

NEMA Enclosure Comparison

Table 1
[From NEMA 250-2003]
 Comparison of Specific Applications of Enclosures
 for Indoor Nonhazardous Locations

Provides a Degree of Protection Against the Following Conditions	Type of Enclosure									
	1 *	2 *	4	4X	5	6	6P	12	12K	13
Access to hazardous parts	X	X	X	X	X	X	X	X	X	X
Ingress of solid foreign objects (falling dirt)	X	X	X	X	X	X	X	X	X	X
Ingress of water (Dripping and light splashing)	...	X	X	X	X	X	X	X	X	X
Ingress of solid foreign objects (Circulating dust, lint, fibers, and flyings **)	X	X	...	X	X	X	X	X
Ingress of solid foreign objects (Settling airborne dust, lint, fibers, and flyings **)	X	X	X	X	X	X	X	X
Ingress of water (Hosedown and splashing water)	X	X	...	X	X	...	...	...
Oil and coolant seepage	X	X	X
Oil or coolant spraying and splashing	X
Corrosive agents	X	...	...	X	...	...	...
Ingress of water (Occasional temporary submersion)	X	X	...	...	...
Ingress of water (Occasional prolonged submersion)	X	...	...	...

* These enclosures may be ventilated.

** These fibers and flyings are nonhazardous materials and are not considered Class III type ignitable fibers or combustible flyings. For Class III type ignitable fibers or combustible flyings see the National Electrical Code, Article 500.

Table 2
[From NEMA 250-2003]
 Comparison of Specific Applications of Enclosures
 for Outdoor Nonhazardous Locations

Provides a Degree of Protection Against the Following Conditions	Type of Enclosure									
	3	3X	3R*	3RX*	3S	3SX	4	4X	6	6P
Access to hazardous parts	X	X	X	X	X	X	X	X	X	X
Ingress of water (Rain, snow, and sleet **)	X	X	X	X	X	X	X	X	X	X
Sleet ***	...	...	...	...	X	X	...	...	...	...
Ingress of solid foreign objects (Windblown dust, lint, fibers, and flyings)	X	X	...	...	X	X	X	X	X	X
Ingress of water (Hosedown)	...	...	...	...	...	...	X	X	X	X
Corrosive agents	...	X	...	X	...	X	...	X	...	X
Ingress of water (Occasional temporary submersion)	...	...	...	...	...	...	...	...	X	X
Ingress of water (Occasional prolonged submersion)	...	...	...	...	...	...	...	...	...	X

* These enclosures may be ventilated.

** External operating mechanisms are not required to be operable when the enclosure is ice covered.

*** External operating mechanisms are operable when the enclosure is ice covered.

NEMA Enclosure Ratings

Table B-1
 [From NEMA 250-2003]
 Comparison of Specific Applications of Enclosures
 for Indoor Hazardous Locations
 (If the installation is outdoors and/or additional protection is required by
 Table 1 and Table 2, a combination-type enclosure is required.)

Provides a Degree of Protection Against Atmospheres Typically Containing (See NFPA 497M for Complete Listing)	Enclosure Types 7 and 8, Class I Groups **				Enclosure Type 9, Class II Groups				10
	Class	A	B	C	D	E	F	G	
Acetylene	I	X	...	...	...	...	...	...	...
Hydrogen, manufactured gas	I	...	X	...	...	...	...	...	...
Diethyl ether, ethylene, cyclopropane	I	...	...	X	...	...	...	...	...
Gasoline, hexane, butane, naphtha, propane, acetone, toluene, isoprene	I	...	...	...	X	...	...	...	...
Metal dust	II	...	...	...	...	X	...	...	...
Carbon black, coal dust, coke dust	II	...	...	...	...	...	X	...	...
Flour, starch, grain dust	II	...	...	...	...	...	...	X	...
Fibers, flyings *	III	...	...	...	...	...	...	X	...
Methane with or without coal dust	MSHA	...	...	...	...	...	...	...	X

* For Class III type ignitable fibers or combustible flyings see the National Electrical Code, Article 500.
 ** Due to the characteristics of the gas, vapor, or dust, a product suitable for one Class or Group may not be suitable for another Class or Group unless marked on the product.

Table A-1
CONVERSION OF NEMA ENCLOSURE TYPE RATINGS
TO IEC 60529 ENCLOSURE CLASSIFICATION DESIGNATIONS (IP)
 (Cannot be Used to Convert IEC Classification Designations to NEMA Type Ratings)

IP First Character	NEMA Enclosure Type																IP Second Character	
	1	2	3, 3X, 3S, 3SX	3R, 3RX	4, 4X	5	6	6P	12, 12K, 13									
IP0_	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_0
IP1_	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_1
IP2_	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_2
IP3_	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_3
IP4_	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_4
IP5_	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_5
IP6_	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_6
	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_7
	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	IP_8
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B

A = A shaded block in the "A" column indicates that the NEMA Enclosure Type exceeds the requirements for the respective IEC 60529 IP First Character Designation. The IP First Character Designation is the protection against access to hazardous parts and solid foreign objects.

B = A shaded block in the "B" column indicates that the NEMA Enclosure Type exceeds the requirements for the respective IEC 60529 IP Second Character Designation. The IP Second Character Designation is the protection against the ingress of water.

EXAMPLE OF TABLE USE

An IEC IP 45 Enclosure Rating is specified. What NEMA Type Enclosures meet and exceed the IP 45 rating?