

NEMA Ratings

"Type 4 - Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure."

"Type 4X - Enclosures, and external parts attached to these enclosures, shall be manufactured of American Iron and Steel Institute (AISI) Type 304 Stainless steel, polymerics, or materials with equivalent corrosion resistance. If material other than Type 304 Stainless Steel is used it shall be tested in accordance with 5.9 and 5.10."

"Type 12 - Enclosures are constructed (without knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; and against dripping and light splashing of liquids."

Comparison of Specific Applications of Enclosures for Indoor Nonhazardous Locations

Provides a Degree of Protection Against the Following Environmental Conditions	Type of Enclosure									
	1 *	2 *	4	4X	5	6	6P	12	12K	13
Incidental contact with the enclosed equipment	X	X	X	X	X	X	X	X	X	X
Falling dirt	X	X	X	X	X	X	X	X	X	X
Falling liquids and light splashing	...	X	X	X	X	X	X	X	X	X
Circulating dust, lint, fibers, and flyings **	X	X	...	X	X	X	X	X
Settling airborne dust, lint, fibers, and flyings **	X	X	X	X	X	X	X	X
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	...	...	...
Occasional temporary submersion	X	X	...	...	...
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.

Comparison of Specific Applications of Enclosures for Outdoor Nonhazardous Locations

Provides a Degree of Protection Against the Following Environmental Conditions	Type of Enclosure						
	3	3R*	3S	4	4X	6	6P
Incidental contact with the enclosed equipment	X	X	X	X	X	X	X
Rain, snow, and sleet **	X	X	X	X	X	X	X
Sleet ***	...	...	X	...	...	...	...
Windblown dust, lint, fibers, and flyings	X	...	X	X	X	X	X
Hosedown	...	...	...	X	X	X	X
Corrosive agents	...	...	...	...	X	...	X
Occasional temporary submersion	...	...	...	...	...	X	X
Occasional prolonged submersion	...	...	...	...	...	...	X

* These enclosures may be ventilated.

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

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Ingress Protection (IP) Ratings

The IP rating system provides a means of classifying the degrees of protection from solid objects and liquids afforded by electrical equipment and enclosures. The system is recognized in most European countries and is set out in a number of British and European standards. These include: Classification of Degrees of Protection Provided by Enclosures, BS (British Standards) 5490:1977; IEC (International Electrotechnical Commission) 529:1976.

First Digit	Protection from solid objects	Second Digit	Protection from moisture
0	No Protection	0	No Protection
1	Protection against objects >50mm	1	Protection against vertically dripping water
2	Protection against objects >12.5mm	2	Protection against spraying water $\pm 15^\circ$ from vertical
3	Protection against objects >2.5mm	3	Protection against spraying water $\pm 60^\circ$ from vertical
4	Protection against objects >1.0mm	4	Protection against spraying water $\pm 90^\circ$ from vertical
5	Dust Protected (limited ingress)	5	Protection against low pressure jetting water
6	Dust Tight Protection	6	Protection against high pressure jetting water
7	N/A	7	Protection against temporary immersion (15cm and 1m)
8	N/A	8	Protection against continuous immersion under pressure

NEMA Ratings vs. IP Ratings

It is not possible to state that an IP rating is equivalent to a NEMA Type designation. An IP rating only considers protection against ingress of solid foreign objects and ingress of water. The NEMA Types consider these but also consider other items such as corrossions and construction details. For this reason it is possible to say that a NEMA Type is equivalent to an IP rating but it is not possible to state that an IP rating is equivalent to a NEMA Type.

There is no direct conversion between NEMA Types and IP Codes. More detailed information can be obtained from NEMA 250 publication and the IEC Publication 60529.

These documents can be purchased from Global by clicking here <http://www.global.ihs.com/> or by calling 800.854.7179.

NEMA 250 - "Enclosures for Electrical Equipment (1000 Volts Maximum)"

IEC 60529 - "Degrees of Protection Provided By Enclosures (IP Code)"