

# Standards



## NEMA, UL, and CSA Ratings

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NEMA, UL, and CSA are standard writing organizations commonly recognized in North America. Their ratings are based on similar application descriptions and expected performance. UL and CSA both require enclosure testing by qualified evaluators. They also send site

inspectors to make sure a manufacturer adheres to prescribed manufacturing methods and material specifications. NEMA, on the other hand, does not require independent testing and leaves compliance completely up to the manufacturer.

### Enclosure Types Non-Hazardous Location

Enclosure Rating	<b>NEMA</b> National Electrical Manufacturers Association (NEMA Standard 250) and Electrical and Electronic Mfg. Association of Canada (EEMAC)	 Underwriters Laboratories Inc. (UL 50 and UL 508)	 Canadian Standards Association (Standard C22.2 No. 94)
<b>Type 1</b>	Enclosures are intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment or locations where unusual service conditions do not exist.	Indoor use primarily to provide protection against contact with the enclosed equipment and against a limited amount of falling dirt.	General purpose enclosure. Protects against accidental contact with live parts.
<b>Type 2</b>	Enclosures are intended for indoor use primarily to provide a degree of protection against limited amounts of falling water and dirt.	Indoor use to provide a degree of protection against limited amounts of falling water and dirt.	Indoor use to provide a degree of protection against dripping and light splashing of noncorrosive liquids and falling dirt.
<b>Type 3</b>	Enclosures are intended for outdoor use primarily to provide a degree of protection against windblown dust, rain, and sleet; undamaged by the formation of ice on the enclosure.	Outdoor use to provide a degree of protection against windblown dust and windblown rain; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain, snow, and windblown dust; undamaged by the external formation of ice on the enclosure.
<b>Type 3R</b>	Enclosures are intended for outdoor use primarily to provide a degree of protection against falling rain and sleet; undamaged by the formation of ice on the enclosure.	Outdoor use to provide a degree of protection against falling rain; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain and snow; undamaged by the external formation of ice on the enclosure.
<b>Type 4</b>	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, and hose directed water; undamaged by the formation of ice on the enclosure.	Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water, and hose-directed water; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure.
<b>Type 4X</b>	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, and hose-directed water; undamaged by the formation of ice on the enclosure.	Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water, and hose-directed water; undamaged by the formation of ice on the enclosure; resists corrosion.	Indoor or outdoor use; provides a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure; resists corrosion.
<b>Type 6</b>	Enclosures are intended for use indoors or outdoors where occasional submersion is encountered. limited depth; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection against entry of water during temporary submersion at a limited depth; undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against the entry of water during temporary submersion at a limited depth. Undamaged by the external formation of ice on the enclosure; resists corrosion.
<b>Type 12</b>	Enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt, and dripping noncorrosive liquids.	Indoor use to provide a degree of protection against dust, dirt, fiber flyings, dripping water, and external condensation of noncorrosive liquids.	Indoor use; provides a degree of protection against circulating dust, lint, fibers, and flyings; dripping and light splashing of non-corrosive liquids; not provided with knockouts.
<b>Type 13</b>	Enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying of water, oil, and noncorrosive coolant.	Indoor use to provide a degree of protection against lint, dust seepage, external condensation and spraying of water, oil, and noncorrosive liquids.	Indoor use; provides a degree of protection against circulating dust, lint, fibers, and flyings; seepage and spraying of non-corrosive liquids, including oils and coolants.

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### Comparison of Specific Non-Hazardous Applications Outdoor 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	•	•	•	•	•	•	•
Rain, snow, and sleet §	•	•	•	•	•	•	•
Sleet ††			•				
Windblown dust	•		•	•	•	•	•
Hosedown				•	•	•	•
Corrosive agents					•		•
Occasional temporary submersion						•	•
Occasional prolonged submersion							•

§ 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.

\*\* These enclosures may be ventilated.

### Comparison of Specific Non-Hazardous Applications Indoor Locations

Provides a Degree of Protection Against the Following Environmental Conditions	Type of Enclosure										
	1*	2*	4	4X	5	6	6P	11	12	12K	13
Incidental contact with the enclosed equipment	•	•	•	•	•	•	•	•	•	•	•
Falling dirt	•	•	•	•	•	•	•	•	•	•	•
Falling liquids and light splashing		•	•	•		•	•	•	•	•	•
Dust, lint, fibers, and flyings †			•	•	•	•	•		•	•	•
Hosedown and splashing water			•	•		•	•				
Oil and coolant seepage									•	•	•
Oil or coolant spraying and splashing											•
Corrosive agents				•			•	•			
Occasional temporary submersion						•	•				
Occasional prolonged submersion							•				

\* These enclosures may be ventilated. However, Type 1 may not provide protection against small particles of falling dirt when ventilation is provided in the enclosure top. Consult Hoffman for more information.

† These fibers and flyings are non-hazardous materials and are not considered Class II type ignitable fibers or combustible flyings. For Class III type ignitable fibers or combustible flyings see the National Electrical Code Section 500-6(a).

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### Cross-Reference (Approximate) NEMA, UL, CSA, vs. IEC Enclosure Type

(Cannot be used to convert IEC Classifications to NEMA Type Numbers)

Enclosure Rating	IP20	IP22	IP55	IP64	IP65	IP66	IP67
Type 1	•						
Type 3				•			
Type 3R		•					
Type 3S				•			
Type 4						•	
Type 4X						•	
Type 6							•
Type 12			•				
Type 13					•		

IEC 60529 has no equivalents to NEMA enclosure Types 7, 8, 9, 10, or 11.

• Indicates compliance.

#### Enclosure Type Rating vs. IP Rating

Electrical enclosures are rated by type (NEMA 250 / UL 50), and/or IP rated (IEC 60529) based on the degree of protection provided.

Type ratings and IP ratings have only the following in common:

1. A degree of protection for persons from hazardous components inside the enclosure
2. A degree of protection for equipment inside the enclosure from ingress of solid foreign objects, including dust
3. A degree of protection for equipment inside the enclosure from ingress of water

NEMA 250 and UL 50 type rating documentation defines additional requirements that a type-rated enclosure must meet. These include:

- Mechanical impact on enclosure walls
- Gasket aging and oil resistance
- Corrosion resistance
- Door and cover latching requirements
- Sheet metal gauge construction requirements

Electrical enclosures that carry an IP rating only, have not been designed to the additional type-rating requirements. Therefore, a type-rating cannot be assigned to an enclosure that has only been IP-rated.

Please note that electrical enclosures manufactured by Hoffman are tested for both type-rating and IP-rating and carry both type and IP ratings.

Data subject to change without notice