
Technical Note 025

Enclosure ratings: UL type vs NEMA

What is the difference?

Sensitive electrical and electronic equipment is often used in areas where dust, dirt, chemicals, gas, moisture and/or fluids are present. These environments have a negative affect on electrical equipment so electrical enclosures are commonly used to protect them. Because there are so many possible variations of contaminants present, different enclosures are designed to provide varying degrees of protection.

The most commonly used ratings for enclosing variable frequency drives (VFD) are 1, 12, 3R, 4 and 4X. Each rating assuring its own degree of protection.

How is this degree of protection defined for each? Who provides the oversight to assure an enclosure meets or exceeds the degree of protection it is designed for?

The National Electrical Manufacturer Association (NEMA) and Underwriters Laboratories (UL) are the two governing agencies commonly referenced in North America. Both provide oversight to assure an enclosure meets or exceeds a determined degree of protection. Both define enclosure designs, what contaminants each design can provide protection for, and how each design is tested to assure compliance with its respective rating or type. The most significant difference between NEMA rated enclosures and a UL type rated is how testing is done and the compliance process.

NEMA rated enclosures are self-certified by the manufacturer. They do not require a third-party testing or a compliance process performed by an accredited testing organization to verify the enclosure rating. The manufacturer can apply a gasket on the enclosure door to protect against dust, dirt and splashing water. Then, self-certify the enclosure to be rated NEMA 12.

UL rated enclosures must go through a rigorous testing and complete a compliance process performed by a UL accredited test facility to achieve UL Type 12 certification. For example, a UL Type 12 enclosure must survive being sprayed with a pressurized hose and exposed to blown concrete dust for a specified period of time, to be certified.

ABB provides and recommends the use of UL type rated enclosures for VFDs. The additional testing requirements of UL provide peace of mind that the enclosure will indeed handle the installation location's environment. Keeping a VFD clean and dry are key aspects to achieving a long lifespan for that VFD.