



Enclosure Definitions13-2

Enclosures for Non-Hazardous Locations13-2

Enclosures for Hazardous Locations13-3

IEC Enclosure Protection13-4

Vynckier Non-metallic Enclosures.....13-5

 Overview13-5

 APO Series13-7

 VJ Series13-8





NEMA Type 1



NEMA Type 3R



NEMA Type 4/4X



NEMA Type 12

Enclosure Definition

An enclosure is a case or cabinet designed to protect:

- (a) Personnel against accidental contact with the enclosed electrical control and
- (b) Internal control against specified external conditions such as dust, sleet, rain, lint, coolant and oil.

The following listed enclosures are those most commonly used with general-purpose controls.

Enclosures for Nonhazardous Locations

Type 1 General-Purpose—Indoor

Type 1 enclosures are intended for use indoors, primarily to prevent accidental contact of personnel with the enclosed equipment in areas where unusual service conditions do not exist. In addition, they provide protection against falling dirt. Ventilating openings may be provided.

Type 3 Dust-tight, Raintight and Sleet- (Ice-) Resistant—Outdoor

Type 3 enclosures are intended for use outdoors to protect the enclosed equipment against windblown dust and water. They are not sleet- (ice-) proof.

Type 3R Rainproof and Sleet- (Ice-) Resistant—Outdoor

Type 3R enclosures are intended for use outdoors to protect the enclosed equipment against rain, and meet the requirements of Underwriters' Laboratories, Inc., Publication No. UL 508, applying to "Rainproof Enclosures." They are not dust-, snow- or sleet- (ice-) proof. Ventilating openings may be provided.

Type 4 Watertight and Dust-Tight—Indoor and Outdoor

Type 4 enclosures are intended for use indoors or outdoors to protect the enclosed equipment against splashing water, seepage of water, falling or hose-directed water, and severe external condensation. They are sleet-resistant but not sleet- (ice-) proof.

Type 4X Watertight, Dust-Tight and Corrosion-Resistant—Indoor and Outdoor

Type 4X enclosures, usually constructed of Type 304 stainless steel or polymeric materials, are corrosion-resistant in addition to the provisions listed for Type 4 enclosures.

Type 6P Submersible

NEMA Type 6P enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against the entry of water during prolonged submersion at a limited depth. These enclosures are tested at a depth of six feet for 24 hours.

Type 12 Industrial Use Dust-Tight and Drip-Tight —Indoor Nonventilated Enclosures

Type 12 enclosures are intended for use indoors to protect the enclosed equipment against fibers, lint, dust and dirt, light splashing, seepage, dripping and external condensation of noncorrosive liquids. There are no holes through the enclosure and no conduit knockouts or conduit openings, except that oil-tight or dust-tight mechanisms may be mounted through holes in the enclosure when provided with oil-resistant gaskets. Doors are provided with oil-resistant gaskets. In addition, enclosures for combination controllers have hinged doors which swing horizontally and require a tool to open.

When intended for wall mounting, Type 12 enclosures have mounting means external to the equipment cavity, captive closing hardware, and provision for locking.

When intended for floor mounting, Type 12 enclosures have closed bottoms, captive closing hardware, and provision for locking.

Ventilated Enclosures

Ventilated enclosures have the same provisions as nonventilated enclosures, except that they contain both dust-tight and nondust-tight sections or compartments. Only the nondust-tight sections or compartments are ventilated.

Type 13 Oil-Tight and Dust-Tight—Indoor

Type 13 enclosures are intended for use indoors primarily to house pilot devices such as limit switches, foot switches, push buttons, selector switches, pilot lights, etc., and to protect these devices against lint and dust, seepage, external condensation and spraying of water, oil or coolant. They have oil-resistant gaskets and, when intended for wall or machine mounting, have mounting means external to the equipment cavity. They have no conduit knockouts or unsealed openings providing access into the equipment cavity. All conduit openings have provision for oil-tight conduit entry.





NEMA Type 7 Hazardous Location
Manual Starter



NEMA Type 7 & 9 Hazardous Location
Geared Rotary Limit Switch



NEMA Type 7 & 9 Hazardous Location
Push Button Station

Enclosures for Hazardous Locations

Type 7 Class I, Group A, B, C or D—Indoor Hazardous Locations—Airbreak Equipment

Type 7 enclosures are intended for use indoors in the atmospheres and Locations defined as Class I and Group A, B, C or D in the National Electrical Code. The letters A, B, C or D, which indicate the gas or vapor atmospheres in the Hazardous Location, shall appear as a suffix to the designation "Type 7" to give the complete NEMA designation and correspond to Class I, Group A, B, C or D, respectively, as defined in the National Electrical Code. These enclosures are designed in accordance with the requirements of Underwriters' Laboratories, Inc., Publication No. UL 698, "Industrial Control Equipment for Use in Hazardous Locations," and marked to show the Class and Group letter designations.

Type 9 Class II, Group E, F or G—Indoor Hazardous Locations—Airbreak Equipment

Type 9 enclosures are intended for use indoors in the atmospheres defined as Class II and Group E, F or G in the National Electrical Code. The letters E, F or G which indicate the dust atmospheres in the Hazardous Location appear as a suffix to the designation and correspond to Class II, Group E, F or G, respectively as defined in the National Electrical Code. These enclosures prevent the entry of explosive amounts of Hazardous dust. If gaskets are used, they are mechanically attached and are of a noncombustible, nondeteriorating, vermin-proof material. These enclosures are designed in accordance with the requirements of Underwriters' Laboratories, Inc., Publication No. UL 698, and marked to show the Class and Group letter designations.

Note: Enclosures which meet the requirements for more than one NEMA Type may be designated by a combination of Type numbers, for example, Type 3/4.

Storage of Control Equipment

All outdoor type equipment in NEMA 3R, 3S, 4, 4X, 7 and 9 enclosures should be stored in a dry Location. If stored in a damp area where ambient temperature cycling can cause internal accumulation of water condensation, a provision must be made to have heat or ventilation inside the control enclosure. For example, if strip heaters are contained in the control equipment, such heaters may be energized to provide heat for this purpose.

Similar precautions must also be followed if the control equipment is made inoperative for extended periods of time, such as the equipment not being operated shortly after being installed.

Any damage to control equipment caused by internal condensation voids its warranty.




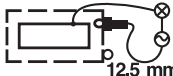

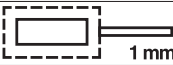
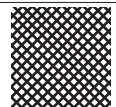
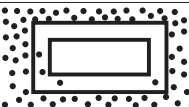
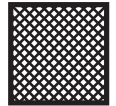
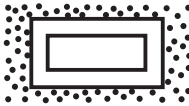
Publications and Reference: See Section 17 for a complete list of additional product-related publications

Degree of Protection of the Electrical Equipment up to 1000 Vac and 1500 Vdc











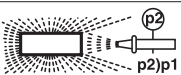

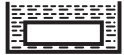

IP X₁ X₂ According to IEC 529 (1976), IEC 947-1 Appendix C
According to DIN 40050

Two numbers or one number plus one letter followed by one number are utilized to identify the degree of protection. For test procedure, refer to IEC 529, Reference IEC 947-1 Appendix C for modification of test requirements.

X₁ Protection of Persons Against Contact With Live Parts Protection of Equipment Against Ingress of Foreign Bodies

| Digit X ₁ | CEE-Symbol | Test | IEC 529 Test Reference | Short Description | Definition |
|----------------------|---|---|---------------------------|--|--|
| 0 | | | | None | |
| 1 | |  | C 7.1 | Protected against solid objects greater than 50mm. | Excludes solid objects exceeding 50mm in diameter, and protects against contact with live and moving parts by a large body surface such as a hand (but not against deliberate access). |
| 2L | |  | C 7.2 | Protected against solid objects greater than 12.5mm and against contact by standard test finger. | Excludes solid objects exceeding 12.5mm in diameter, and protects against contact with live and moving parts by standard finger test or similar. |
| 3 | |  | C 7.31 | Protected against solid objects greater than 2.5mm. | Excludes solid objects exceeding 2.5mm in diameter or thickness. |
| 3L | | | C 7.32 | Protected against solid objects greater than 12.5mm and against contact by 2.5mm probe. | Excludes solid objects exceeding 12.5mm in diameter and protects against contact with live and moving parts by a 2.5mm diameter test probe not exceeding 100mm in length. |
| 4 | |  | C 7.41 | Protected against solid objects greater than 1.0mm. | Excludes solid objects exceeding 1.0mm in diameter or thickness. |
| 4L | | | C 7.42 | Protected against solid objects greater than 12.5mm and against contact by 1.0mm probe. | Excludes solid objects exceeding 12.5mm in diameter and protects against contact with live and moving parts by a 1.0mm diameter test probe not exceeding 100mm in length. |
| 5 |  |  | C 7.5 | Dust protected. | Prevents ingress of dust in quantities and locations that would interfere with the intended operation of the equipment. |
| 6 |  |  | C 7.6 | Dust tight. | Prevents ingress of dust. |

X₂ Protected Against Ingress of Liquids

| Digit X ₂ | CEE-Symbol | Test | IEC 529 Test Reference | Short Description | Definition |
|----------------------|---|---|---------------------------|--|--|
| 0 | | | | None | |
| 1 |  |  | C 8.1 | Protected against dripping water. | Dripping water (vertical falling drops) shall have no harmful effect. |
| 2 | |  | C 8.2 | Protected against dripping of water when tilted up to 15°. | Vertical dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position. |
| 3 |  |  | C 8.3 | Protected against spraying water. | Water falling at a spray angle up to 60° from the vertical shall have no harmful effect. |
| 4 |  |  | C 8.4 | Protected against splashing water. | Water splashed against the enclosure from any direction shall have no harmful effect. |
| 5 |  |  | C 8.5 | Protected against water jets. | Water projected by a nozzle against the enclosure from any direction shall have no harmful effect. |
| 6 |  |  | C 8.6 | Protected against heavy seas. | Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities. |
| 7 |  |  | C 8.7 | Protected against the effects of immersion. | Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under standard conditions of pressure and time. |
| 8 | |  | C 8.8 | Protected against submersion. | No ingress of water. |

Note: The short description given in column 5 should not be used to specify the form of protection. It should only be used as a brief description.



Enclosures

Vynckier Non-metallic Enclosures

Section 13

Part of the GE Power Controls Group, Vynckier n.v. is the world's leading manufacturer of non-metallic enclosures.

Vynckier, headquartered in Ghent, Belgium, has one of the largest and most advanced plastic molding operations in Europe. Vynckier produces many of its own raw materials, such as molding compounds, bakelite and Fiberglass Reinforced Polyester (FRP). Vynckier became the leader in FRP enclosures by being the first to market FRP enclosures.

Vynckier's advanced toolmaking facility has an active research and development staff continually creating and improving a wide variety of products.

Vynckier is among the first enclosure companies to receive its ISO 9001 Certification. Having a wealth of diverse experiences, Vynckier is a progressive company committed to excellence and performance.

Fire, Water, Dust, Chemicals, Weather...and Halogen.

Vynckier enclosures protect your valuable equipment from many adverse conditions because they are manufactured from hot compression-molded fiberglass reinforced polyester (FRP). FRP is a complex composite material consisting of a polyester resin base with organic fillers to facilitate flow and to obtain special physical characteristics such as UV resistance, halogen-free and self-extinguishing properties. Additional additives are used to provide for proper consistency and pigmentation of the resin base.

Glass fibers, which make up 25 percent of the overall compound, are sandwiched between two layers of the polyester resin and are impregnated into the resin base by an elaborate roller system. This process produces a very uniform, high strength material. Vynckier utilizes the most advanced process for molding its enclosures. Our hot compression molding process provides better flow of material into tight corner areas than cold molding process. This produces a stronger end product, allowing the glass fibers to run in a single direction.

Vynckier enclosures are lightweight, durable, watertight and non-corroding. They are a superior alternative to metal enclosures. Vynckier's track record for producing these quality products spans more than 40 years.

Inventory & Selection

Our enclosures are versatile. The Vynckier product choices range from small pushbutton enclosures to modular units able to be coupled to meet size requirements to large freestanding cabinets. All product series offer superior strength and are made from corrosion resistant material.

Vynckier's 92,000 square foot Houston, Texas service center contains inventory of all enclosure series, cabinets, pedestals and accessories. All stock orders are shipped within 24 hours. Our service center is also home to our UL-508 modification facility and a complete showroom where Vynckier Enclosure Systems' full line of FRP enclosures, cabinets and pedestals are on display. Most modified orders ship within two weeks.

Computer Aided Design & Manufacturing

Vynckier's FRP enclosures are easily custom modified either by our plants or in the field. Precision modifications such as a special cutout or a certain diameter hole are made on CNC machinery. Custom windows, latches, hinges or component sub-assembly are our specialty. Even individual special orders for such items as combination starters, disconnects, pushbutton control stations and modular units may be configured to meet your specifications.

Pre-Assembly

All Vynckier enclosures are ready for use once they leave our facility. There are no requirements for tools for additional assembly.

Complete Custom Turn-Key Jobs

When a complete solution is required, select your GE parts, and we will put them together in an enclosed package in our UL508 modification facility.

GE Product Quality

Upon completion of your order, the enclosures are inspected for accuracy. This quality assurance process involves measuring for proper dimensional requirements, confirming proper modifications, fit and finish.

Moisture/Dust Proof

Whatever the conditions—washdown, rain, condensation on wind-blown dust—Vynckier has the enclosure to fit your application.

Stress Proof

With fiberglass reinforced polyester (FRP) enclosures from Vynckier, field modification is a snap.

Corrosion Proof

For cost-effective corrosion control there's no better solution than a non-metallic enclosure from Vynckier.

Benefits of an FRP Enclosure: Consistent Quality

—Because of machine hot compression molding

Corrosion Resistance

—Acid rain, salt spray or Acid

Impact Resistance

—Up to 1Pxx-11

Maintenance Free



Publications and Reference: See Section 17 for a complete list of additional product-related publications

Enclosures

Vynckier Non-metallic Enclosures

Section 13

Halogen Free

- Self extinguishing, fire retardant
- Limits fire propagation
- Protects equipment
- No toxic gas released in fire

UV Resistant

High IP Rating

- Gasket tongue/groove arrangement
- Continuous Poured polyurethane gasket

Temperature Resistance

- Resistant to wide temperature variations without modification of properties—
 - Constant: -59 deg./ F to 3-2 deg. F
 - Momentary: 392 deg. F

Lightweight

- Weight 1/4 of steel
- Easy to handle Installer friendly
- Easy to work (standard tools)
- Easy to install (mounting feet, lightweight)
- Easy to maintain (cleaned with petroleum distillate, scratches removed with Vaseline)

Aesthetic

- Suitable for indoor/outdoor designs

Total Insulation

- Provides protection against indirect electrical contact

Economical

- Less costly than stainless steel
- Savings on modifications, installation, maintenance and shipping costs

Condensation Limiting

- Polyester enclosures ease temperature variation of outside environment
- FDA approved



Enclosures

APO SERIES

Section 13

Features

- APO sizes range consists of nine sizes from 7" 3 6" to 24" 3 24" with varying depths. All APO enclosures have the capability to be horizontally or vertically coupled by means of gasketed coupling collars.
- All bases are gray (RAL 7036) and are hot compression molded with fiberglass - reinforced polyester. Brass M4 threaded inserts are factory installed for attachment of mounting plates.
- Covers are made of either clear polycarbonate or opaque gray (RAL 7036) hot compression molded fiberglass reinforced polyester.
- APO enclosures meet Ingress Protection standard IP67-11 and IP67-9, respectively (NBN C20-001 annex A).
- Large APO enclosures are maintenance free and corrosion resistant.
- Four to six bosses suitable for M6 threaded inserts are provided in each base.
- APO enclosures are suitable for wall or pole mounting.
- These enclosures may easily be modified with conventional tools such as a drill, milling equipment, saw, or a punch.
- Vynckier's APO enclosures are capable of withstanding continuous temperatures up to 302 deg. F (150 deg. C).
- Clear polycarbonate covers are able to resist temperatures of up to 248 deg. F (120 deg. C).
- APO enclosures provide protection for equipment and operators from indirect electrical contact.
- APO enclosures are UL listed per UL Standard 508 and CSA Certified per Standard C22.2-0, 0.4, 0.7, 0.6, 94 Type 3, 3R, 4, 4X, 12 and 13.

Applications

Designed for use as insulated electrical junction boxes, terminal wiring boxes, instrument housing, and electrical control enclosures in highly corrosive environments. Ideal for use in most petro-chemical plants, sewage plants, electroplating plants, and etc that may be subject to occasional submersion. Clear polycarbonate cover provides easy visual inspection of interior components.

Standards

- IEC 439-1
- IEC 529- Rated IP67-11
- EN 60439-1
- EN 60529
- CSA Certified per C22.2 No. 94

Approvals

- UL 508 NEMA 3, 3R, 4, 4X, 12 and 13
- CSA
- AS Australian Standards 3131-1991
- EExell, NIEB 88B.102.698 U
- LLOYD'S Register of Shipping
- BASEEFA



Static Load

- Nonmetallic feet: These mounting feet have been successfully tested with loads up to 330 lbs.
- Stainless steel feet: These mounting feet have been successfully tested with loads up to 330 lbs.
- Direct corner mounting: Loads up to 660 lbs. have been successfully tested.

These are tested loads and are below the product limitations. However, for high load applications, direct corner mounting is recommended.

For information on Ordering, Pricing, Availability and Technical Support contact Vynckier Enclosure Systems at 1-888-837-1114 (Toll Free) or fax 1-800-444-1261



Publications and Reference: See Section 17 for a complete list of additional product-related publications

Features

- The VJ Series is designed in accordance with the Joint Industrial Council (JIC)-USA
- The VJ range consists of seven box sizes in several versions:
 - with screw cover
 - with stainless steel piano hinge
 - with non-metallic hinges
 - with standard or padlockable latch
- The bases and covers are made of gray (RAL 7036), hot molded, fiberglass reinforced polyester, dyed in mass. They come complete with UL/CASE-label and 4 threaded inserts for a mounting plate.
- Cover screw holes in corners are outside of gasketed area.
- Continuous gaskets made of polyurethane foam guarantee optimal integrity.
- All mounting hardware is made of stainless steel.
- The enclosure can be readily worked with conventional tools, such as drills, mills, saws, punches, etc....
- Versatile service conditions: polyester enclosures can withstand continuous temperatures up to -58 deg. F to +302 deg. F (-50 deg. C to 150 deg. C) and momentary temperatures to +392 deg. F (200 deg. C)
- The VJ enclosures without latches provide optimum security to both operators and equipment because they feature double insulation and protection degree IP66-11 according to IEC 529.
- VJ enclosures are maintenance free and corrosion resistant.
- VJ enclosures are UL listed, as per UL Standard 508 type 3, 3R, 4, 4X, 12 and 13. They are also CSA approved as per C22.2 NO. 94.



Application

Designed for use as electrical junction boxes in highly corrosive environments including oil refineries and chemical processing plants, waste water treatment and marine installations, electroplating plants, agricultural environments and food or animal processing plants. These enclosures are also suitable as instrument housings in both indoor and outdoor applications. Window enclosure provides easy visual inspection of interior components.

Standards

- IEC 439-1
- IEC 529—Rated IP66-11
- EN 50298
- CSA Certified per C22.2 No. 94

For information on Ordering, Pricing, Availability and Technical Support contact Vynckier Enclosure Systems at 1-888-837-1114 (Toll Free) or fax 1-800-444-1261

