

### Outline of Enclosure Types:

The National Electrical Manufacturers Association publishes NEMA 250-2014, Enclosures for Electrical Equipment (1000 Volts Maximum). This standard establishes the degrees of protection afforded by various enclosure types. It is similar, though unrelated, to the IP codes that are familiar to the lighting industry.

NEMA is not a certifying body, and the NEMA 250 standard allows for self-certification. Of course 3rd party test facilities can provide an added measure of confidence through independent testing. All enclosures provide some means of protection, even at the most basic level of shielding end users from access to electrical components.

The most basic of NEMA enclosures for use with handrail components is a NEMA 3R. This is effectively “drip proof”, meaning when mounted in the proper orientation it will protect the internal components from getting wet, though it affords little dust intrusion prevention. Most commonly, the 3R is installed when covered by other structures (i.e. solid bridge deck), or mounted internally to a building.

Increased protection can be found by specifying NEMA 4 and 4X. These both provide protection from hose down and splashing water, as well as prevent ingress of dust and foreign objects. These enclosures will have a gasket affixed to a hinged cover to seal the internals. You’d specify this enclosure when mounting to an open deck, or on the side of an outdoor structure. The 4X designation mandates the enclosure be fabricated of a non-corrosive alloy; for use if mounting to a bridge where deicing compounds are present, for example.

The NEMA 6 and 6P designation indicate all the above, with additional protection against submersion (either temporary or prolonged). This is the highest designation of NEMA-rated enclosure, often associated with a direct-bury box. The unit is very well sealed, and like the NEMA 4X, the 6P designation indicates resistance to corrosive agents.

Loose association to the IP codes can be made, though again the two are not connected. The NEMA 3R would be considered an IP24; the NEMA4 an IP66; and the NEMA6 and 6P an IP66 or IP68.

A complete summary can be found at [www.nema.org](http://www.nema.org), where the standards are available for purchase.