

Protection Ratings

Ingress Protection (IP) Ratings

The Ingress Protection Code indicates the degree of protection provided by enclosures for electrical equipment

- The **first numeral** indicates protection of persons against access to dangerous parts and protection of internal equipment against the ingress of solid foreign objects
- The **second numeral** indicates protection of internal equipment against harmful ingress of water
- The **third numeral** indicates protection of equipment against impact

IEC529/ EN 60529 defines the different tests.

* Not specified in EN 60598

Degree of Protection	First Digit Solid Objects	Second Digit Liquids	Third Digit Impact *
0	Not Protected	Not Protected	Not Protected
1	Protected against objects larger than 50mm	Drip Proof	Impact 0.225 Joules
2	Protected against objects larger than 12mm	Protected against dripping water when tilted up to 15°	Impact 0.375 Joules
3	Protected against objects larger than 2.5mm	Rain Proof	Impact 0.5 Joules
4	Protected against objects larger than 1.0mm	Splash Proof	Not defined
5	Dust Proof	Jet Proof	Impact 2.0 Joules
6	Dust tight	Protected against powerful water jets	Not Defined
7	Not Defined	Water tight	Impact 6.0 Joules
8	Not Defined	Pressure Water tight	Impact 20.0 Joules

NEMA Protection Ratings

In North America, Equipment can be classified per the National Electrical Manufacturer's Association (NEMA) Enclosure Classifications. NEMA is a non-profit trade organization composed of mainly U.S. manufacturers of electrical apparatus. NEMA created voluntary standards for electrical enclosures. These classifications describe the environment in which the product can be used due to the protection the enclosure provides. ("Enclosure" includes electrical and mechanical connections and external adjustments.) Among others, NEMA classifies enclosures based on the effects of external icing, rust and corrosion, or contamination from oil and coolants.

Type 1	General Purpose	Indoor	accidental contact will not corrode
Type 2	Drip-proof	Indoor	limited amounts of falling water and dirt will not corrode
Type 3	Dust-tight, rain-tight	Outdoor	windblown dust, rain, sleet, and undamaged by external ice formation
Type3R	Dust-tight, rain-tight	Outdoor	same as type 3 above, plus diverts water from live parts, provision for drainage, will not corrode
Type 3S	Dust-tight, rain-tight	Outdoors	same as type 3 above, operation of external mechanism when ice laden, will not corrode

Type 4	Water-tight, dust-tight	Indoor/Outdoor	windblown dust and rain, splashing water, and hose directed water, undamaged by ice formation, will not corrode
Type 4X	Water-tight, dust-tight	Indoor/Outdoor	same as type 4 above, plus corrode resistant, will not corrode
Type 5	Dust-tight	Indoor	dust and falling dirt, will not corrode
Type 6	Water-tight/dust-tight	Indoor/Outdoor	temporary entry of water during limited submersion (6ft/2m for 30 Min), undamaged by formation of ice, will not corrode
Type 6P	Water-tight/dust-tight	Indoor/Outdoor	same as type 6 above plus prolonged submersion, will not corrode
Type 7	Explosion proof/Class I Groups A, B, C, D	Indoor	Hazardous Locations: Protection against corrosive effects of liquids and gases
Type 8	Explosion proof/Class I	Indoor/Outdoor	Hazardous Locations: protection against corrosive effects of liquids and gases; contacts or connections immersed in oil
Type 9	Explosion Proof/Class II Groups E or G	Indoor	Hazardous Locations: dust-tight, hazardous dust
Type 10	Hazardous Locations	Indoor	U.S. MSHA Mine Safety and Health Adm. per 30 C.F.R., Part 18
Type 11	Oil-tight/Corrode	Indoor	protection from corrosive effects of gases and liquid dripping, seepage and external condensation or corrosion, oil immersion
Type 12	Oil-tight/Dust-tight	Indoor	fibers, lint, dust and light splashing, seepage and dripping condensation or non-corrosive liquids
Type 12K		Indoor	same as type 12 above, enclosure has knockouts
Type 13	Oil-tight/Dust-tight	Indoor	dust, spraying of water, oil and corrosive coolant, oil resistant gaskets