



NEMA Data

A brief description of the more common types of enclosures used by the electrical industry relating to their environmental capabilities follows. Please refer to the appropriate sections of the latest revision of NEMA Standards Publication No. 250 for complete information regarding applications, features and design tests.

Definitions Pertaining to Non-hazardous Locations

Type 1 Enclosures

Intended for use primarily to provide a degree of protection against limited amounts of falling dirt.

Type 3 Enclosures

Intended for outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust, and damage from external ice formation.

Type 3R Enclosures

Intended for outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.

Type 3S Enclosures

Intended for outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust, and to provide for operation of external mechanisms when ice laden.

Type 4 Enclosures

Intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water, and damage from external ice formation.

Type 4X Enclosures

Intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water, and damage from ice formation

Type 6 Enclosures

Intended for indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during occasional temporary submersion at a limited depth, and damage from external ice formation.

Type 6P Enclosures

Intended for indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during prolonged submersion at a limited depth, and damage from external ice formation.

Type 12 Enclosures

Intended for indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping non-corrosive liquids.

Type 12K Enclosures

Type 12 with knockouts.

Definitions Pertaining to Hazardous (Classified) Locations

Type 7 Enclosures

Intended for indoor use in locations classified as Class I, Groups A, B, C, or D, as defined in the National Electrical Code.

Type 8 Enclosures

Intended for indoor or outdoor use in locations classified as Class I, Groups A, B, C, or D, as defined in the National Electrical Code.

Type 9 Enclosures

Intended for indoor use in locations classified as Class II, Groups E, F, or G, as defined in the National Electrical Code.

Type 10 Enclosures

Constructed to meet the applicable requirements of the Mine Safety and Health Administration.

IP Data

Ingress Protection (IP), as stated by I.E.C. Standard 529, describes the degree of protection an enclosure provides. The first digit of the IP designation describes the degree of protection against access to hazardous parts and ingress of solid objects; the second digit designates the Ingress Protection against water. Please refer to the appropriate sections of IEC 529 for complete information regarding applications, features, and design tests.

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IP65 Ratings

<p>Protection Against Access to Hazardous Parts (First Digit)</p>		<p>Protection Against Ingress of Liquids (Second Digit)</p>	
Number	Description	Number	Description
0	Non-protected	0	Non-protected
1	Protected against access with back of hand (50 mm)	1	Water dripping vertically
2	Protected against access with jointed finger (12 mm x 80 mm)	2	Water dripping, enclosure tilted up to 15°
3	Protected against access with a tool (2.5 mm)	3	Spraying water, up to 60° angle from vertical
4, 5, 6	Protected against access with a wire (1.0 mm)	4	Splashing water, any direction
<p>Protection Against Ingress of Solid Foreign Objects (First Digit)</p>		5	Jetting water, any direction
Number	Description	6	Powerful jetting water, any direction
0	Non-protected	7	Temporary immersion in water
1	Objects equal or greater than 50mm	8	Continuous immersion in water
2	Objects equal or greater than 12.5mm		
3	Objects equal or greater than 2.5mm		
4	Objects equal or greater than 1mm		
5	Dust protected		
6	Dust tight		

NEMA No. 250 Appendix A: NEMA To IEC Enclosure Designations

The following information is provided by NEMA Standard No. 250 Appendix A as a guide to comparing NEMA enclosure types to IEC designations.

IEC Publication 529 *Classification of Degrees of Protection Provided by Enclosures* provides a system for specifying the enclosures of electrical equipment on the basis of the degree of protection provided by the enclosure. IEC 529 does not specify degrees of protection against mechanical damage of equipment, risk of explosions, or conditions such as moisture (produced for example by condensation), corrosive vapors, fungus, or vermin. NEMA Standards Publication 250 does test for environmental conditions such as corrosion, rust, icing, oil, and coolants. For this reason, and because the tests and evaluations for other characteristics are not identical, the IEC Enclosure Classification Designations cannot be exactly equated with NEMA Enclosure Type Numbers.

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Table A-1 provides a guide for converting from NEMA Enclosure Type Numbers to IEC Enclosure Classification Designations. The NEMA Types meet or exceed the test requirements for the associated IEC Classifications; for this reason Table A-1 cannot be used to convert from IEC Classifications to NEMA Types and the NEMA to IEC conversion should be verified by test.

Table A-1 Conversion of NEMA Type Numbers to IEC Classification Designations (Cannot be used to convert IEC Classification Designations to NEMA TypeNumbers)	
NEMA Enclosure Type Number	IEC Enclosure Classification Designation
1	IP10
2	IP11
3	IP54
3R	IP14
3S	IP54
4 and 4X	IP56
5	IP52
6 and 6P	IP67
12 and 12K	IP52
13	IP54

NOTE: This comparison is based on tests specified in IEC Publication 529.