

Technical Information

NEMA, UL And CSA Standards

Enclosure rating	NEMA National Electrical Manufacturers Association (NEMA 250) 	UL Underwriters Laboratories, Inc. (UL 50) 	CSA Canadian Standards Association (C22.2 No.94-M91) 
Type 1	Enclosures are intended for indoor use primarily to provide a degree of protection against the contact with the enclosed equipment.	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.
Type 2	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 contact with the enclosed equipment and against a limited amount of falling dirt.	Indoor use to provide a degree of protection against dripping and light splashing of noncorrosive liquids, and falling dirt.
Type 3	Enclosures are intended for outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust, and damage from external ice formation.	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 to provide a degree of protection against rain, snow, and windblown dust; undamaged by the external formation of ice on the enclosure.
Type 3R	Enclosures are intended for outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.	Outdoor use to provide a degree of protection against falling rain; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection against rain, snow; undamaged by the external formation of ice on the enclosure.
Type 4	Enclosures are intended for indoor and 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.	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 to provide a degree of protection against rain, snow, and windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure.
Type 4X	Enclosures are intended for indoor and outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water, and damage from external ice formation.	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 to provide a degree of protection against rain, snow, and windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure; resists corrosion.
Type 6	Enclosures are intended for indoor and 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.	Indoor or outdoor use to provide a degree of protection against entry of water during temporary submersion at a 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 formation of ice on the enclosure.
Type 12	Enclosures are intended for indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping non-corrosive liquids.	Indoor use to provide a degree of protection against dust, dirt, fiber flyings, dripping water, and external condensation of non-corrosive liquids.	Indoor use primarily to provide a degree of protection against circulating dust, lint, fibers, and flyings; dripping and light splashing of noncorrosive liquids; not provided with knockouts.
Type 13	Enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying water, oil and non-corrosive liquids.	Indoor use to provide a degree of protection against lint, dust seepage, external condensation and spraying of water, oil, non-corrosive liquids.	Indoor use primarily to provide a degree for protection against circulating dust, lint, fibers, and flyings; seepage and spraying of noncorrosive liquids including oils and coolants.

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EN60529/IP Environmental Ratings

Degrees Of Protection Against Solid Objects				Degrees Of Protection Against Water	
Description	Definition	First characteristic numeral	Second characteristic numeral	Description	Definition
Non-protected		0	0	No protection	
Protected against solid foreign objects of 50 mm diameter and greater	The object probe, sphere of 50 mm diameter shall not fully penetrate	1	1	Protected against vertically falling water drops	Vertically falling water drops shall have no harmful effects
Protected against solid foreign objects of 12.5 mm diameter and greater	The object probe sphere of 12.5 mm diameter shall not fully penetrate	2	2	Protected against vertically falling water drops when enclosure tilted up to 15 degrees	Vertically falling water drops shall have no harmful effects when the enclosure is tilted at any angle up to 15 degrees on either side of the vertical axis
Protected against solid foreign objects of 2.5 mm diameter and greater	The object probe of 2.5 mm diameter shall not penetrate at all	3	3	Protected against spraying water	Water sprayed at an angle up to 60 degrees on either side of the vertical shall have no harmful effects
Protected against solid foreign objects of 1.0 mm and greater	The object probe of 1.0 mm diameter shall not penetrate	4	4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effects
Dust protected	Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety	5	5	Protected against water jets	Water protected in jets against the enclosure from any direction shall have no harmful effects
Dust tight	No ingress of dust	6	6	Protected against powerful water jets	Water protected in powerful water jets against the enclosure from any direction shall have no harmful effects
			7	Protected against the effects of temporary immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under standardized conditions of pressure and time
			8	Protected against the effects of continuous immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7

The degree of protection provided by an enclosure is indicated by the IP code in the following way:

1st characteristic numeral—
e.g. protection against solid foreign objects of 12.5 mm diameter and greater

IP 2 3

2nd characteristic numeral—
e.g. protected against spraying water