

IP Ratings and NEMA protection

Ingress Protection (IP) ratings (described in IEC 60529) specify the environmental protection an enclosure provides. The IP rating normally has two numbers.

The first number specifies the protection from solid objects or materials.

The second number specifies the protection from liquids.

IP Protection Number Summary

FIRST NUMBER - Protection against solid objects / PRIMEIRO ALGARISMO - Proteção quanto a objetos sólidos e pessoas

0 = No protection / Sem proteção

1 = Protected against solid objects up to 50mm / Proteção contra objetos maiores que 50 mm (exemplo: toque com a mão).

2 = Protected against solid objects up to 12mm / Idem, maiores que 12 mm (exemplo: toque com dedos)

3 = Protected against solid objects up to 2.5mm / Idem, maiores que 2,5 mm (exemplo: fios e ferramentas)

4 = Protected against solid objects up to 1mm / Idem, maiores que 1 mm (exemplo: fios e ferramentas finos)

5 = Protected against dust, limited ingress (no harmful deposit) / Proteção limitada contra poeiras (sem depósitos prejudiciais)

6 = Totally protected against dust / Totalmente protegido contra poeiras

SECOND NUMBER - Liquid protection / SEGUNDO ALGARISMO - Proteção quanto a líquidos

0 = No protection / Sem proteção

1 = Protection against vertically falling drops of water / Proteção contra pingos d'água verticais

2 = Protection against direct sprays of water up to 15 degrees from vertical / Proteção contra pingos d'água na direção de 15° a partir da vertical

3 = Protection against direct sprays of water up to 60 degrees from vertical / Idem, na direção de 60°

4 = Protection against water sprayed from all directions / Idem, em qualquer direção. Alguma (pequena) entrada é permitida

5 = Protected against low-pressure jets of water from all directions / Proteção contra jatos d'água em qualquer direção. Pequena entrada permitida

6 = Protected against low pressure jets of water (such as use on ship decks) / Idem, para uso em conveses de embarcações

7 = Protected against the effect of immersion between 15cm and 1m / Proteção contra imersão até 1 m de profundidade

8 = Protected against long periods of immersion under pressure / Proteção contra submersão (> 1 m) por longos períodos

THIRD NUMBER (often omitted) - Impact protection / TERCEIRO ALGARISMO - Proteção contra impactos (muitas vezes omitida)

0 = No protection / Sem proteção

1 = Protection against 150g falling from 15cm height (0.225 Joules) / Proteção contra impacto de 0,225 J

2 = Protection against 250g falling from 15cm height (0.375 Joules) / Proteção contra impacto de 0,375 J

3 = Protection against 250g falling from 20cm height (0.5 Joules) / Proteção contra impacto de 0,500 J

4 = Protection against 500g falling from 40cm height (2.0 Joules) / Proteção contra impacto de 2,000 J

5 = Protected against 1500g falling from 40cm height (6.0 Joules) / Proteção contra impacto de 6,000 J

6 = Protected against 5kg falling from 40cm height (20.0 Joules) / Proteção contra impacto de 20,00 J

NEMA comparisons

The NEMA rating system can be compared to the IP system. The most common NEMA ratings are:

NEMA 1 Similar to IP30. Protects against limited amounts of falling dirt in indoor installations.

NEMA 2 Similar to IP55. Protects against circulating dust, falling dirt and dripping non-corrosive liquids in indoor installations.

NEMA 13 Similar to IP65. Protects against dust, sprayed water, oil and non corrosive coolants in indoor installations.

NEMA 4 Similar to IP65. Protects against wind-blown dust and rain, splashing water, hose-directed water and damage from external ice formation in indoor and outdoor installations.

NEMA 4X Similar to NEMA4 but also protects against corrosion.

Underwriters Laboratories Inc. can provide testing and certification services to verify and document conformity of products for any of the above "IP" Codes in accordance with:

a) IEC 60529, *Degrees of protection provided by enclosures ("IP" Code)*, for all "IP" Codes.

b) CENELEC (European Norm) EN 60 529, *Degrees of protection provided by enclosures ("IP" Code)*, for all "IP" Codes.