length is greater than or equal to the maximum support span. Choose a fitting radius which will not only meet or exceed the minimum bend radius of the cables but will facilitate cable installation.

[See pages M-10 & M-11 for more information on selecting the appropriate cable tray length]

392.5. Construction Specifications. (B) Smooth Edges.

This is a quality statement for cable tray systems and their construction. Cooper B-Line cable tray is designed and manufactured to the highest standards to provide easy, safe installation of both the cable tray and cables.

392.5. Construction Specifications. (C) Corrosion Protection.

Cable tray shall be protected from corrosion per Section 300.6, which lists some minimum criteria for different corrosive environments. The Cooper B-Line Cable Tray Catalog contains a corrosion chart for cable tray materials. Cable trays may be obtained in a wide range of materials including aluminum, pregalvanized steel, hot dipped galvanized steel (after fabrication), Type 304 or 316 stainless steel, polyvinyl chloride (PVC) or epoxy coated aluminum or steel and also nonmetallic (fiber reinforced plastic). Check with a metallurgist to determine which metals and coatings are compatible with a particular corrosive environment. B-Line has corrosion information available and may be able to recommend a suitable material. Remember that no material is totally impervious to corrosion. Stainless steel can deteriorate when attacked by certain chemicals and nonmetallic cable trays can deteriorate when attacked by certain solvents.

392.5. Construction Specifications. (D) Side Rails.

The technical information in Article 392 was originally developed for cable trays with rigid side rails by the 1973 **NEC®** Technical Subcommittee on Cable Tray. “Equivalent Structural Members” was added later to incorporate new styles of cable tray such as center rail type tray and ‘mesh’ or wire basket tray.

392.5. Construction Specifications. (E) Fittings.

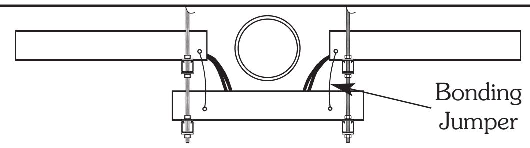
This section has been misinterpreted to mean that cable tray fittings must be used for all changes in direction and elevation [See Section 392.6(A) Complete system for further explanation). When two cable tray runs cross at different elevations, lacing a cable between the rungs of one tray and dropping into the other is a common practice which changes the direction of the cable while providing adequate cable support. Although the use of cable tray fittings is not mandatory, it is often desirable to use them when possible to improve the appearance of the installation.

392.5. Construction Specifications. (F) Nonmetallic Cable Tray.

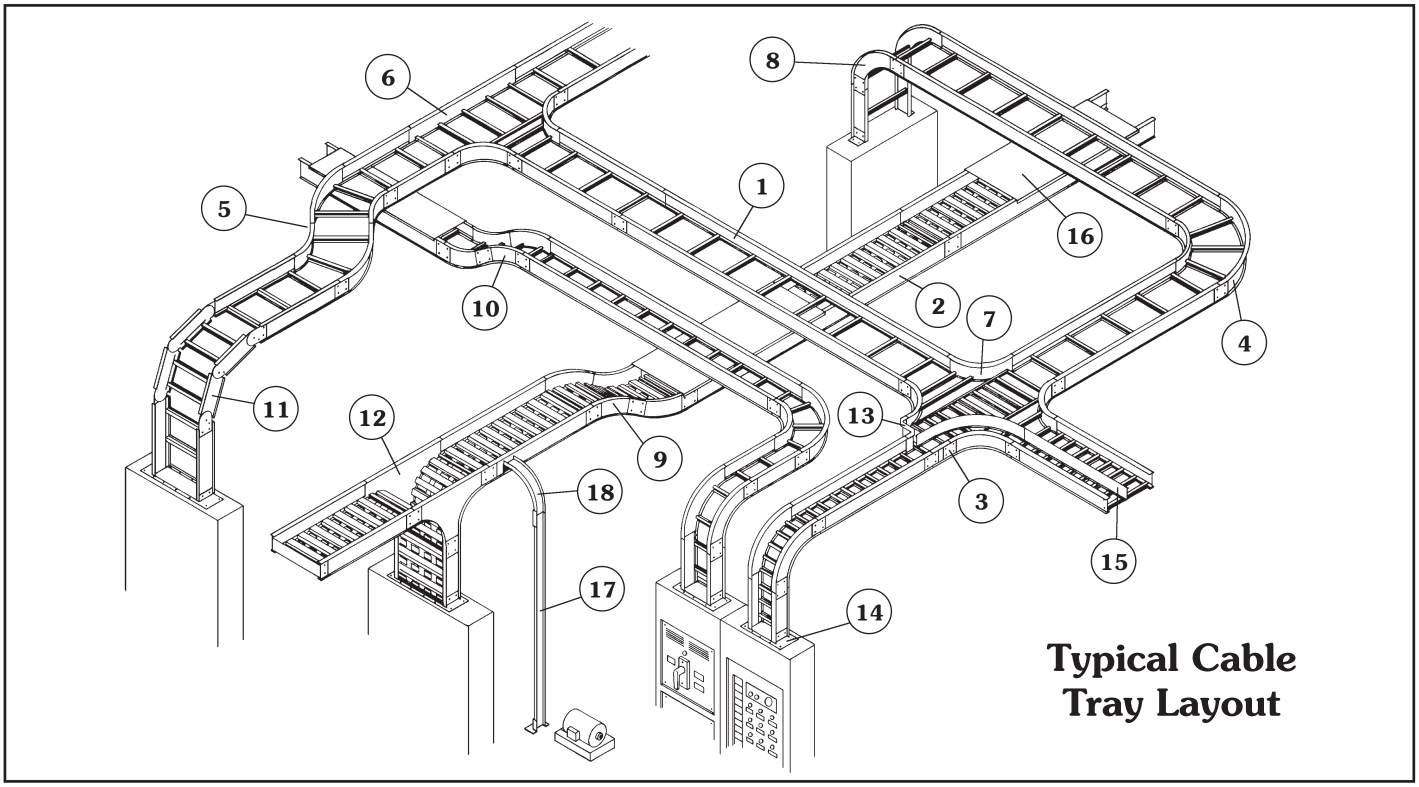
This type of cable tray is usually made of Fiberglass Reinforced Plastic (FRP). Applications for FRP cable tray systems include some corrosive atmospheres and where non-conductive material is required. Cooper B-Line fiberglass cable tray systems are manufactured from glass fiber reinforced plastic shapes that meet ASTM flammability and self-extinguishing requirements. A surface veil is applied during pultrusion to ensure a resin rich surface and increase ultraviolet resistance, however, for extended exposure to direct sunlight, additional measures, such as painting the tray, are sometimes employed to insure the longevity of the product. Ambient temperature is also a design consideration when FRP cable tray is used. An ambient temperature of 100°F will decrease the loading capacity of polyester resin fiberglass cable tray by 10%.

392.6. Installation. (A) Complete System.

This section states that cable tray systems can have mechanically discontinuous segments, and that the mechanically discontinuous segment cannot be greater than 6 feet. A bonding jumper sized per Section 250.102 is necessary to connect across any discontinuous segment. The bonding of the system should be in compliance with Section 250.96.



Cable Tray Elevation Change Without Fittings

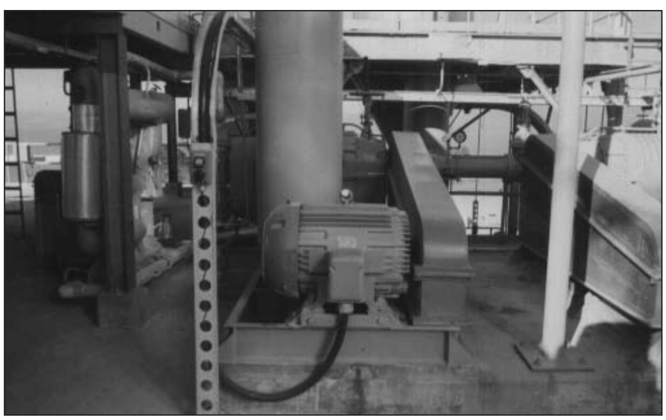


Typical Cable Tray Layout

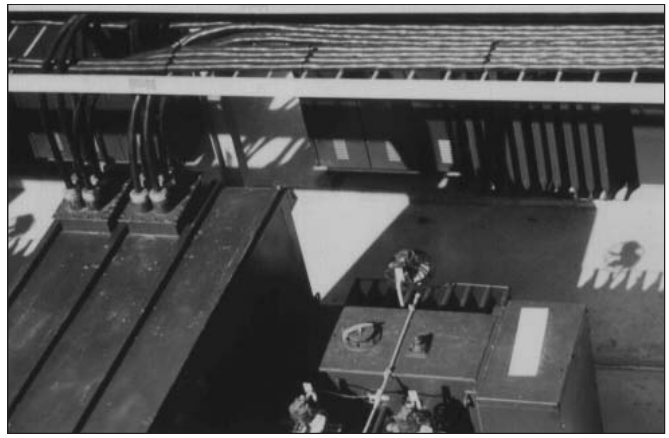
Nomenclature	
1. Ladder Type Cable Tray	**10. 30° Vertical Inside Bend, Ladder Type Tray**
2. Ventilated Trough Type Cable Tray	**11. Vertical Bend Segment (VBS)**
3. Splice Plate	**12. Vertical Tee Down, Ventilated Trough Type Tray**
4. 90° Horizontal Bend, Ladder Type Tray	**13. Left Hand Reducer, Ladder Type Tray**
5. 45° Horizontal Bend, Ladder Type Tray	**14. Frame Type Box Connector**
6. Horizontal Tee, Ladder Type Tray	**15. Barrier Strip Straight Section**
7. Horizontal Cross, Ladder Type Tray	**16. Solid Flanged Tray Cover**
8. 90° Vertical Outside Bend, Ladder Type Tray	**17. Cable Channel Straight Section, Ventilated**
9. 45° Vertical Outside Bend, Ventilated Type Tray	**18. Cable Channel, 90° Vertical Outside Bend**

There are some designers, engineers, and inspectors that do not think that cable tray is a mechanical support system just as strut is a mechanical support system. Cable tray is not a raceway in the **NEC®** but some designers, engineers, and inspectors attempt to apply the requirements for raceway wiring systems to cable tray wiring systems even when they are not applicable. Cable tray wiring systems have been used by American industry for over 35 years with outstanding safety and continuity of service records. The safety service record of cable tray wiring systems in industrial facilities has been significantly better than those of conduit wiring systems. There have been industrial fires and explosions that have occurred as a direct result of the wiring system being a conduit wiring system. In these cases, cable tray wiring systems would not have provided the fires and explosions that the conduit systems did by providing as explosion gas flow path to the ignition source even though the conduit systems contained seals.

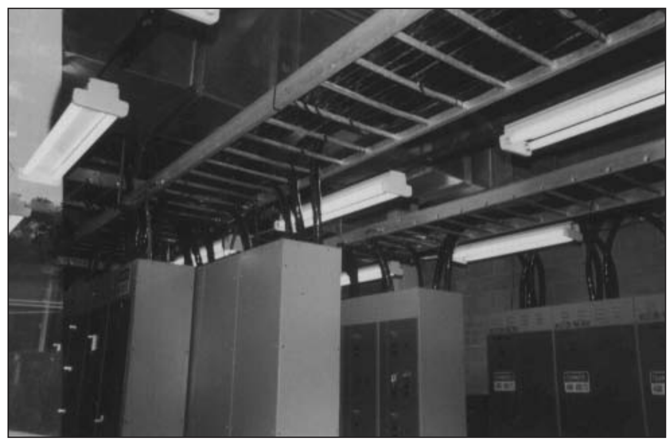
The most significant part of this section is that the metallic cable tray system must have electrical continuity over its entire length and that the support for the cables must be maintained. These requirements can be adequately met even though there will be installation conditions where the cable tray is mechanically discontinuous, such as at a firewall penetration, at an expansion gap in a long straight cable tray run, where there is a change in elevation of a few feet between two horizontal cable tray sections of the same run, or where the cables drop from an overhead cable tray to enter equipment. In all these cases, adequate bonding jumpers must be used to bridge the mechanical discontinuity.



Control Cable Entering Pushbutton and Power Cable Entering Motor Terminal Box from 6 Inch Channel Cable Tray System (Bottom entries provide drip loops to prevent moisture flow into enclosures.)



Cables Exiting 480 Volt Outdoor Switchgear and Entering Cable Tray System (Cable fittings with clamping glands are required to prevent moisture flow into equipment due to the cable's overhead entry into the switchgear enclosure).



Cables Entering and Exiting Motor Control Centers from Cable Tray Systems.

392.6. Installation. (B) Completed Before Installation.

This means that the final cable tray system must be in place before the cables are installed. It does not mean that the cable tray must be 100% mechanically continuous. The electrical bonding of the metallic cable tray system must be complete before any of the circuits in the cable tray system are energized whether the cable tray system is being utilized as the equipment grounding conductor in qualifying installations or if the bonding is being done to satisfy the requirements of Section 250.96.

392.6. Installation. (C) Supports.

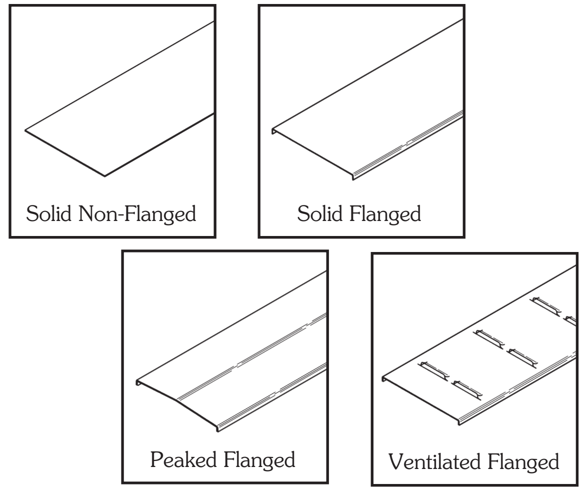
The intent of this section is to ensure that the conductor insulation and cable jackets will not be damaged due to stress caused by improper support. Multiconductor 600 volt Type TC cables and 300 volt Type PLTC cables exhibit a high degree of damage resistance when exposed to mechanical abuse at normal temperatures.

During an inspection of industrial installations by the 1973 **NEC**® Technical Subcommittee on Cable Tray, a test setup was constructed of an 18 inch wide Class 20C aluminum cable tray supported three feet above ground level containing several sizes of multiconductor cables. This installation was continuously struck in the same area with eight pound sledge hammers until the cable tray was severely distorted, the cables however, exhibited only cosmetic damage. When these cables were tested electrically, they checked out as new tray cable. Since that time, significant improvements have been made in cable jacket and conductor insulation materials so that the cables available today are of better quality than the 1973 test cables. Although tray cables are capable of taking a great deal of abuse without any problems, cable tray installations must be designed by taking appropriate measures to ensure that the tray cables will not be subjected to mechanical damage.

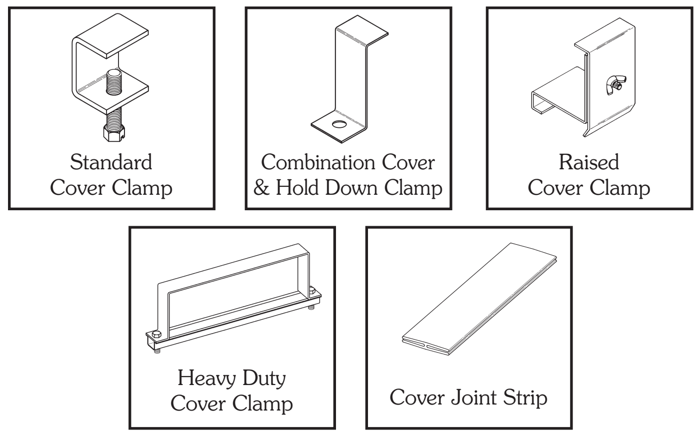
392.6. Installation. (D) Covers.

Cable tray covers provide protection for cables where cable trays are subject to mechanical damage. The most serious hazard to cable in cable trays is when the cables are exposed to significant amounts of hot metal spatter during construction or maintenance from torch cutting of metal and welding activities. For these exposure areas, the cable tray should be temporarily covered with plywood sheets. If such exposure is to be a frequent occurrence, cable tray covers should be installed in the potential exposure areas. Where cable trays contain power and lighting conductors, raised or ventilated covers are preferable to solid covers since the raised or ventilated covers allow the cable heat to be vented from the cable tray.

When covers are installed outdoors, they should be attached to the cable trays with heavy duty wrap around clamps instead of standard duty clips. During high winds, the light duty clips are not capable of restraining the covers. Outdoor cover installations should be overlapped at expansion joint locations to eliminate cover buckling. Covers which fly off the cable tray create a serious hazard to personnel, as was the case at a Texas gulf coast chemical plant where operators would not leave their control room because hurricane force winds had stripped many light gauge stainless steel covers off a large cable tray system. These sharp edged metal covers were flying though the air all during the high wind period, posing a serious threat to the worker's safety.



Types of Cable Tray Covers.



Aluminum Cable Tray Cover Accessories - Equivalent Items are available for Steel Cable Trays.

392.6. Installation. (E) Multiconductor Cables Rated 600 Volts or Less.

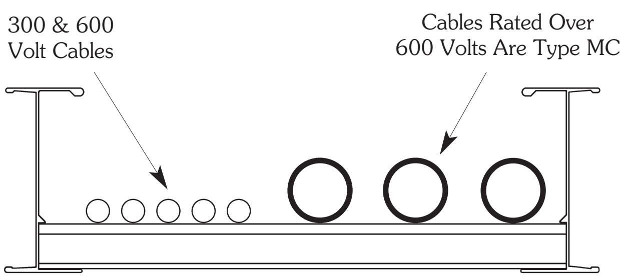
Cables containing 300 or 600 volt insulated conductors may be installed intermingled in the same cable tray which is different from the requirements for raceways. This is a reasonable arrangement because a person may safely touch a 300 or 600 volt cable which is in good condition, so having the cables come into contact with each other is not a problem either. Many cable tray users separate the instrumentation cables from the power and control cables by installing them in separate cable trays or by installing barriers in the cable trays. Often, because of the volume of the instrumentation cable, using separate cable trays is the most desirable installation practice.

Numerous cable tray systems have been installed where the instrumentation cables and branch circuit cables are installed in the same cable trays with and without barriers with excellent performance and reliability. Most problems that occur involving instrumentation circuits are due to improper grounding practices. For analog and digital instrumentation circuits, good quality twisted pair Type ITC and Type PLTC cables with a cable shield and a shield drain wire should be used. Do not purchase this type of cable on price alone, it should be purchased because of it's high quality. Engineers specifying cables should be knowledgeable of the cable's technical details in order to design systems which will provide trouble free operation.

392.6. Installation. (F) Cables Over 600 Volts.

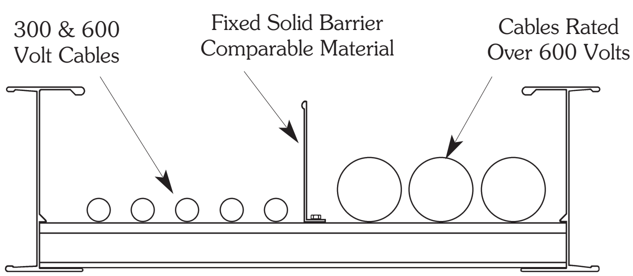
Cables with insulation rated 600 volts or less may be installed with cables rated over 600 volts if either of the following provisions are met.

No. 1: *Where the cables over 600 volts are Type MC.*



NO. 1

No. 2: *Where separated with a fixed solid barrier of a material compatible with the cable tray.*

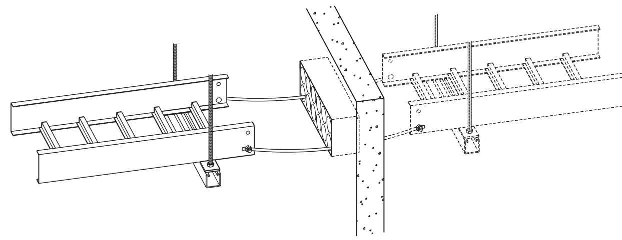


NO. 2

392.6. Installation. (G) Through Partitions and Walls.

Whether penetrating fire rated walls with tray cable only or cable tray and tray cable, the designer should review with the local building inspector the method he proposes to use to maintain the fire rating integrity of the wall at the penetration. Many methods for sealing fire wall penetrations are available, including bag or pillow, caulk, cementitious, foam, putty and mechanical barrier systems.

Many designers prefer to run only the tray cable through fire rated walls. Sealing around the cables is easier than sealing around the cables and the cable tray. Also, should the cable tray or its supports become damaged, the tray will not exert forces which could damage the wall or the penetration.



392.6. Installation. (H) Exposed and Accessible.

Article 100 - Definitions.

Exposed: (as applied to wiring methods) on or attached to the surface or behind panels designed to allow access.

Accessible: (As applied to wiring methods) Capable of being removed or exposed without damaging the building structure or finish, or not permanently closed in by the structure or finish of the building.

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392.6. Installation. (I) Adequate Access.

Cable tray wiring systems should be designed and installed with adequate room around the cable tray to allow for the set up of cable pulling equipment. Also, space around the cable tray provides easy access for installation of additional cables or the removal of surplus cables. Where cable trays are mounted one above the other, a good rule to follow is to allow 12 to 18 inches between the underside and the top of adjacent cable trays or between the structure's ceiling and the top of the cable tray.

392.6. Installation. (J) Conduits and Cables Supported from Cable Tray.

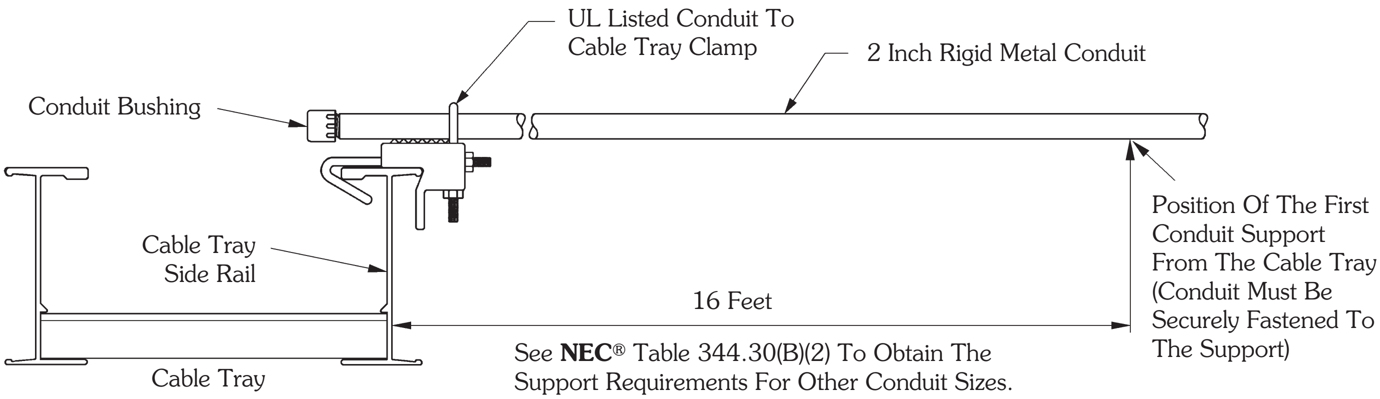
For the 1996 **NEC®**, a significant change was made in this section. The installations covered in this section may now only be made in qualifying industrial facilities.

In Section 392.6(J) of the 1993 **NEC®**, cable tray installations that supplied support for conduits were not restricted to qualifying industrial facilities. The 1996 **NEC®**, Section 392.6(J) text restricts the use of such installations even though there is no documented history of problems in non-industrial installations.

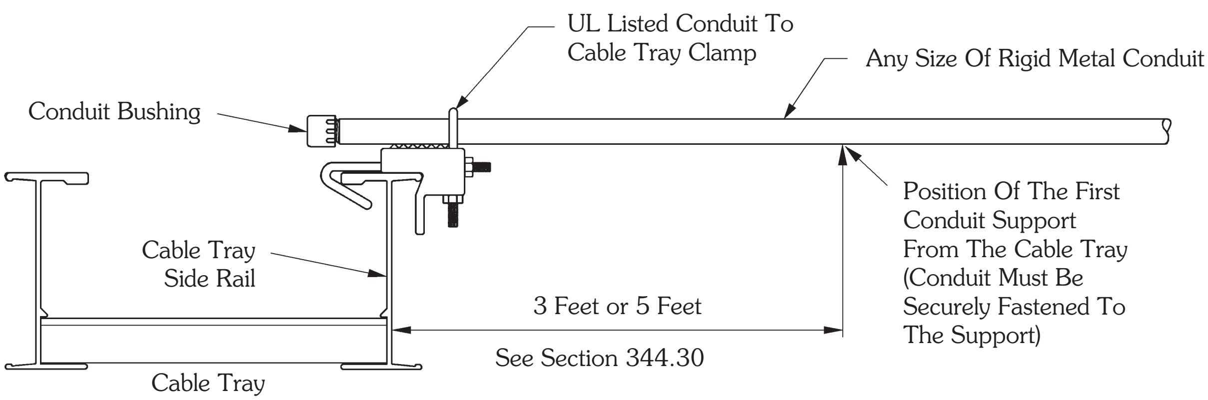
As a result of the change in this section, identical functional installations in non-qualifying installations (commercial and industrial) and qualifying industrial installations have different physical requirements. In a qualifying industrial installation, a conduit terminated on a cable tray may be supported from the cable tray. In a commercial or non-qualifying industrial installation, the conduit that is terminated on the cable tray must be securely fastened to a support that is within 3 feet of the cable tray or securely fastened to a support that is within 5 feet of the cable tray where structural members don't readily permit a secure fastening within 3 feet. The conduit of the non-qualifying installation still needs to be bonded to the cable tray. A fitting may be used for this bonding even though it will not count as a mechanical support.

Over 99 percent of the conduits supported on cable trays are the result of conduits being terminated on the cable tray side rails [See Section 392.8(C)]. For over 40 years, it has been common practice to house the cables exiting the cable tray in conduits or cable channel where the distance from the cable tray system to the cable terminations requires the cable be supported. Several manufacturers supply UL approved cable tray to conduit clamps such as the Cooper B-Line 9ZN-1158.

In addition to conduit and cables being supported from cable tray; industrial companies have been mounting instrumentation devices, push buttons, etc. on cable tray and cable channel for over 40 years. This section once lead some to believe that only conduit or cables may be supported from cable trays which is not correct as cable tray is a mechanical support just as strut is a mechanical support. Because of this, the wording in Section 392.6(J) of the 2002 **NEC®** was changed. Instead of allowing only cable and conduit to be supported from cable tray, the code now states that **raceways, cables, boxes and conduit bodies** are now permitted to be supported from the cable tray. Where boxes or conduit bodies are attached to the bottom or side of the cable tray, they must be fastened and supported in accordance with Section 314.23.



Conduit Terminated On And Supported By The Cable Tray Side Rail.
Installation For Qualifying Industrial Facilities As Per 392.6(J).



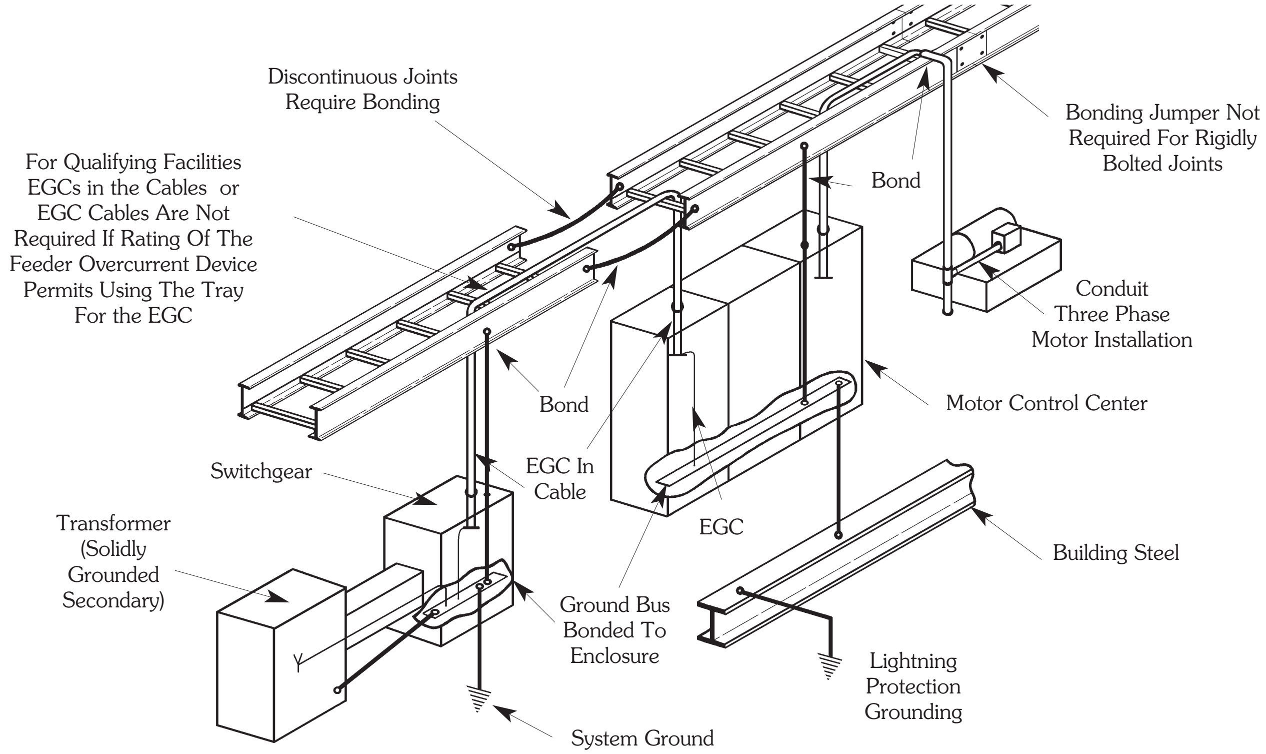
Conduit Terminated On The Cable Tray Side Rail.
Installation For Commercial And Non-Qualifying Industrial Facilities As Per 392.6(J).

392.7. Grounding. (A) Metallic Cable Trays.

All metallic cable trays shall be grounded as required in Article 250.96 regardless of whether or not the cable tray is being used as an equipment grounding conductor (EGC).

The EGC is the most important conductor in an electrical system as its function is electrical safety.

There are three wiring options for providing an EGC in a cable tray wiring system: (1) An EGC conductor in or on the cable tray. (2) Each multiconductor cable with its individual EGC conductor. (3) The cable tray itself is used as the EGC in qualifying facilities.



Correct Bonding Practices To Assure That The Cable Tray System Is Properly Grounded

If an EGC cable is installed in or on a cable tray, it should be bonded to each or alternate cable tray sections via grounding clamps (this is not required by the **NEC**® but it is a desirable practice). In addition to providing an electrical connection between the cable tray sections and the EGC, the grounding clamp mechanically anchors the EGC to the cable tray so that under fault current conditions the magnetic forces do not throw the EGC out of the cable tray.

A bare copper equipment grounding conductor should not be placed in an aluminum cable tray due to the potential for electrolytic corrosion of the aluminum cable tray in a moist environment. For such installations, it is best to use an insulated conductor and to remove the insulation where bonding connections are made to the cable tray, raceways, equipment enclosures, etc. with tin or zinc plated connectors.

See Table 250.122 on page M-45
for the minimum size EGC for grounding raceway and equipment.

392.7. Grounding. (B) Steel or Aluminum Cable Tray Systems. (1) & (2)

Table 392.7(B). Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductors

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit In the Cable Tray System	Minimum Cross-Sectional Area of Metal* In Square Inches	
	Steel Cable Trays	Aluminum Cable Trays
60	0.20	0.20
100	0.40	0.20
200	0.70	0.20
400	1.00	0.40
600	1.50**	0.40
1000	---	0.60
1200	---	1.00
1600	---	1.50
2000	---	2.00**

For SI units: one square inch = 645 square millimeters.

***Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.**

****Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.**

Table 392.7(B) "Metal Area Requirements for Cable Trays used as Equipment Grounding Conductors" shows the minimum cross-sectional area of cable tray side rails (total of both side rails) required for the cable tray to be used as the Equipment Grounding Conductor (EGC) for a specific Fuse Rating, Circuit Breaker Ampere Trip Rating or Circuit Breaker Ground Fault Protective Relay Trip Setting. These are the actual trip settings for the circuit breakers and not the maximum permissible trip settings which in many cases are the same as the circuit breaker frame size. If the maximum ampere rating of the cable tray is not sufficient for the protective device to be used, the cable tray cannot be used as the EGC and a separate EGC must be included within each cable assembly or a separate EGC has to be installed in or attached to the cable tray. [See also Section 250-120 for additional information]

The subject of using cable tray for equipment grounding conductors was thoroughly investigated by the 1973 **NEC®** Technical Subcommittee on Cable Tray. Many calculations were made and a number of tests were performed by Monsanto Company Engineers at the Bussman High Current Laboratory. The test setup to verify the capability of cable tray to be used as the EGC is shown in Figure 1 on page M-26. The test amperes available were forced through one cable tray side rail which had three splice connections in series. No conductive joint compound was used at the connections and the bolts were wrench tight. Copper jumper cables were used from the current source to the cable tray. The cable tray was NEMA Class 12B. The test results are shown on Page M-39 (Appendix Sheet 1), Table I for aluminum and Table II for steel cable tray.

One of the most interesting results of the tests was for an aluminum cable tray with a corroded joint and only two nylon bolts. 34,600 amperes for 14 cycles produced only a 34° C temperature rise at the splice plate area. If the protective devices work properly, the temperature rises recorded at the cable tray splices during these tests would not be sufficient to damage the cables in the cable tray. Also note that in these tests only one side rail was used, but in a regular installation, both side rails would conduct fault current and the temperature rise at the splice plate areas would be even lower.

When the cable tray is used as the EGC, consideration has to be given to the conduit or ventilated channel cable tray connections to the cable tray so that the electrical grounding continuity is maintained from the cable tray to the equipment utilizing the electricity. Conduit connections to the cable tray were also tested. At that time, no commercial fittings for connecting conduit to cable tray were available, so right angle beam clamps were used with very good results. There are now UL Listed fittings for connecting and bonding conduit to cable tray. This test setup and results are shown on page M-40 (Appendix Sheet 2).

Temperature Rise Test

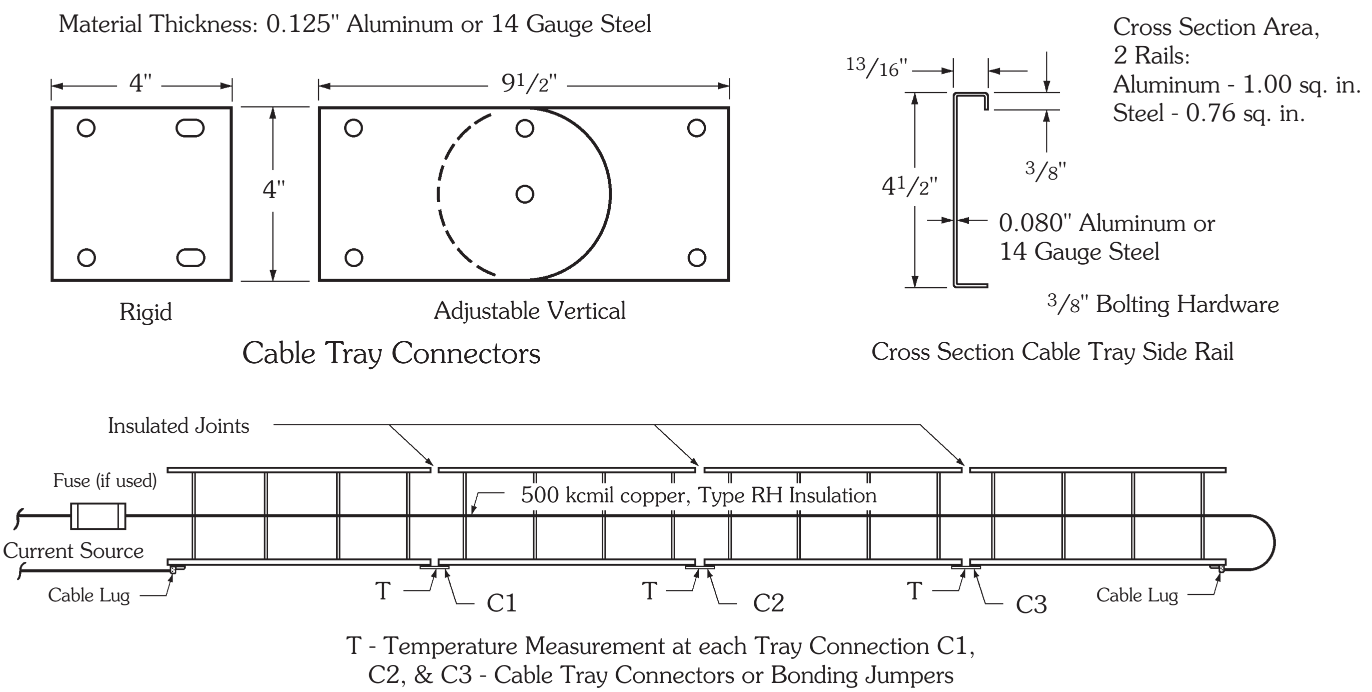


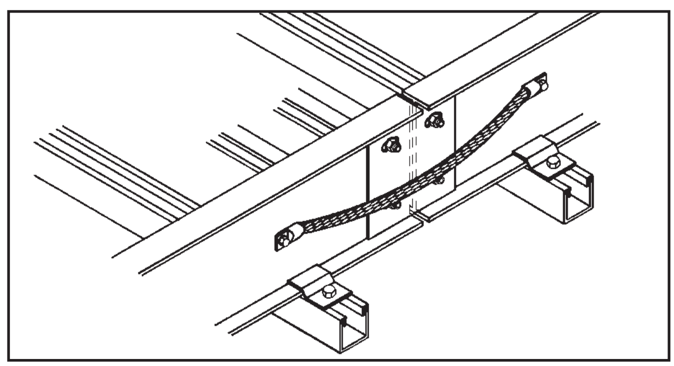
Figure 1
(See Page M-39 Appendix Sheet 1)

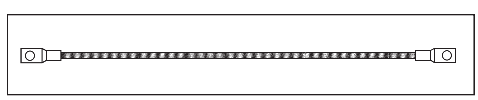
392.7. Grounding. (B) Steel or Aluminum Cable Tray Systems. (3) & (4)

For a cable tray to be used as an EGC the manufacturer must provide a label showing the cross-sectional area available. This also holds true for some mechanically constructed cable tray systems such as Redi-Rail®. Redi-Rail has been tested and UL Classified as an EGC. Cooper B-Line's label is shown at the top of page M-27.

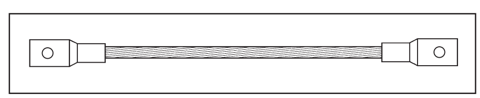
The cable tray system must be electrically continuous whether or not it is going to serve as the EGC. At certain locations (expansion joints, discontinuities, most horizontal adjustable splice plates, etc.), bonding jumpers will be required. Section 250.96. Bonding Other Enclosures states that cable tray shall be effectively bonded where necessary to assure electrical continuity and to provide the capacity to conduct safely any fault current likely to be imposed on them (also see Sections 250.92(A)(1) & 250.118(12)).

It is not necessary to install bonding jumpers at standard splice plate connections. The splice connection is UL classified as an EGC component of the cable tray system.

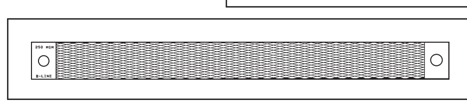




99-N1
600 amps max.



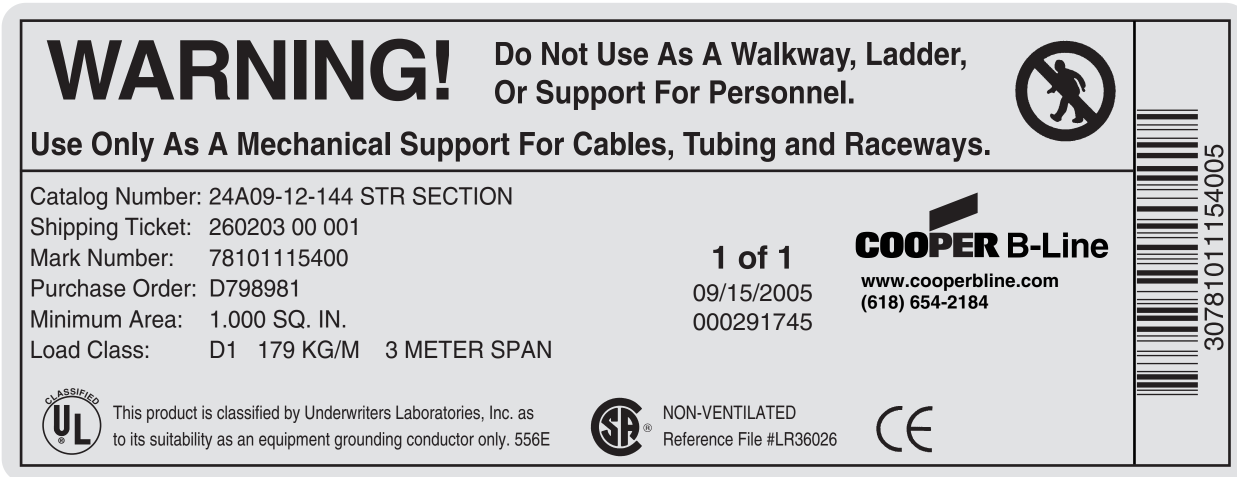
99-40
1600 amps max.



99-1620
2000 amps max.

NOTE: The **NEC**® only recognizes aluminum and steel cable trays as EGC's. As with all metallic cable trays, stainless steel cable trays must be bonded according to **NEC**® guidelines. Fiberglass cable trays do not require bonding jumpers since fiberglass is non-conductive.

Cable Tray Label

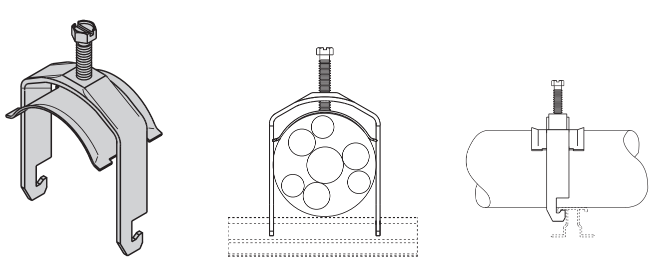


392.8. Cable Installation. (A) Cable Splices.

There is no safety problem due to cable splices being made in cable trays if quality splicing kits are used, provided that the splice kits do not project above the siderails and that they are accessible. A box or fitting is not required for a cable splice in a cable tray.

392.8. Cable Installation. (B) Fastened Securely.

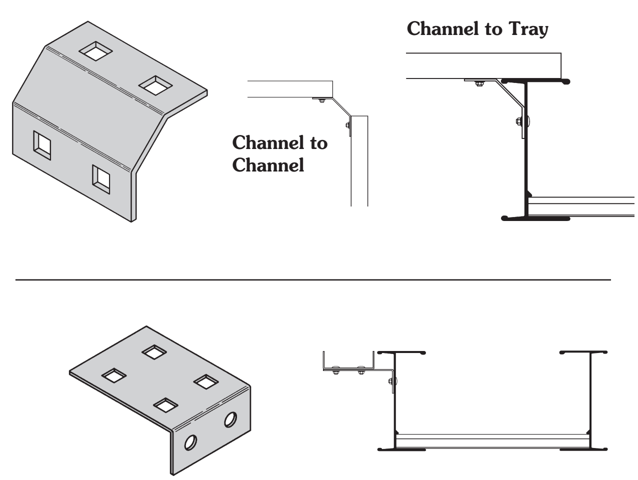
In seismic, high-shock and vibration prone areas, cables (especially unarmored cables) should be secured to the cable tray at 1 to 2 foot intervals to prevent the occurrence of sheath chafing. Otherwise, there is no safety or technical reason to tie down multiconductor cables in horizontal cable tray runs unless the cable spacing needs to be maintained or the cables need to be confined to a specific location in the cable tray. In non-horizontal cable tray runs, small multiconductor cables should be tied down at 3 or 4 foot intervals and larger (1 inch diameter and above) Type MC and Type TC multiconductor cable should be tied down at 6 foot intervals. If used outdoors, plastic ties should be sunlight, ultraviolet (UV), resistant and be made of a material that is compatible with the industrial environment. Installed outdoors, white nylon plastic ties without a UV resistant additive will last 8 to 14 months before breaking. Also available for these applications are cable cleats, stainless steel ties and P-clamps.



(P-Clamp shown installed on industrial aluminum rung)

392.8. Cable installation. (C) Bushed Conduit and Tubing.

For most installations, using a conduit to cable tray clamp for terminating conduit on cable tray is the best method. Where a cable enters a conduit from the cable tray, the conduit must have a bushing to protect the cable jacket from mechanical damage; a box is not required **[See Section 300.15(C). Boxes, Conduit Bodies, or Fittings - Where Required. Where cables enter or exit from conduit or tubing that is used to provide cable support or protection against physical damage. A fitting shall be provided on the end(s) of the conduit or tubing to protect the wires or cables from abrasion.].** There are some special installations where the use of conduit knockouts in the cable tray side rail for terminating conduit is appropriate. This would not be a good standard practice because it is costly and labor intensive, and if randomly used may result in damaging and lowering the strength of the cable tray.



Cable Channel Branch Circuit

392.8. Cable Installation. (D) Connected in Parallel.

Section 310.4. Conductors in Parallel. States the following:

The paralleled conductors in each phase, neutral or grounded conductor shall:

(1) Be the same length.
(2) Have the same conductor material.
(3) Be the same size in circular mil area.
(4) Have the same insulation type.
(5) Be terminated in the same manner.

Where run in separate raceways or cables, the raceways or cables shall have the same physical characteristics. Conductors of one phase, neutral, or grounded circuit shall not be required to have the same physical characteristics as those of another phase, neutral, or grounded circuit conductor to achieve balance.

A difference between parallel conductors in raceways and those in cable trays is that the conductors in the cable tray are not derated unless there are more than three current carrying conductors in a cable assembly **[as per Exception No.2 of Section 310.15(B)(2)(a) and Section 392.11(A)(1)].** Where the single conductor cables are bundled together as per Section 392.8(D) and if there are neutrals that are carrying currents due to the type of load involved (harmonic currents) it may be prudent to derate the bundled single conductor cables.

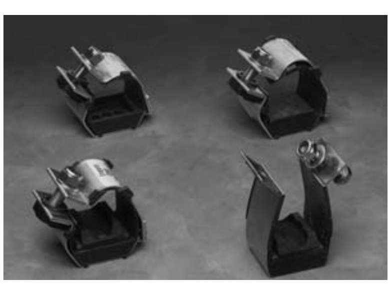
The high amperages flowing under fault conditions in 1/0 and larger cables produce strong magnetic fields which result in the conductors repelling each other until the circuit protective device either de-energizes the circuit or the circuit explodes. Under such fault conditions, the cables thrash violently and might even be forced out of the cable tray. This happened at a northern Florida textile plant where several hundred feet of Type MV single conductor cable was forced out of a cable tray run by an electrical fault because the cables were not restrained properly. This potential safety threat is precisely why Atricle 392.8 (D) requires single conductor cables be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces. For a three-phase trefoil or triangular arrangement (the most common single conductor application), these forces can be calculated according to the formula:

$$F_t = (0.17 \text{ x } i_p^2) / S.$$

F_t=Maximum Force on Conductor (Newtons/meter)

i_p=Peak Short Circuit Current (kilo-Amperes)

S=Spacing between Conductors (meters) = Cable Outside Diameter for Triplex (trefoil) Installations.



One technique to prevent excessive movement of cables is to employ fault-rated cable cleats.

To maintain the minimum distance between conductors, the single conductor cables should be securely bound in circuit groups using fault rated cable cleats. If the cleat spacing is properly chosen according to the available fault-current, the resulting cable grouping will inherently maintain a minimum distance between conductors. These circuit groups provide the lowest possible circuit reactance which is a factor in determining the current balance amoung various circuit groups.

For installations that involve phase conductors of three conductor or single conductor cables installed in parallel, cable tray installations have conductor cost savings advantages over conduit wiring systems. This is because the conductors required for a cable tray wiring system are often a smaller size than those required for a conduit wiring system for the same circuit. No paralleled conductor ampacity adjustment is required for single conductor or three conductor cables in cable trays [See **NEC®** Section 392.11(A)].

There were changes in the 1993 **NEC®** and 1996 **NEC®** for installations where an equipment grounding conductor is included in a multiconductor cable: the equipment grounding conductor must be fully rated per Section 250.122. If multiconductor cables with internal equipment grounding conductors are paralleled, each multiconductor cable must have a fully rated equipment grounding conductor.

Section 250.122 now prohibits the use of standard three conductor cables with standard size EGCs when they are installed in parallel and the EGCs are paralleled. There have been no safety or technical problems due to operating standard three conductor cables with standard sized EGCs in parallel. This has been a standard industrial practice for over 40 years with large numbers of such installations in service. This change was made without any safety or technical facts to justify this change.

To comply with Section 250.122, Three options are available: 1. Order special cables with increased sized EGCs which increases the cost and the delivery time. 2. Use three conductor cables without EGCs and install a single conductor EGC in the cable tray or use the cable tray as the EGC in qualifying installations. 3. Use standard cables but don't utilize their EGCs, use a single conductor EGC or the cable tray as the EGC in qualifying installations.

Should industry be required to have special cables fabricated for such installations when there have been absolutely no safety problems for over 40 years? Each designer and engineer must make his own decision on this subject. If the installations are properly designed, quality materials are used, and quality workmanship is obtained, there is no safety reason for not following the past proven practice of paralleling the EGCs of standard three conductor cable.

392.8. Cable Installation. (E) Single Conductors.

This section states that single conductors in ladder or ventilated trough cable tray that are Nos. 1/0 through 4/0, must be installed in a single layer.

In addition to the fill information that is in Section 392.10(A)(4), an exception was added which allows the cables in a circuit group to be bound together rather than have the cables installed in a flat layer. The installation practice in the exception is desirable to help balance the reactance's in the circuit group. This reduces the magnitudes of voltage unbalance in three phase circuits.

Where ladder or ventilated trough cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, or signal cables, the maximum number of cables that can be installed in a cable tray are limited to the Table 392.9 allowable fill areas. The cable tray fill areas are related to the cable ampacities. Overfill of the cable tray with the conductors operating at their maximum ampacities will result in cable heat dissipation problems with the possibility of conductor insulation and jacket damage.

Compatibility Of Cable Tray Types And Cable Trays Based On The *NEC*®

	Ladder Cable Tray	Ventilated Trough Cable Tray	Solid Bottom Cable Tray	3", 4", & 6" Wide Solid or Ventilated Channel Cable Tray
Multiconductor Cables 300 & 600 Volt *	X	X	X	X
Single Conductor Cables - 600 Volt *	*** X	X	X	X
Type MV Multiconductor Cables **	X	X		X
Type MV Single Conductor Cables **	X	X		X

X - Indicates the Installations Allowed by Article 392

* - For cables rated up to 2000 volts.

** - For cables rated above 2000 volts.

*** - For 1/0 - 4/0 AWG single conductor cables installed in ladder cable tray, maximum rung spacing is 9 inches.

392.9. Number of Multiconductor Cables. Rated 2000 Volts or less, in Cable Trays. (A) Any Mixture of Cables. (1) 4/0 or Larger Cables

The ladder or ventilated trough cable tray must have an inside usable width equal to or greater than the sum of the diameters (Sd) of the cables to be installed in it. For an example of the procedure to use in selecting a cable tray width for the type of cable covered in this section see page M-41 (Appendix Sheet 3), [Example 392.9(A)(1)].

Increasing the cable tray side rail depth increases the strength of the cable tray but the greater side rail depth does not permit an increase in cable fill area for power or lighting cables or combinations of power, lighting, control and signal cables. The maximum allowable fill area for all cable tray with a 3 inch or greater loading depth side rail is limited to the 38.9 percent fill area for a 3 inch loading depth side rail (Example: 3 inches x 6 inches inside cable tray width x 0.389 = 7.0 square inch fill area. This is the first value in Column 1 of Table 392.9. All succeeding values for larger cable tray widths are identically calculated).

392.9. Number of Multiconductor Cables. Rated 2000 Volts or less, in Cable Trays. (A) Any Mixture of Cable. (2) Cables Smaller Than 4/0

The allowable fill areas for the different ladder or ventilated trough cable tray widths are indicated in square inches in Column 1 of Table 392.9. The total sum of the cross-sectional areas of all the cables to be installed in the cable tray must be equal to or less than the cable tray allowable fill area. For an example of the procedure to use in selecting a cable tray width for the type of cable covered in this section see page M-42 (Appendix Sheet 4), [Example 392.9(A)(2)].

392.9. Number of Multiconductor Cables. Rated 2000 Volts or less, in Cable Trays. (A) Any Mixture of Cables. (3) 4/0 or Larger Cables Installed With Cables Smaller Than 4/0

The ladder or ventilated trough cable tray needs to be divided into two zones (a barrier or divider is not required but one can be used if desired) so that the No. 4/0 and larger cables have a dedicated zone as they are to be placed in a single layer.

The formula for this type of installation is shown in Column 2 of Table 392.9. This formula is a trial and error method of selecting a cable tray of the proper width. A direct method for determining the cable tray width is available by figuring the cable tray widths that are required for each of the cable combinations and then adding these widths together to select the proper cable tray width. [Sd (sum of the diameters of the No. 4/0 and larger cables)] + [Sum of Total Cross Sectional Area of all Cables No. 3/0 and Smaller) x (6 inches/7 square inches)] = The Minimum Width of Cable Tray Required. For an example of the procedure to use in selecting a cable tray width for the type of cable covered in this section, see page M-43, (Appendix Sheet 5), [EXAMPLE 392.9(A)(3)].

392.9. Number of Multiconductor Cables. Rated 2000 Volts or less, in Cable Trays. (B) Multiconductor Control and/or Signal Cables Only.

A ladder or ventilated trough cable tray, having a loading depth of 6 inches or less containing only control and/or signal cables, may have 50 percent of its cross-sectional area filled with cable. If the cable tray has a loading depth in excess of 6 inches, that figure cannot be used in calculating the allowable fill area as a 6 inch depth is the maximum value that can be used for the cross-sectional area calculation. For an example of the procedure to use in selecting a cable tray width for the type of cable covered in this section, see page M-44 (Appendix Sheet 6),[Example 392.9 (B)].

392.9. Number of Multiconductor Cables, Rated 2000 Volts, Nominal, or Less, in Cable Trays. (C) Solid Bottom Cable Trays Containing Any Mixture.

For solid bottom cable tray, the allowable cable fill area is reduced to approximately 30 percent as indicated by the values in Columns 3 and 4 of Table 392.9. The first value in Column 3 was obtained as follows: 3 in. loading depth x 6 in. inside width x 0.305 = 5.5 square inches. The other values in Column 3 were obtained in a like manner. The Sd term in Column 4 has a multiplier of 1 vs. the multiplier of 1.2 for Column 2.

392.9. Number of Multiconductor Cables, Rated 2000 Volts, Nominal, or Less, in Cable Trays. (C) Solid Bottom Cable Trays Containing any Mixture. (1) 4/0 or Larger Cables

The procedure used in selecting a cable tray width for the type of cable covered in this section is similar to that shown on Appendix Sheet 3 page M-41, but only 90 percent of the cable tray width can be used.

392.9. Number of Multiconductor Cables, Rated 2000 Volts, Nominal, or Less, in Cable Trays. (C) Solid Bottom Cable Trays Containing Any Mixture. (2) Cables Smaller Than 4/0

The procedure used in selecting a cable tray width for the type of cable covered in this section is similar to that shown on Appendix Sheet 4 page M-42. The maximum allowable cable fill area is in Column 3 of Table 392.9.

392.9. Number of Multiconductor Cables, Rated 2000 Volts, Nominal, or Less, in Cable Trays. (C) Solid Bottom Cable Trays Containing any Mixture. (3) 4/0 or Larger Cables Installed With Cables Smaller Than 4/0

No. 4/0 and larger cables must have a dedicated zone in the tray in order to be installed in one layer. Therefore the cable tray needs to be divided into two zones (a barrier or divider is not required but one can be used if desired).

The formula for this type of installation is shown in Column 4 of Table 392.9. This formula is a trial and error method of selecting a cable tray of the proper width. A direct method for determining the cable tray width is available by figuring the cable tray widths that are required for each of the cable combinations and then adding these widths together to select the proper cable tray width. [Sd (sum of the diameters of the No. 4/0 and larger cables) x (1.11)] + [(Sum of Total Cross-Sectional Area of all Cables No. 3/0 and Smaller) x (6 inches/5.5 square inches) = The Minimum Width of Cable Tray Required. The procedure used in selecting a cable tray width for the type of cables covered in this section is similar to that shown on Appendix Sheet 5 page M-43.

392.9. Number of Multiconductor Cables, Rated 2000 Volts, Nominal, or Less, in Cable Trays. (D) Solid Bottom Cable Tray Multiconductor Control and/or Signal Cables Only.

This is the same procedure as for ladder and ventilated trough cable trays except that the allowable fill has been reduced from 50 percent to 40 percent. The procedure used in selecting a cable tray width for the type of cable covered in this section is similar to that shown on Appendix Sheet 6 page M-44. [Example 392.9(B)]

392.9. Number of Multiconductor Cables, Rated 2000 Volts, Nominal, or Less in Cable Trays. (E) Ventilated Channel Cable Trays.

392.9(E)(1)

Where only one multiconductor cable is installed in a ventilated channel cable tray.

Ventilated Channel Cable Tray Size	Maximum Cross-Sectional Area of the Cable
3 Inch Wide	2.3 Square Inches
4 Inch Wide	4.5 Square Inches
6 Inch Wide	7.0 Square Inches

392.9(E)(2)

The fill areas for combinations of multiconductor cables of any type installed in ventilated channel cable tray.

Ventilated Channel Cable Tray Size	Maximum Allowable Fill Area
3 Inch Wide	1.3 Square Inches
4 Inch Wide	2.5 Square Inches
6 Inch Wide	3.8 Square Inches

392.9. Number of Multiconductor Cables, Rated 2000 Volts, Nominal, or Less in Cable Trays. (F) Solid Channel Cable Trays.

392.9(F)(1)

Where only one multiconductor cable is installed in a solid channel cable tray.

Solid Channel Cable Tray Size	Maximum Cross-Sectional Area of the Cable
2 Inch Wide	1.3 Square Inches
3 Inch Wide	2.0 Square Inches
4 Inch Wide	3.7 Square Inches
6 Inch Wide	5.5 Square Inches

392.9(F)(2)

The fill areas for combinations of multiconductor cables of any type installed in solid channel cable tray.

Solid Channel Cable Tray Size	Maximum Allowable Fill Area
2 Inch Wide	0.8 Square Inches
3 Inch Wide	1.1 Square Inches
4 Inch Wide	2.1 Square Inches
6 Inch Wide	3.2 Square Inches

392.10. Number of Single Conductor Cables, Rated 2000 Volts or Less in Cable Trays.

Installation of single conductors in cable tray is restricted to industrial establishments where conditions of maintenance and supervision assure that only qualified persons will service the installed cable tray systems. Single conductor cables for these installations must be 1/0 or larger, and they may not be installed in solid bottom cable trays.

392.10. Number of Single Conductor Cables, Rated 2000 Volts or Less in Cable Trays. (A) Ladder or Ventilated Trough Cable Trays. (1) 1000 KCMIL or Larger Cables

The sum of the diameters (Sd) of all single conductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.

392.10. Number of Single Conductor Cables, Rated 2000 Volts or Less, in Cable Trays. (A) Ladder or Ventilated Trough Cable Trays. (2) 250 KCMIL to 1000 KCMIL Cables

Number Of 600 Volt Single Conductor Cables That May Be Installed In Ladder Or Ventilated Trough Cable Tray - Section 392.10(A) (2)

			Cable Tray Width							
Single Conductor Size	Dia. In. (Note) #1	Area Sq. In.	6 In.	9 In.	12 In.	18 In.	24 In.	30 In.	36 In.	(Note #2) 42 In.
1/0	0.58	--	10	15	20	31	41	51	62	72
2/0	0.62	--	9	14	19	29	38	48	58	67
3/0	0.68	--	8	13	17	26	35	44	52	61
4/0	0.73	--	8	12	16	24	32	41	49	57
250 Kcmil	0.84	0.55	11	18	24	35	47	59	71	82
350 Kcmil	0.94	0.69	9	14	19	28	38	47	57	65
500 Kcmil	1.07	0.90	7	11	14	22	29	36	43	50
750 Kcmil	1.28	1.29	5	8	10	15	20	25	30	35
1000 Kcmil	1.45	--	4	6	8	12	16	20	24	28

Notes:

#1. Cable diameter's used are those for Okonite-Okolon 600 volt single conductor power cables.

#2. 42 inch wide is ladder cable tray only.

#3. Such installations are to be made only in qualifying industrial facilities as per Sections 392.3(B) & (B)(1).

#4. To avoid problems with unbalanced voltages, the cables should be bundled with ties every three feet or four feet. The bundle must contain the circuit's three phase conductors plus the neutral if one is used.

#5. The single conductor cables should be firmly tied to the cable trays at six foot or less intervals.

392.10. Number of Single Conductor Cables, Rated 2000 Volts or Less in Cable Trays. (A) Ladder or Ventilated Trough Cable Trays. (3) 1000 KCMIL or Larger Cables Installed With Cables Smaller Than 1000 KCMIL.

Such installations are very rare.

392.10. Number of Single Conductor Cables, Rated 2000 Volts or Less in Cable Trays. (A) Ladder or Ventilated Trough Cable Trays. (4) Cables 1/0 Through 4/0

The sum of the diameters (Sd) of all 1/0 through 4/0 cables shall not exceed the inside width of the cable tray.

392.10. Number of Single Conductor Cables, Rated 2000 Volts or Less in Cable Trays. (B) Ventilated Channel Cable Trays.

The sum of the diameters (Sd) of all single conductors shall not exceed the inside width of the ventilated cable channel.

Number Of 600 Volt Single Conductor Cables That May Be Installed In A Ventilated Channel Cable Tray - Section 392.10(B)

Single Conductor Size	Diameter Inches (Note #1)	3 Inch V. Channel C.T.	4 Inch V. Channel C.T.	6 Inch V. Channel C.T.
1/0 AWG	0.58	5	6	10
2/0 AWG	0.62	4	6	9
3/0 AWG	0.68	4	5	8
4/0 AWG	0.73	4	5	8
250 Kcmil	0.84	3	4	7
350 Kcmil	0.94	3	4	6
500 Kcmil	1.07	2	3	5
750 Kcmil	1.28	2	3	4
1000 Kcmil	1.45	2	2	4

Notes:

#1. Cable diameter's used are those for Okonite-Okolon 600 volt single conductor power cables.

#2. Such installations are to be made only in qualifying industrial facilities as per Sections 392.3(B) & (B)(1).

#3. The phase, neutral, and EGCs cables are all counted in the allowable cable fill for the ventilated channel cable tray.

#4. To avoid problems with unbalanced voltages, the cables should be bundled with ties every three feet or four feet. The bundle must contain the circuit's three phase conductors plus the neutral if one is used. If a cable is used as the EGC, it should also be in the cable bundle. If the designer desires, the ventilated channel cable tray may be used as the EGC as per Table 392.7(B)(2).

#5. The single conductor cables should be firmly tied to the ventilated channel cable tray at six foot or less intervals.

392.11. Ampacity of Cables Rated 2000 Volts or Less in Cable Trays. (A) Multiconductor Cables.

Ampacity Tables 310.16 and 310.18 are to be used for multiconductor cables which are installed in cable tray using the allowable fill areas as per Section 392.9. The ampacities in Table 310.16 are based on an ambient temperature of 30˚ Celsius. Conduit and cable tray wiring systems are often installed in areas where they will be exposed to high ambient temperatures. For such installations, some designers and engineers neglect using the Ampacity Correction Factors listed below the Wire Ampacity Tables which results in the conductor insulation being operated in excess of its maximum safe temperature. These correction factors must be used to derate a cable for the maximum temperature it will be subjected to anywhere along its length.

392.11(A)(1)

Section 310.15(B)(2)(a) refers to Section 392.11 which states that the derating information of Table 310.15(B)(2)(a) applies to multiconductor cables with more than three current carrying conductors but not to the number of conductors in the cable tray.

392.11(A)(2)

Where cable trays are continuously covered for more than 6 feet (1.83m) with solid unventilated covers, not over 95 percent of the allowable ampacities of Tables 310.16 and 310.18 shall be permitted for multiconductor cables.

This is for multiconductor cables installed using Table 392.16 or 392.18. If these cables are installed in cable trays with solid unventilated covers for more than 6 feet the cables must be derated. Where cable tray covers are to be used, it is best to use raised or ventilated covers so that the cables can operate in a lower ambient temperature.

392.11(A)(3)

Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0-2000 volts in free air, in accordance with Section 310.15(C).

By spacing the cables one diameter apart, the engineer may increase the allowable ampacities of the cables to the free air rating as per Section 310.15(C) and Table B-310.3 in Appendix B. Notice that the allowable fill of the cable tray has been decreased in this design due to the cable spacing.

392.11. Ampacity of Cables Rated 2000 Volts or Less in Cable Trays. (B) Single Conductor Cables.

Single conductor cables can be installed in a cable tray cabled together (triplexed, quadruplexed, etc.) if desired. Where the cables are installed according to the requirements of Section 392.10, the ampacity requirements are shown in the following chart as per Section 392.11(B)(1), (2), (3), & (4):

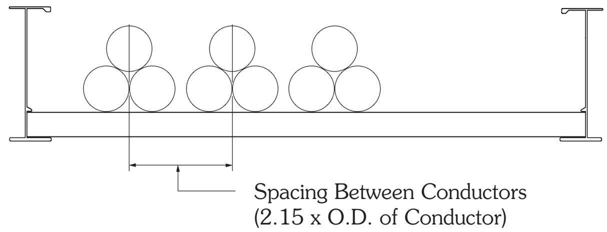
The 2005 **NEC®** has added a new exception to 392.11(B)(3). Stating that the capacity for single conductor cables be placed in solid bottom shall be determined by 310.15(C).

Sec. No.	Cable Sizes	Solid Unventilated Cable Tray Cover	Applicable Ampacity Tables (*)	Mult. Amp. Table Values By	Special Conditions
(1)	600 kcmil and Larger	No Cover Allowed (**)	310.17 and 310.19	0.75	
(1)	600 kcmil and Larger	Yes	310.17 and 310.19	0.70	
(2)	1/0 AWG through 500 kcmil	No Cover Allowed (**)	310.17 and 310.19	0.65	
(2)	1/0 AWG through 500 kcmil	Yes	310.17 and 310.19	0.60	
(3)	1/0 AWG & Larger In Single Layer	No Cover Allowed (**)	310.17 and 310.19	1.00	Maintained Spacing Of One Cable Diameter
(4)	Single Conductors In Triangle Config. 1/0 AWG and Larger	No Cover Allowed (**)	310.20 [See NEC Section 310.15(B)]	1.00	Spacing Of 2.15 x One Conductor O.D. Between Cables(***)

(*) The ambient ampacity correction factors must be used.

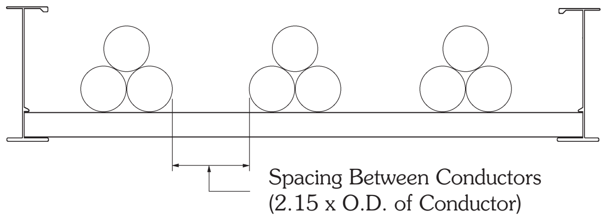
(**) At a specific position, where it is determined that the tray cables require mechanical protection, a single cable tray cover of six feet or less in length can be installed.

The wording of Section 392.11(B)(4) states that a spacing of 2.15 times one conductor diameter is to be maintained between circuits. Two interpretations of this statement are possible. Interpretation #1. - The 2.15 times one conductor diameter is the distance between the centerlines of the circuits (the center lines of the conductor bundles). Interpretation #2. - The 2.15 times one conductor diameter is the free air distance between the adjacent cable bundles. The use of the word "circuit" is unfortunate as its presence promotes Interpretation #1. An installation based on Interpretation #1 is not desirable as a free air space equal to 2.15 times one conductor diameter between the cable bundles should be maintained to promote cable heat dissipation.



Technically Undesirable Installation

Interpretation #1



Technically Desirable Installation

Interpretation #2

392.12. Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

Sum the diameters of all the cables (Sd) to determine the minimum required cable tray width. Triplexing or quadruplexing the cables does not change the required cable tray width. Whether the cables are grouped or ungrouped, all installations must be in a single layer.

392.13. Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays. (A) Multiconductor Cables (2001 Volts or Over).

Provision No. 1: Where cable trays are continuously covered for more than six feet (1.83 m) with solid unventilated covers, not more than 95% of the allowable ampacities of Tables 310.75 and 310.76 shall be permitted for multiconductor cables.

Cables installed in cable trays with solid unventilated covers must be derated. Where cable tray covers are to be used, it is best to use raised or ventilated covers so that the cables can operate in a lower ambient temperature.

Provision No. 2: Where multiconductor cables are installed in a single layer in uncovered cable trays with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.71 and 310.72.

If the cable tray does not have covers and the conductors are installed in a single layer spaced not less than one cable diameter apart, the cable conductor ampacities can be 100 percent of the ambient temperature corrected capacities in Tables 310.71 or 310.72.

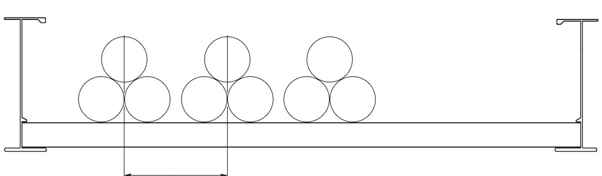
392.13. Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays. (B) Single Conductor Cables (2001 Volts or Over).

Sec. No.	Cable Sizes	Solid Unventilated Cable Tray Cover	Applicable Ampacity Tables (*)	Mult. Amp. Table Values By	Special Conditions
(1)	1/0 AWG and Larger	No Cover Allowed (**)	310.69 and 310.70	0.75	
(1)	1/0 AWG and Larger	Yes	310.69 and 310.70	0.70	
(2)	1/0 AWG & Larger In Single Layer	No Cover Allowed (**)	310.69 and 310.70	1.00	Maintained Spacing Of One Cable Diameter
(3)	Single Conductors In Triangle Config. 1/0 AWG and Larger	No Cover Allowed (**)	310.67 and 310.68	1.00	Spacing Of 2.15 x One Conductor O.D. Between Cables(***)

(*) The ambient ampacity correction factors must be used.

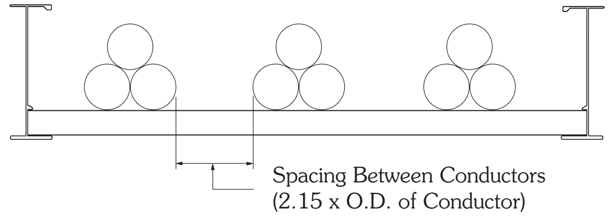
(**) At a specific position, where it is determined that the tray cables require mechanical protection, a single cable tray cover of six feet or less in length can be installed.

The wording of Section 392.13(B)(3) states that a spacing of 2.15 times one conductor diameter is to be maintained between circuits. Two interpretations of this statement are possible. Interpretation #1. - The 2.15 times one conductor diameter is the distance between the centerlines of the circuits (the center lines of the conductor bundles). Interpretation #2. - The 2.15 times one conductor diameter is the free air distance between the adjacent cable bundles. The use of the word “circuit” is unfortunate as its presence promotes Interpretation #1. An installation based on Interpretation #1 is not desirable as a free air space equal to 2.15 times one conductor diameter between the cable bundles should be maintained to promote cable heat dissipation.



Technically Undesirable Installation

Interpretation #1



Technically Desirable Installation

Interpretation #2

CABLE TRAY WIRING SYSTEM DESIGN AND INSTALLATION HINTS.

Cable tray wiring systems should have a standardized cabling strategy. Standard cable types should be used for each circuit type. Most of the following circuits should be included; feeder circuits, branch circuits, control circuits, instrumentation circuits, programmable logic controller input and output (I/O) circuits, low level analog or digital signals, communication circuits and alarm circuits. Some cables may satisfy the requirements for several circuit types. Minimizing the number of different cables used on a project reduces installed costs. Some companies have cable standards based on volume usage to minimize the numbers of different cables used on a project. For example: if a 6 conductor No. 14 control cable is needed but 7 conductor No. 14 control cable is stocked, a 7 conductor control cable would be specified and the extra conductor would not be used. Following such a practice can reduce the number of different cables handled on a large project without increasing the cost since high volume cable purchases result in cost savings. Orderly record keeping also helps provide quality systems with lower installation costs. The following items should be included in the project's cable records:

- Cable Tray Tag Numbers - The tagging system should be developed by the design personnel with identification numbers assigned to cable tray runs on the layout drawings. Cable tray tag numbers are used for controlling the installation of the proper cable tray in the correct location, routing cables through the tray system and controlling the cable fill area requirements.

- Cable Schedules - A wire management system is required for any size project. Cable schedules must be developed to keep track of the cables. This is especially true for projects involving more than just a few feeder cables. A typical cable schedule would contain most or all of the following:

- The Cable Number, the Cable Manufacturer & Catalog Number, Number of conductors, the conductor sizes, and the approximate cable length.

- Cable Origin Location - The origin equipment ID with the compartment or circuit number and terminals on which the cable conductors are to be terminated. It should also include the origin equipment layout drawing number, and the origin equipment connection diagram number.

• Cable Routing - Identifies the cable tray sections or runs that a cable will occupy. Cable tray ID tag numbers are used to track the routing.

• Cable Termination Location - The device or terminal equipment on which the cable conductors are to be terminated. It should also include the termination equipment layout drawing number, and the termination equipment connection diagram number.

Some design consultants and corporate engineering departments use spread sheets to monitor the cable tray runs for cable fill. With such a program, the cable tray fill area values for each cable tray run or section can be continuously upgraded. If a specified cable tray run or section becomes overfilled, it will be flagged for corrective action by the designer.

• Cable Installation Provisions - The cable tray system must be designed and installed, to allow access for cable installation. For many installations, the cables may be hand laid into the cable trays and no cable pulling equipment is required. There are other installations where sufficient room must be allotted for all the cable pulling activities and equipment.

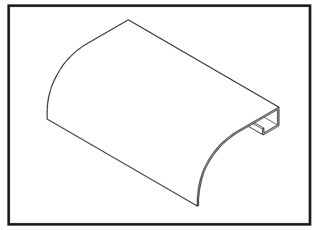
The cable manufacturers will provide installation information for their cables such as maximum pulling tension, allowable sidewall pressures, minimum bending radii, maximum permissible pulling length etc.. Lubricants are not normally used on cables being installed in cable trays.

The engineer and designers should discuss in detail the installation of the cables with the appropriate construction personnel. This will help to avoid installation problems and additional installation costs. It is important that the cable pull is in the direction that will result in the lowest tension on the cables. Keep in mind there also needs to be room at the ends of the pulls for the reel setups and for the power pulling equipment. Cable pulleys should be installed at each direction change. Triple pulleys should be used for 90 degree horizontal bends and all vertical bends. Single pulleys are adequate for horizontal bends less than 90 degrees. Use rollers in-between pulleys and every 10 to 20 feet depending on the cable weight. Plastic jacketed cables are easier to pull than are the metallic jacketed cables and there is less chance of cable damage. The pulling eye should always be attached to the conductor material to avoid tensioning the insulation. For interlocked armor cables, the conductors and the armor both have to be attached to the pulling eye.

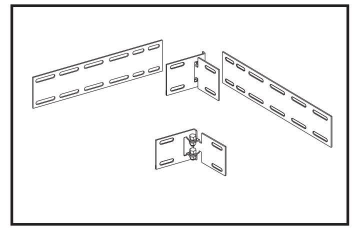
Normally, the cables installed in cable trays are not subjected to the damage suffered by insulated conductors pulled into conduit. Depending on the size of the insulated conductors and the conduit, jamming can take place which places destructive stresses on the cable insulation. In the October, 1991 issue of EC]&M magazine, the article on cable pulling stated that 92 percent of the insulated conductors that fail do so because they were damaged in installation.

CABLE TRAY ACCESSORIES.

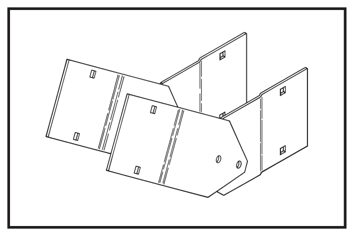
B-Line manufactures a full line of prefabricated accessories for all types of B-Line cable trays. The use of the appropriate accessories will provide installation cost and time savings. In addition to providing desirable electrical and mechanical features for the cable tray system, the use of the appropriate accessories improves the physical appearance of the cable tray system. Some of the most common accessories are shown below.



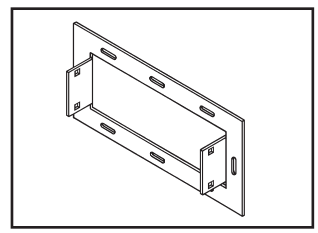
Ladder Dropout



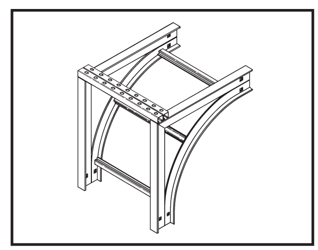
Horizontal Adjustable Splice
Requires supports within 24" on both sides, per NEMA VE 2.



Vertical Adjustable Splice
Requires supports within 24" on both sides, per NEMA VE 2.



Frame Box Connector



Cable Support Fitting

FIREPROOFING CABLE TRAY

Cable trays should not be encapsulated for fire protection purposes other than for the short lengths at fire rated walls unless the cables are adequately derated. Encapsulation to keep fire heat out will also keep conductor heat in. If conductors cannot dissipate their heat, their insulation systems will deteriorate. If the cable tray will be encapsulated, the cable manufacturer should be consulted for derating information.

CABLE TRAY MAINTENANCE AND REPAIR

If the cable tray finish and load capacity is properly specified and the tray is properly installed, virtually no maintenance is required.

Pre-Galvanized - This finish is for dry indoor locations. No maintenance is required.

Hot Dip Galvanized - This finish is maintenance free for many years in all but the most severe environments. If components have been cut or drilled in the field, the exposed steel area should be repaired with a cold galvanizing compound. Cooper B-Line has a spray on zinc coating available which meets the requirements of ASTM A780, *Repair of Hot Dip Finishes*.

Aluminum - Our cable tray products are manufactured from type 6063-T6 aluminum alloy with a natural finish. The natural oxide finish is self healing and requires no repair if it is field modified.

Non-metallic - Fabrication with fiberglass is relatively easy and comparable to working with wood. Any surface that has been drilled, cut, sanded, or otherwise broken, **must be sealed** with a comparable resin. Polyester or vinyl ester sealing kits are available.

Cable tray should be visually inspected each year for structural damage i.e., broken welds, bent rungs or severely deformed side rails. If damage is evident, from abuse or installation, it is recommended that the damaged section of cable tray be replaced rather than repaired. It is much easier to drop a damaged section of tray out from under the cables than it is to shield the cables from weld spatter.

CABLE TRAY. THERMAL CONTRACTION AND EXPANSION

All materials expand and contract due to temperature changes. Cable tray installations should incorporate features which provide adequate compensation for thermal contraction and expansion. Installing expansion joints in the cable tray runs only at the structure expansion joints does not normally compensate adequately for the cable tray's thermal contraction and expansion. The supporting structure material and the cable tray material will have different thermal expansion values. They each require unique solutions to control thermal expansion.

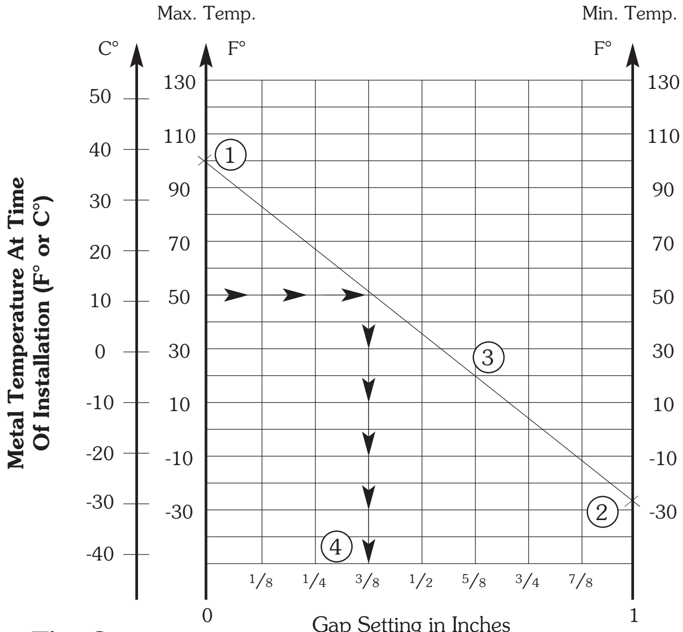
NEC® Section 300.7(B) states that **'Raceways shall be provided with expansion joints where necessary to compensate for thermal expansion or contraction.'** **NEC®** Section 392 does not address thermal contraction and expansion of cable tray. One document which addresses expansion is the NEMA Standards Publication No. VE 2, Section 4.3.2. NEMA VE-2 Table 4-2 shows the allowable lengths of steel and aluminum cable tray between expansion joints for the temperature differential values.

Table 4-2

Maximum Spacing Between Expansion Joints That Provide For One Inch (25.4 mm) Movement

Temp. Differential		Steel		Aluminum		Stainless Steel 304		Stainless Steel 316		FRP	
°F	(°C)	Feet	(m)	Feet	(m)	Feet	(m)	Feet	(m)	Feet	(m)
25	(-4)	512	(156.0)	260	(79.2)	347	(105.7)	379	(115.5)	667	(203.3)
50	(10)	256	(78.0)	130	(39.6)	174	(53.0)	189	(57.6)	333	(101.5)
75	(24)	171	(52.1)	87	(26.5)	116	(35.4)	126	(38.4)	222	(67.6)
100	(38)	128	(39.0)	65	(19.8)	87	(26.5)	95	(29.0)	167	(50.9)
125	(51)	102	(31.1)	52	(15.8)	69	(21.0)	76	(23.2)	133	(40.5)
150	(65)	85	(25.9)	43	(13.1)	58	(17.7)	63	(19.2)	111	(33.8)
175	(79)	73	(22.2)	37	(11.3)	50	(15.2)	54	(16.4)	95	(28.9)

For a 100°F differential (winter to summer), a steel cable tray will require an expansion joint every 128 feet and an aluminum cable tray every 65 feet. The temperature at the time of installation will dictate the gap setting.



The Gap

Figure 4.13B
Gap Setting Of Expansion Splice Plate
1" (25.4 mm) Gap Maximum

Setting of the Expansion Joint Splice Plate is used as follows per the example indicated in VE-2 Figure 4.13B.

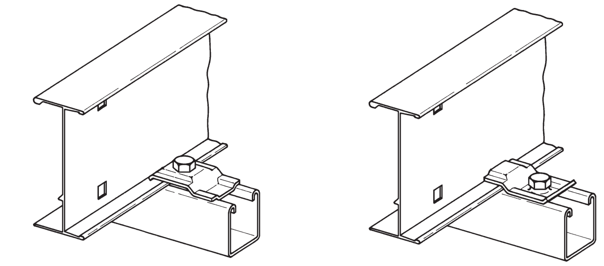
Step 1. Plot the highest expected cable tray metal temperature during the year on the maximum temperature vertical axis. Example's Value: 100 Degrees F.

Step 2. Plot the lowest expected cable tray metal temperature during the year on the minimum temperature vertical axes. Example's Value: - 28 Degrees F.

Step 3. Draw a line between these maximum and minimum temperature points on the two vertical axis.

Step 4. To determine the required expansion joint gap setting at the time of the cable tray's installation: Plot the cable tray metal temperature at the time of the cable tray installation on the maximum temperature vertical axis (Example's Value: 50 Degrees F). Project over from the 50 Degrees F point on the maximum temperature vertical axis to an intersection with the line between the maximum and minimum cable tray metal temperatures. From this intersection point, project down to the gap setting horizontal axis to find the correct gap setting value (Example's Value: 3/8 inch gap setting). This is the length of the gap to be set between the cable tray sections at the expansion joint.

The plotted High - Low Temperature Range in Figure 4-13B is 128° F. The 125° F line in Table 4-1 shows that installations in these temperature ranges would require 3/8" expansion joints approximately every 102 feet for Steel and every 52 feet for Aluminum cable tray.



As a clamp. As a guide.

Another item essential to the operation of the cable tray expansion splices is the type of hold down clamps used. The cable tray must not be clamped to each support so firmly that the cable tray cannot contract and expand without distortion. The cable tray needs to be anchored at the support closest to the midpoint between the expansion joints with **hold down clamps** and secured by **expansion guides** at all other support locations.The expansion guides allow the cable tray to slide back and forth as it contracts and expands. Supports must also be located on both sides of an expansion splice. The supports should be located within two feet of the expansion splice to ensure that the splice will operate properly. If these guidelines for cable tray thermal contraction and expansion are not followed, there is the potential for the cable trays to tear loose from their supports, and for the cable trays to bend and collapse.

Appendix Pages

TABLE I
TEMPERATURE RISE TESTS, CABLE TRAY CONNECTORS, CLASS II ALUMINUM LADDER CABLE TRAY

Test Current Amps And Fuse Size*	Test Time Cycles	I^2T mult. by 10^6	Connector Data								
			C1			C2			C3		
			Type Of Connector	No. & Type Bolts	Temp. Rise °C	Type Of Connector	No. & Type Bolts	Temp. Rise °C	Type Of Connector	No. & Type Bolts	Temp. Rise °C
7,900 1,200A Fuse	66	69	Adj. Vert. 1 Bolt**	4 Steel	6	3/0 CU Bond	AL-CU Lugs	18	Rigid Clean	2 Steel	8
7,900 1,200A Fuse	82	85	Rigid Corroded	4 Steel	10	3/0 CU Bond	AL-CU Lugs	22	Rigid Clean	2 Steel	9
12,000	120	288	Rigid Corroded	2 Nylon	50	3/0 CU Bond	AL-CU Lugs	104	Rigid Clean	2 Steel	32
12,000	124	297	Rigid Corroded	4 Steel	40	Rigid Corroded	4 Lugs	46	Rigid Clean	4 Steel	21
34,600	14	280	Rigid Corroded	2 Nylon	34	3/0 CU Bond	AL-CU Lugs	75	Rigid Clean	2 Steel	29
34,400	14	276	Rigid Corroded	4 Nylon	28	Rigid Corroded	4 Steel	35	Rigid Clean	4 Steel	20

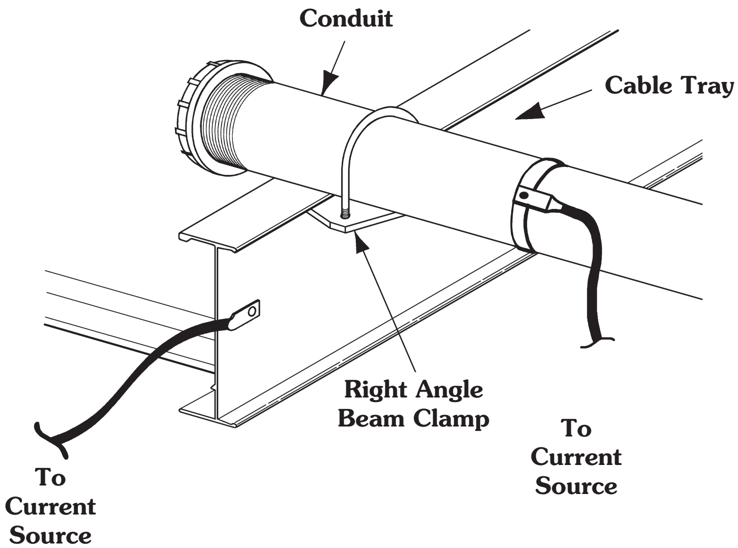
TABLE II
TEMPERATURE RISE TESTS, CABLE TRAY CONNECTORS, CLASS II STEEL LADDER CABLE TRAY

Test Current Amps And Fuse Size*	Test Time Cycles	I^2T mult. by 10^6	Connector Data								
			C1			C2			C3		
			Type Of Connector	No. & Type Bolts	Temp. Rise °C	Type Of Connector	No. & Type Bolts	Temp. Rise °C	Type Of Connector	No. & Type Bolts	Temp. Rise °C
1,980 200A, FU	52	3.4	Adj. Vert. 1 Bolt**	4	2	No. 6 CU Bond	AL-CU Lugs	10	Rigid	2	3
1,970 400A, FU	394	25.5	Adj. Vert. 1 Bolt**	4	9	No. 6 CU Bond	AL-CU Lugs	***	Rigid	2	15
1,960 400A, FU	8100	51.8	Adj. Vert. 1 Bolt**	4	18	Rigid	4	23	Rigid	2	32
12,000	120	288	Adj. Vert. 2 Bolts**	4	94	Adj. Vert. 2 Bolts**	4	89	Rigid	4	81
12,000	123	295	Rigid	4	70	Rigid	4	87	Rigid	4	85
34,000	13	250	Rigid	4	71	Rigid	4	57	Rigid	4	69

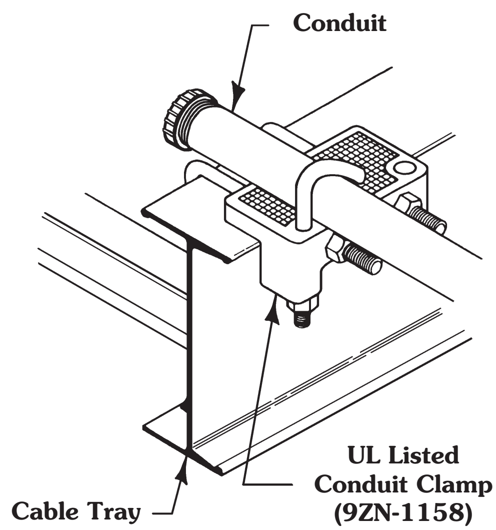
* Test current was interrupted in a predetermined time when a fuse was not used.
** 1 or 2 Bolts - Number of bolts installed on the adjustable vertical connector hinge.
*** The No. 6 bonding jumper melted and opened the circuit when protected by 400A fuse.

(See Page M-26 - Figure 1 for Temperature Rise Test illustration)

Appendix Sheet 1



Test Set-Up



Conduit Clamp Detail

CIRCUIT ARRANGEMENT FOR RIGID CONDUIT TEMPERATURE RISE TESTS

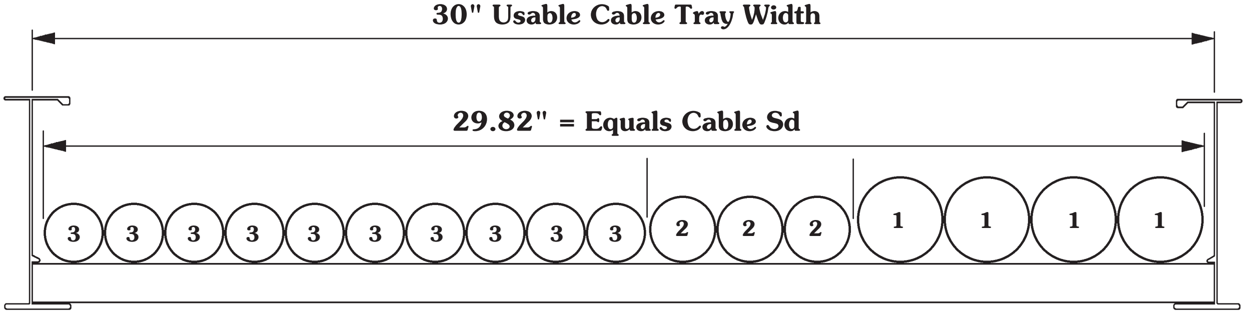
TABLE III
TEMPERATURE RISE TESTS, CONDUIT CLAMPS FOR BONDING RIGID CONDUIT TO CABLE TRAY

Test Current Amperes	Test Time Cycles	I^2T mult. 10^6	Rigid Conduit		Cable Tray		Temp. Rise °C	Condition After Test
			Size	Material	Class	Material		
36,000	16	344.7	4"	Aluminum	II	Aluminum	19	No arcing or damage
20,900	60.5	441.2	4"	Aluminum	II	Aluminum	70	No arcing or damage
12,100	178	433.3	4"	Aluminum	II	Aluminum	74	No arcing or damage
21,000	20	146.8	4"	Steel	II	Steel	(?)	Zinc melted at point where conduit contacted with tray
3,260	900	159.5	4"	Steel	II	Steel	63	No arcing or damage
21,000	30	220	2"	Aluminum	II	Aluminum	21	No arcing or damage
12,100	120.5	294.2	2"	Aluminum	II	Aluminum	59	No arcing or damage
8,000	245	261.1	2"	Aluminum	II	Aluminum	44	No arcing or damage
21,000	14	103.8	2"	Steel	II	Steel	62	Zinc melted at point where conduit contacted with tray
12,000	60.5	145.4	2"	Steel	II	Steel	22	Slight arc between clamp and tray
3,240	600	104.9	2"	Steel	II	Steel	49	No arcing or damage
21,000	20	146.8	1"	Aluminum	II	Aluminum	20	No arcing or damage
12,200	60.5	150.3	1"	Aluminum	II	Aluminum	24	No arcing or damage
12,100	14.5	35.3	1"	Steel	II	Steel	6	No arcing or damage
8,000	63.5	67.84	1"	Steel	II	Steel	59	No arcing or damage
1,980 200A FU	44.5	2.9	1"	Steel	II	Steel	1	No arcing or damage

Appendix Sheet 2

Example - *NEC*® Section 392.9(A)(1)

Width selection for cable tray containing 600 volt multiconductor cables, sizes #4/0 AWG and larger only. Cable installation is limited to a single layer. The sum of the cable diameters (Sd) must be equal to or less than the usable cable tray width.



Cross Section Of The Cables And The Cable Tray

Cable tray width is obtained as follows:

Item Number	List Cable Sizes	(D) List Cable Outside Diameter	(N) List Number of Cables	Multiply (D) x (N) Subtotal of the Sum of the Cables Diameters (Sd)
1.	3/C - #500 kcmil	2.26 inches	4	9.04 inches
2.	3/C - #250 kcmil	1.76 inches	3	5.28 inches
3.	3/C - #4/0 AWG	1.55 inches	10	15.50 inches

The sum of the diameters (Sd) of all cables (Add Sds for items 1, 2, & 3.)
9.04 inches + 5.28 inches + 15.50 inches = 29.82 inches (Sd)
A cable tray with a usable width of 30 inches is required. For a 10% increase in cost a 36 inch wide cable tray could be purchased which would provide for some future cable additions.

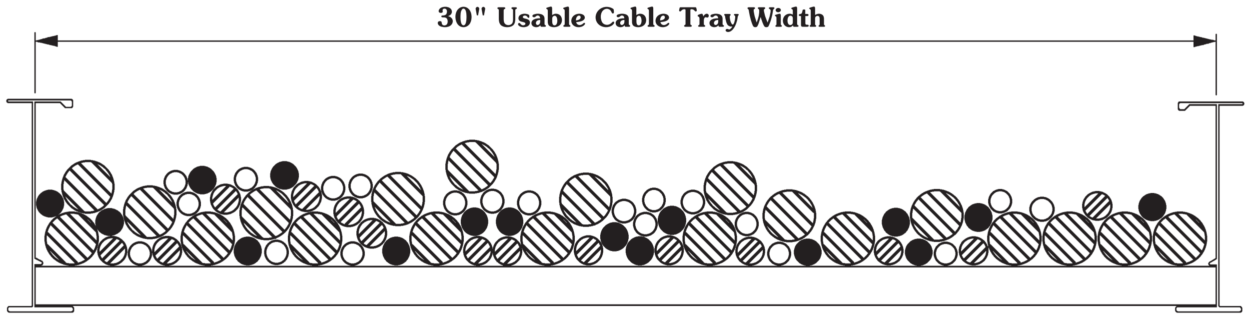
Notes:

1. The cable sizes used in this example are a random selection.
2. Cables - copper conductors with cross linked polyethylene insulation and a PVC jacket. (These cables could be ordered with or without an equipment grounding conductor.)
3. Total cable weight per foot for this installation.
   61.4 lbs./ft. (without equipment grounding conductors)
   69.9 lbs./ft. (with equipment grounding conductors)
   This load can be supported by a load symbol "B" cable tray - 75 lbs./ft.

Appendix Sheet 3

Example - *NEC*® Section 392.9(A)(2)

Width selection for cable tray containing 600 volt multiconductor cables, sizes #3/0 AWG and smaller. Cable tray allowable fill areas are listed in Column 1 of Table 392.9.



Cross Section Of The Cables And The Cable Tray

Cable tray width is obtained as follows:

Item Number	List Cable Sizes	(A) List Cable Cross Sectional Areas	(N) List Number of Cables	Multiply (A) x (N) Total of the Cross Sectional Area for Each Item
1.	3/C #12 AWG	0.17 sq. in.	20	3.40 sq. in.
2.	4/C #12 AWG	0.19 sq. in.	16	3.04 sq. in.
3.	3/C #6 AWG	0.43 sq. in.	14	6.02 sq. in.
4.	3/C #2 AWG	0.80 sq. in.	20	16.00 sq. in.

Method 1.
The sum of the total areas for items 1, 2, 3, & 4:
3.40 sq. in. + 3.04 sq. in. + 6.02 sq. in. + 16.00 sq. in. = 28.46 sq. inches
From Table 392.9 Column 1 a 30 inch wide tray with an allowable fill area of 35 sq. in. must be used. The 30 inch cable tray has the capacity for additional future cables (6.54 sq. in. additional allowable fill area can be used.)

Method 2.
The sum of the total areas for items 1, 2, 3, & 4 multiplied by

$$\left(\frac{6\text{ in.}}{7\text{ sq. in.}}\right) = \text{cable tray width required}$$

3.40 sq. in. + 3.04 sq. in. + 6.02 sq. in. + 16.00 sq. in. = 28 46 sq. in.

$$\left(\frac{28.46\text{ sq. in. x }6\text{ in.}}{7\text{ sq. in.}}\right) = 24.39\text{ inch cable tray width required}$$

Use a 30 inch wide cable tray.

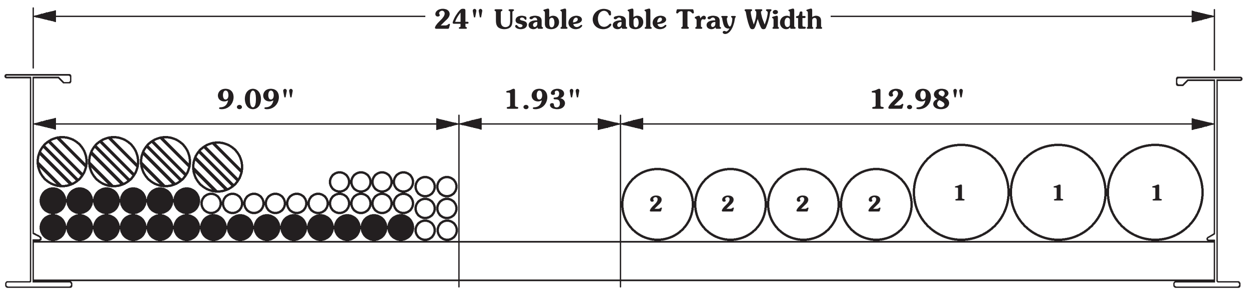
Notes:

1. The cable sizes used in this example are a random selection.
2. Cables - copper conductors with cross linked polyethylene insulation and a PVC jacket. (These cables could be ordered with or without an equipment grounding conductor.)
3. Total cable weight per foot for this installation. 31.9 lbs./ft. (Cables in this example do not contain equipment grounding conductors.) This load can be supported by a load symbol "A" cable tray - 50 lbs./ft.

Appendix Sheet 4

Example - *NEC*® Section 392.9(A)(3)

Width selection for cable tray containing 600 volt multiconductor cables, sizes #4/0 AWG and larger (single layer required) and #3/0 AWG and smaller. These two groups of cables must have dedicated areas in the cable tray.



Cross Section Of The Cables And The Cable Tray

Cable tray width is obtained as follows:

A - Width required for #4/0 AWG and larger multiconductor cables -

Item Number	List Cable Sizes	(D) List Cable Outside Diameter	(N) List Number of Cables	Multiply (D) x (N) Subtotal of the Sum of the Cables Diameters (Sd)
1.	3/C - #500 kcmil	2.26 inches	3	6.78 inches
2.	3/C - #4/0 AWG	1.55 inches	4	6.20 inches

Total cable tray width required for items 1 & 2 = 6.78 inches + 6.20 inches = 12.98 inches

B - Width required for #3/0 AWG and smaller multiconductor cables -

Item Number	List Cable Sizes	(A) List Cable Cross Sectional Area	(N) List Number of Cables	Multiply (A) x (N) Total of the Cross Sectional Area For Each Item
3.	3/C #12 AWG	0.17 sq. in.	20	3.40 sq. in.
4.	3/C #10 AWG	0.20 sq. in.	20	4.00 sq. in.
5.	3/C #2 AWG	0.80 sq. in.	4	3.20 sq. in.

Total cable tray width required for items 3, 4, & 5

$$(3.40 \text{ sq. in.} + 4.00 \text{ sq. in.} + 3.20 \text{ sq. in.}) \left(\frac{6 \text{ in.}}{7 \text{ sq. in.}}\right)^{1} = (10.6 \text{ sq. in.}) \left(\frac{6 \text{ in.}}{7 \text{ sq. in.}}\right)^{1} = 9.09 \text{ inches}$$

Actual cable tray width is A - Width (12.98 in.) + B - Width (9.09 in.) = 22.07 inches
A 24 inch wide cable tray is required. The 24 inch cable tray has the capacity for additional future cables (1.93 inches or 2.25 sq. inches allowable fill can be used).

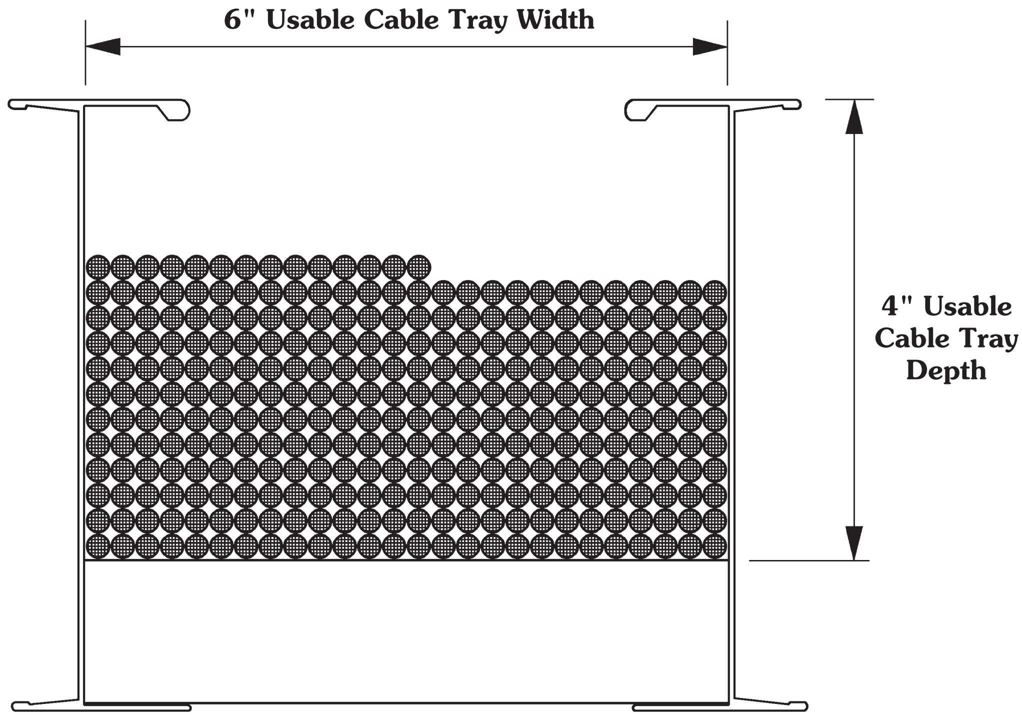
Notes:

1. This ratio is the inside width of the cable tray in inches divided by its maximum fill area in sq. inches from Column 1 Table 392.9.
2. The cable sizes used in this example are a random selection.
3. Cables - copper conductors with cross linked polyethylene insulation and a PVC jacket.
4. Total cable weight per foot for this installation.
   40.2 lbs./ft. (Cables in this example do not contain equipment grounding conductors.)
   This load can be supported by a load symbol "A" cable tray - 50 lbs./ft.

Appendix Sheet 5

Example - *NEC*® Section 392.9(B)

Cable Tray containing Type ITC or Type PLTC Cables



Cross Section Of The Cables And The Cable Tray

50% of the cable tray useable cross sectional area can contain type PLTC cables

4 inches x 6 inches x .050 = 12 square inches allowable fill area.

2/C - #16 AWG 300 volt shielded instrumentation cable O.D. = 0.224 inches.

Cross Sectional Area = 0.04 square inches.

$$\frac{12 \text{ sq. in.}}{0.04 \text{ sq. in./cable}} = 300 \text{ cables can be installed in this cable tray.}$$

$$\frac{300 \text{ cables}}{26 \text{ cables/rows}} = 11.54 \text{ rows can be installed in this cable tray.}$$

Notes:

1. The cable sizes used in this example are a random selection.
2. Cables - copper conductors with PVC insulation, aluminum/mylar shielding, and PVC jacket.

Appendix Sheet 6

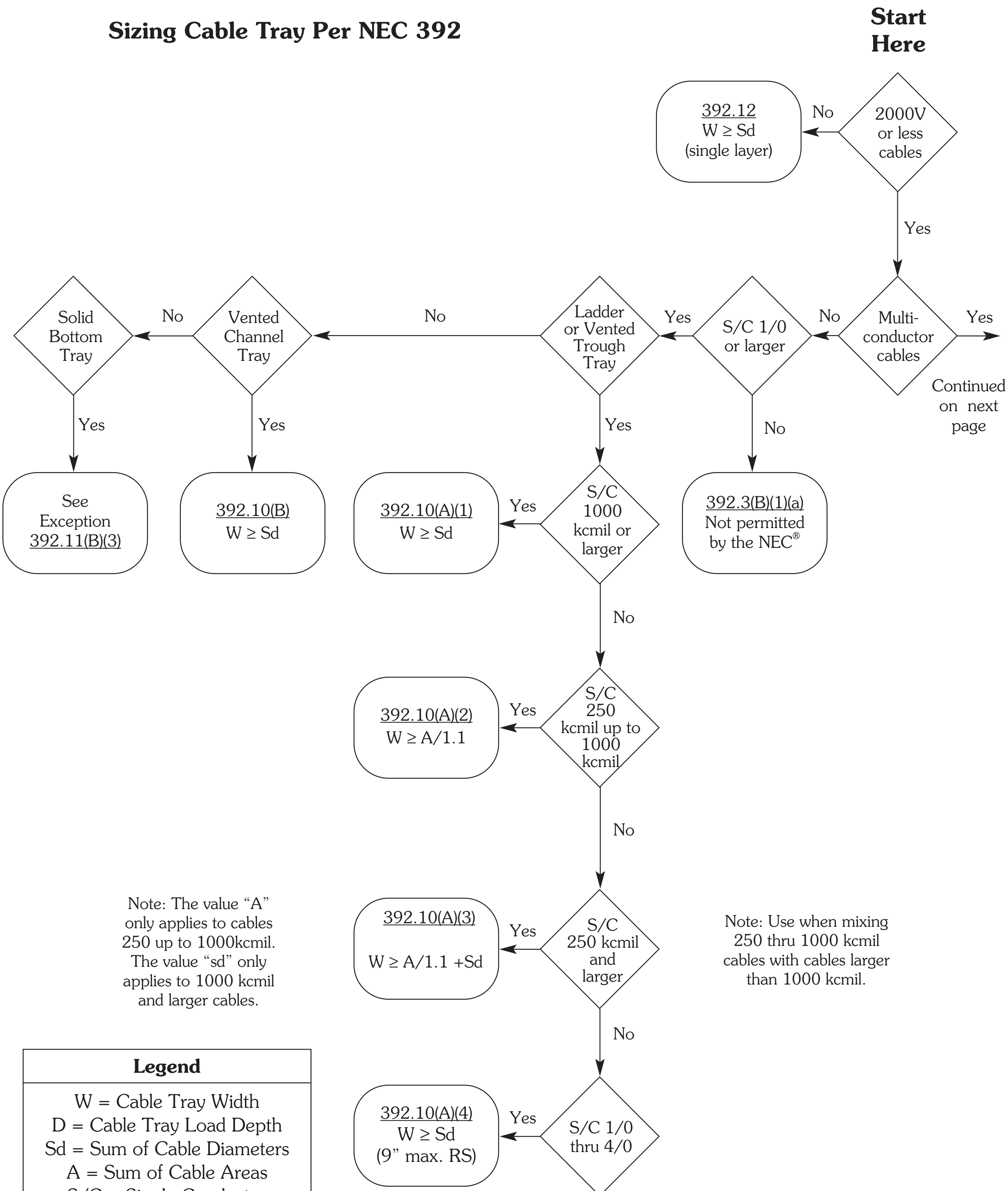
Table 250.122. Minimum Size Equipment Grounding Conductors for Grounding Raceways and Equipment

Rating or Setting of Automatic Overcurrent Device in Circuit Ahead of Equipment, Conduit, etc., Not Exceeding (Amperes)	Size (AWG or kcmil) Copper	Size (AWG or kcmil) Aluminum or Copper-Clad Aluminum*
15	14	12
20	12	10
30	10	8
40	10	8
60	10	8
100	8	6
200	6	4
300	4	2
400	3	1
500	2	1/0
600	1	2/0
800	1/0	3/0
1000	2/0	4/0
1200	3/0	250
1600	4/0	350
2000	250	400
2500	350	600
3000	400	600
4000	500	800
5000	700	1200
6000	800	1200

Appendix Sheet 7

CABLE TRAY SIZING FLOWCHART

Sizing Cable Tray Per NEC 392



Note: The value "A" only applies to cables 250 up to 1000kcmil. The value "sd" only applies to 1000 kcmil and larger cables.

Note: Use when mixing 250 thru 1000 kcmil cables with cables larger than 1000 kcmil.

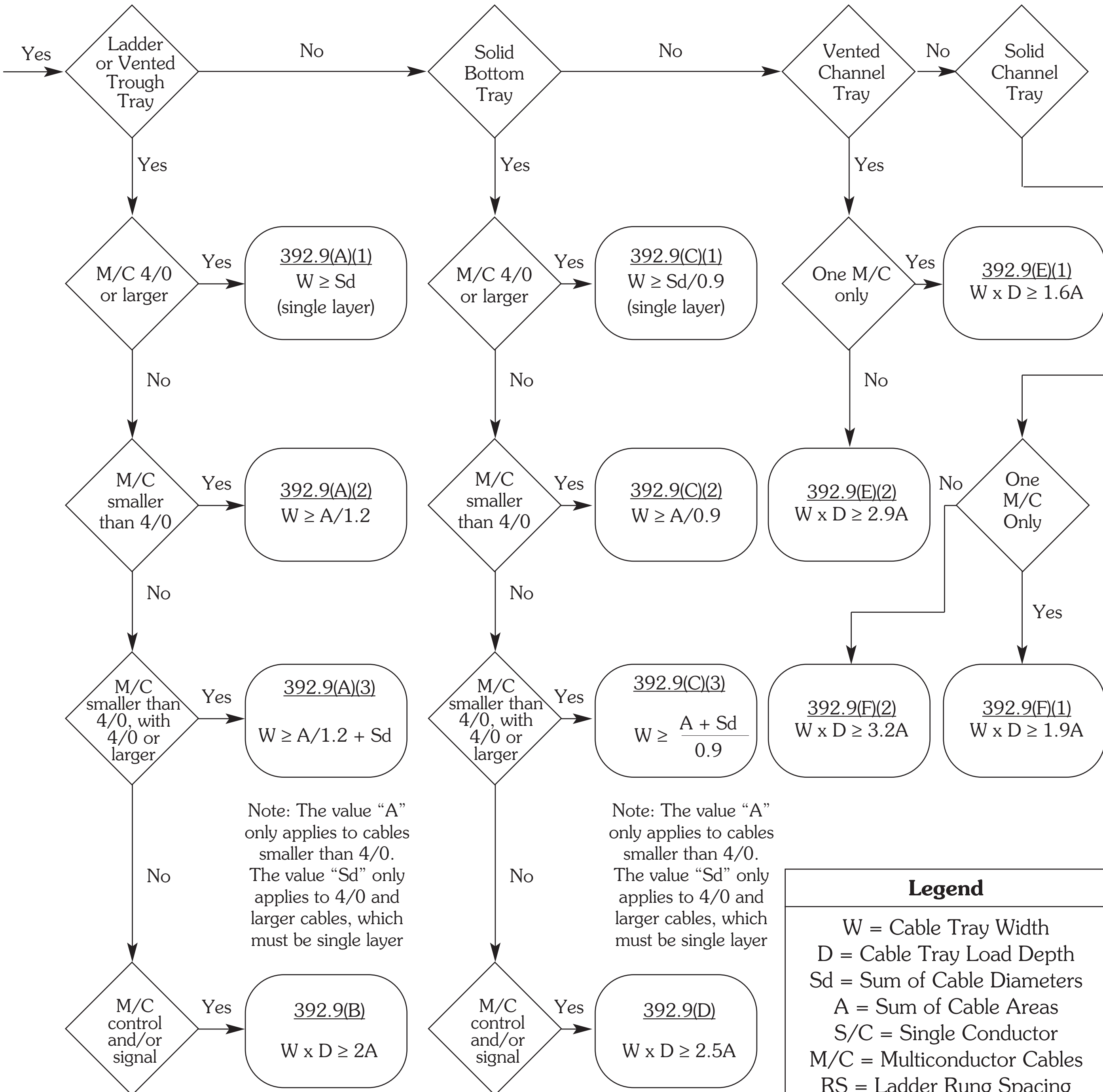
Legend
W = Cable Tray Width
D = Cable Tray Load Depth
Sd = Sum of Cable Diameters
A = Sum of Cable Areas
S/C = Single Conductor
M/C = Multiconductor Cables
RS = Ladder Rung Spacing

Appendix Sheet 8

CABLE TRAY SIZING FLOWCHART

Ampacity: See pages M-32 - M-34 for information on cable ampacity that might affect the cable tray sizing flowchart.

See pages M-13 - M-16 for information on hazardous (classified) areas that might affect the cable tray sizing flowchart.



Appendix Sheet 8

CABLE TRAY INSTALLATION & SPECIFICATION CHECKLIST

Project Information

Project Name: ______________________ # __________
Location: ______________________
Contractor/Engineer: ______________________
Phone: ______________________

Project Information

Distributor Name: ______________________
Location: ______________________
Contact: ______________________
Phone: ______________ Fax: ______________

Cable Tray

Material

- Aluminum ❏
- Pre-Galvanized Steel ❏
- Hot-Dip Galvanized Steel ❏
- 304 Stainless Steel ❏
- 316 Stainless Steel ❏
- Fiberglass-Polyester Resin ❏
- Fiberglass-Vinyl Ester Resin ❏
- Fiberglass-Zero Halogen ❏
- Fiberglass-Dis Stat ❏

NEMA Load Depth*

- 2" ** ❏
- 3" ❏
- 4" ❏
- 5" ❏
- 6" ❏

** Load depth is 1" less than siderail height.*

*** Fiberglass and wire mesh.*

Width

- 6" ❏
- 9" ❏
- 12" ❏
- 18" ❏
- 24" ❏
- 30" ❏
- 36" ❏
- 42" ❏

Bottom Styles

- 6" ❏
- 9" ❏
- 12" ❏
- 18" ❏
- Ventilated Trough ❏
- Non-Ventilated Trough ❏
- Non-Ventilated Bottom ❏

Length

Metallic
- 120" ❏
- 144" ❏
- 240" ❏
- 288" ❏
- ________ ❏

Non-Metallic
- 120" ❏
- 240" ❏

Fitting Radius

- 12" ❏
- 24" ❏
- 36" ❏
- 48" ❏

Tray Series

B-Line Series ____________ OR

System Loading
- (50 lbs./ft.) ❏
- (75 lbs./ft.) ❏
- (100 lbs./ft.) ❏
- ____________ ❏

Support Span ________ ft.
Load Rating ________ lbs./ft.
Safety Factor ________

Appendix Sheet 9

CABLE TRAY INSTALLATION & SPECIFICATION CHECKLIST

Cable Channel

Material

- Aluminum ❏
- Pre-Galvanized Steel ❏
- Hot-Dip Galvanized Steel ❏
- 304 Stainless Steel ❏
- 316 Stainless Steel ❏
- Fiberglass-Polyester Resin ❏
- Fiberglass-Vinyl Ester Resin ❏
- Fiberglass-Zero Halogen ❏
- Fiberglass-Dis Stat ❏

Type

- Ventilated ❏
- Non-Ventilated ❏

Width

- 3” ❏
- 4” ❏
- 6” ❏
- 8” * ❏

* *Fiberglass only.*

Fitting Radius

- 0” ❏
- 6” ❏
- 12” ❏
- 24” ❏
- 36” ❏

Cent-R-Rail

System

- Data-Track ❏
- Verti-Rack ❏
- Half-Rack ❏
- Multi-Tier Half Rack ❏

Depth*

- Straight Rung ❏
- 2” ❏
- 3” ❏
- 4” ❏
- 6” ❏

Width*

- 3” ❏
- 6” ❏
- 9” ❏
- 12” ❏
- 18” ❏
- 24” ❏

Rung Spacing*

- 6” ❏
- 9” ❏
- 12” ❏
- 18” ❏
- 24” ❏

Tiers*

- 2 ❏
- 3 ❏
- 4 ❏
- 5 ❏
- 6 ❏

Length

- 120” ❏
- 144” ❏

* Options shown are not available for all systems. Please check B-Line Cent-R-Rail Catalog for availability.

Wire Basket Tray

Width*

- 2” ❏
- 4” ❏
- 6” ❏
- 8” ❏
- 12” ❏
- 18” ❏
- 20” ❏
- 21” ❏
- 24” ❏

Depth*

- 1” ❏
- 2” ❏
- 4” ❏
- 6” ❏

Wire Mesh Size

2 x 4

Length

118” (3 meters)

* Widths shown are not available for all depths.
Please check B-Line Wire Basket Catalog for availability.

Appendix Sheet 9

Footnotes:

[1] NEMA Standard VE-2, Section 4, Installation 4.3 Straight Section Installation - 4.3.1. Horizontal Cable Tray Straight Sections states that straight section lengths should be equal to or greater than the span length to ensure not more than one splice between supports.

Additional Cable Tray Resources

Cable Tray Institute
1300 N. 17th Street
Rosslyn, VA 22209

www.cabletrays.com

National Electrical Manufacturers Association
1300 N. 17th Street
Rosslyn, VA 22209

www.nema.org

B-Line Engineering Software

TrayCAD®

TrayCAD® is a Cable Tray layout design program that works within the AutoCAD® environment. TrayCAD® is a windows based program and installs as an add-on to your AutoCAD® system. Use the TrayCAD® toolbar to add cable tray to your existing plans by drawing a single centerline representation of the tray run. Then, with the click of a button, the program will build a full-scale 3-D wire-frame model of the cable tray and all the appropriate fittings. The program also automatically creates a Bill of Material and contains a library of modifiable details.

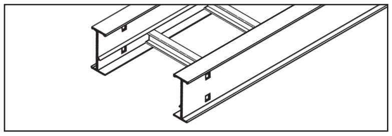
Runway Router®

Runway Router® is a cable ladder runway (ladder rack) layout design program that works within your AutoCAD® environment. Use the commands from the Runway Router® toolbar to layout runway, relay racks and electronic cabinets. Add cable tray or Cent-R-Rail® to your existing plans by drawing a single centerline representation of the cable run. Then, with the click of a button, the program will build a full-scale 3-D wire-frame model of the cable runway and all the appropriate connectors and fittings. The program also automatically creates a Bill of Material and contains a library of modifiable details.

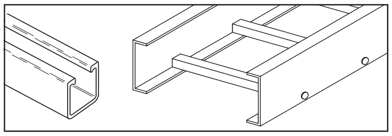
B-Line Wire Management Resources

B-Line Product Catalogs

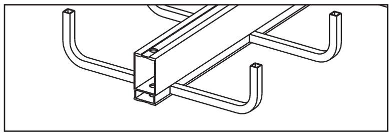
- Cable Tray Systems
  Metallic, Two Siderail System
  Commercial and Industrial Applications



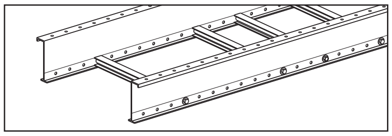
- Fiberglass Cable Tray
  Non-Metallic, Two Siderail Trays
  Non-Metallic Strut Systems



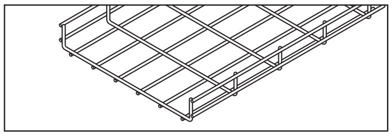
- Cent-R-Rail®
  Center Supported Cable Tray
  "Lay-In" Cable Design for Easy Installation
  of Low Voltage Cables



- Redi-Rail®
  Pre-Punched Aluminum Side Rail Design
  Unmatched Job Site Adaptability for a Two
  Side Rail System - Load Depths 2" to 6"

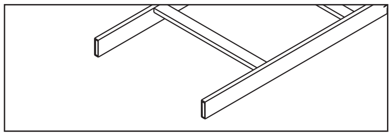


- Wire Basket Runway
  Unmatched Adaptability to Site Conditions
  Pre-Packaged Installation Kits and Accessories
  Fast - Adaptable - Economical

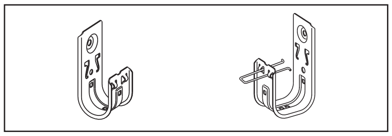


Other B-Line Wire Management Systems

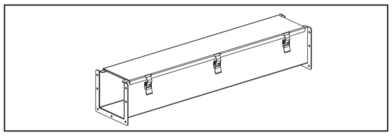
- Telecom
  Saunders' Cable Runway and Relay Racks
  Unequal Flange Racks



- Cable Hooks
  Supports all Cat 5, Fiber Optic, Innerduct
  and Low Voltage Cabling Requirements

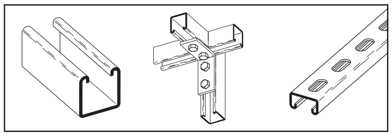


- Wireway
  Houses Runs of Control and Power Cable
  Available in NEMA 12, Type 1 & Type 3R

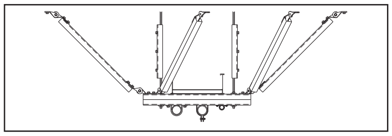


B-Line Mechanical Support Systems

- Strut Systems
  Metal Framing Support System. Fully Adjustable
  and Reusable, with a Complete Line of Channel,
  Fittings and Accessories for Multi-Purpose Applications



- Seismic Restraints
  Multi-Directional Bracing for Electrical Conduit,
  Cable Tray and Mechanical Piping Systems.
  OSHPD Pre-Approved Details



Notes & Miscellaneous

Notes & Miscellaneous

Index - *Straight Sections*

Cable Tray Straight Sections

Prefix
Example: **148** * **12** - **24** - **144**
① ② ③ ④ ⑤

① Series
② Material
③ Rung Spacing
④ Width
⑤ Length

Redi-Rail® Aluminum Cable Tray

A = Aluminum

Series 2, 3, 4, & 5 Aluminum Cable Tray

A = Aluminum

Series 1 Steel Cable Tray

G = Hot Dipped Galvanized Steel
P = Pre-Galvanized Steel

Series 2, 3, 4, & 5 Steel Cable Tray

G = Hot Dipped Galvanized Steel
P = Pre-Galvanized Steel

Series 2, 3, 4, & 5 Stainless Steel Cable Tray

SS4 = Stainless Steel 304
SS6 = Stainless Steel 316

Fiberglass Cable Tray

F = Polyester Resin
FD = Dis-Stat Resin
FT = Zero Halogen Resin
FV = Vinyl Ester Resin

Cable Channel Straight Sections

Prefix
Example: A CC - 06 - 144
① ② ③ ④

① Material ③ Width
② Series ④ Length

Wire Basket

Prefix
Example: WB 2 12
① ② ③

① Wire Basket ③ Width
② loading Height

Cent-R-Rail® Straight Sections

Prefix
Example: C0 A DT 09 - 12 - 144
① ② ③ ④ ⑤ ⑥

① Series ④ Rung Spacing
② Material ⑤ Width
③ Type ⑥ Length

continued in next column

Cable Tray Fittings

Prefix
Example: **4 * x - 24 - 90 HB 24**
① ② ③ ④ ⑤ ⑥ ⑦

① Series/Height ④ Width
② Material ⑤ Angle
③ Bottom ⑥ Type (HB, VI, VO)
⑦ Radius

continued in next column

Index

Cable Tray Fittings

Prefix
Example: 4 * x - 24 - 90 HB 24
① ② ③ ④ ⑤ ⑥ ⑦

① Series/Height
② Material
③ Bottom
④ Width
⑤ Angle
⑥ Type (HB, VI, VO)
⑦ Radius

Fiberglass Cable Tray Fittings

F = Polyester Resin, FD = Dis-Stat Resin
FT = Zero Halogen Resin, FV = Vinyl Ester Resin
(†) = Insert 3 for 3", 4 for 4", 6 for 6" or 8 for 8" side rail heights

Cable Channel Fittings

Prefix
Example: G CC - 04 - 45 VI 12
① ② ③ ④ ⑤ ⑥

① Material
② Series
③ Width
④ Angle
⑤ Type (HB, VI, VO)
⑥ Radius

Aluminum Cable Channel Fittings

A = Aluminum

Steel Cable Channel Fittings

G = Hot-Dipped Galvanized Steel
Note: Not available in Pre-Galvanized

Stainless Steel Cable Channel Fittings

SS4 = Stainless Steel 304
SS6 = Stainless Steel 316

Fiberglass Cable Channel Fittings

(†) For Polyester Resin leave blank
For Dis-Stat Resin insert D
For Zero Halogen insert T
For Vinyl Ester Resin insert V

(xx) = Insert 03 for 3", 04 for 4", 06 for 6" or 08 for 8" side rail heights

Cable Tray Covers

Prefix

Example: **801** ***** **20 - 24 - 144**

① ② ③ ④ ⑤

① Series ④ Width
② Material ⑤ Length or
③ Thickness Fitting Type

Redi-Rail® Aluminum Cable Tray Covers

A = Aluminum

Contact Cooper B-Line Engineering for fitting cover information.
See page RR-9 for fitting cover examples.

Series 2, 3, 4, & 5 Aluminum Cable Tray Covers

A = Aluminum

Contact Cooper B-Line Engineering for fitting cover information.
See page AT-22 for fitting cover examples.

Series 1 Steel Cable Tray Covers

G = Hot Dipped Galvanized Steel
P = Pre-Galvanized Steel

Contact Cooper B-Line Engineering for fitting cover information.
See page LST-13 for fitting cover examples.

Series 2, 3, 4, & 5 Steel Cable Tray Covers

G = Hot Dipped Galvanized Steel
P = Pre-Galvanized Steel

Contact Cooper B-Line Engineering for fitting cover information.
See page ST-20 for fitting cover examples.

Series 2, 3, 4, & 5 Stainless Steel Cable Tray Covers

SS4 = Stainless Steel 304
SS6 = Stainless Steel 316

Contact Cooper B-Line Engineering for fitting cover information.
See page SST-12 for fitting cover examples.

Fiberglass Cable Tray Covers

F = Polyester Resin
FD = Dis-Stat Resin
FT = Zero Halogen Resin
FV = Vinyl Ester Resin

C = Cover

Covers are flat unless a P is added to part number P = Peaked

Contact Cooper B-Line Engineering for fitting cover information.

Cable Channel Covers

Prefix
Example: **808** * **20** - **04** - **120**
① ② ③ ④ ⑤

① Series
② Material
③ Thickness
④ Width
⑤ Length or Fitting Type

Wire Basket Covers

Cent-R-Rail® Covers

Index

Aluminum Redi-Rail™ Cable Tray Accessories

Not all accessories for Redi-Rail cable tray are aluminum only. Those finishes and part numbers will be listed in this section.

A = Aluminum
G = Hot-Dipped Galvanized
SS = Stainless Steel 304
ZN = Zinc Plated

Series 2, 3, 4, & 5 Aluminum Cable Tray Accessories

Not all accessories for aluminum cable tray are aluminum only. Those finishes and part numbers will be listed in this section.

continued on next page

Index

Aluminum Cable Tray Accessories

A = Aluminum
G = Hot-Dipped Galvanized
GRN = Dura-Green Painted
P = Pre-Galvanized Steel
SS = Stainless Steel 304
SS4 = Stainless Steel 304
SS6 = Stainless Steel 316
ZN = Zinc Plated

Series 1 Steel Cable Tray Accessories

Not all accessories for steel cable tray are steel only.
Those finishes and part numbers will be listed in this section.

Series 1 Steel Cable Tray Accessories

continued on next page

Series 1 Steel Cable Tray Accessories

Not all accessories for steel cable tray are steel only. Those finishes and part numbers will be listed in this section.

A = Aluminum
G = Hot-Dipped Galvanized
P = Pre-Galvanized Steel
SS4 = Stainless Steel 304
ZN = Zinc Plated

Series 2, 3, 4, & 5 Steel Cable Tray Accessories

Not all accessories for steel cable tray are steel only. Those finishes and part numbers will be listed in this section.

Series 2, 3, 4, & 5 Steel Cable Tray Accessories

continued on next page

Series 2, 3, 4, & 5 Steel Cable Tray Accessories

Not all accessories for steel cable tray are steel only. Those finishes and part numbers will be listed in this section.

A = Aluminum
G = Hot-Dipped Galvanized
GRN = Dura-Green Painted
P = Pre-Galvanized Steel
SS4 = Stainless Steel 304
SS6 = Stainless Steel 316
ZN = Zinc Plated

Index

Series 2, 3, 4, & 5 Stainless Steel Cable Tray Accessories

Not all accessories for steel cable tray are steel only. Those finishes and part numbers will be listed in this section.

continued on next page

G = Hot-Dipped Galvanized
SS4 = Stainless Steel 304
SS6 = Stainless Steel 316

Fiberglass Cable Tray Accessories

(x) = Insert F for Polyester Resin
Insert V for Vinyl Ester Resin
Insert T for Zero Halogen Resin
Insert V for Dis-Stat Resin

Index

Cable Channel Accessories

A = Aluminum
G = Hot-Dipped Galvanized
ZN = Zinc Plated

continued on next page

Index

Cable Channel Accessories

SS6 = Stainless Steel 316
(x) = Insert F for Polyester Resin
Insert V for Vinyl Ester Resin
Insert T for Zero Halogen Resin
Insert V for Dis-Stat Resin

Wire Basket Accessories

Cent-R-Rail® Accessories

continued on next page

Cent-R-Rail® Accessories

continued on next page

Cent-R-Rail® Accessories

Cable Cleats & Accessories

Catalog No.	Page	Catalog No.	Page	Catalog No.	Page

Cable Cleats & Accessories

Cabling Support Options

Ask The Experts!

1-800-851-7415 ext. 366

CABLE HOOK SYSTEM

Cooper B-Line's cable hook system is a user friendly, cost effective means to support communications cabling. The cable hooks are designed to maximize cable-bearing surface, eliminate stress and optimize cable performance. Cable hooks are available in three convenient sizes: 1 5/16", 2", and 4", and will accommodate most support applications.

CABLE RUNWAY

Traditional telecom cabling support system offered in solid bar, tubular, C-Channel and our new aluminum design. No side rail design allows system to be installed in limited spaces without fittings.

WIRE BASKET CABLE SUPPORT SYSTEMS

Cooper B-Line's wire basket cable support system is a low profile, rugged wire mesh design, which provides an economical cable support system that is field adaptable. The unique field control eliminates the need to special order clumsy fittings.

CENT-R-RAIL® SYSTEMS

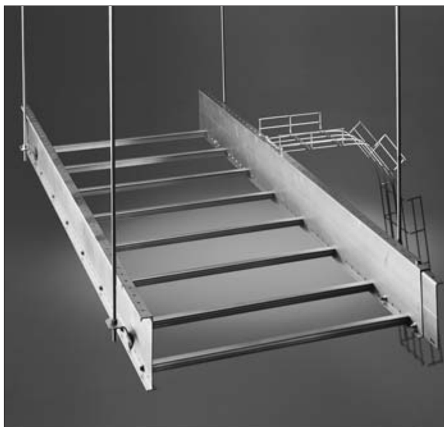
Four separate systems created to match installation needs. The best systems for cable to freely enter and exit the system. Strong, NEMA 12C, aluminum construction. System assembles with couplings and connectors and is UL Classified. The fastest system to install.

Ask The Experts!

1-800-851-7415 ext. 366

CABLE TRAY SYSTEMS

Cooper B-Line's traditional two side rail cable tray. Rugged two side rail construction protects cables and allows for a wide range of sizes and strengths. Coupled with a large selection of materials, finishes, and bottom types, these engineered systems can satisfy your particular requirements.



REDI-RAIL™ SYSTEMS

This new high tech design offers new freedom to the installer. The mechanically assembled, pre-punched side rail design provides unmatched job sight adaptability for a two side rail system. Loading depths from 2" to 6", aluminum construction.

CHANNEL CABLE TRAY

Cooper B-Line's channel cable tray is a compact, adaptable, easy to install system that is available in steel, aluminum, and fiberglass. System has fittings available as well as connectors and a full line of accessories.

WIREWAY

Cooper B-Line offers commercial and industrial wireway and wiring trough to handle almost any of your wire and cable routing needs. Commercial Type 1 and 3R designs are available with or without knockouts. Sizes range from 2.5" x 2.5" to 12" x 12" and lengths from 12" to 120". Industrial NEMA 12 designs are available in both lay-in and feed-through styles. Wireway is available in ANSI 61 gray painted steel and Type 304 stainless steel. Cooper B-Line can also provide special sizes, finishes, and other modifications.

Other Cooper B-Line Product Lines

Strut Systems (Bolted Framing)
Electrical Enclosures
Electronic Enclosures
Pipe Hanger & Support Systems
Spring Steel Fasteners
Cable Runway & Relay Racks (CommData)
Meter Mounting & Distribution Equipment
Anchors

Cooper B-Line
509 West Monroe Street
Highland, IL 62249
Phone: 800-851-7415
Fax: 618-654-1917

www.cooperbline.com

SYSTEMS THAT MAKE SENSE

Cooper Industries, Ltd.
600 Travis, Ste. 5800
Houston, TX 77002-1001
Phone: 713-209-8400
www.cooperindustries.com

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