CERTIFICATIONS & STANDARDS

Governing

ELECTRIC MOTOR CONTROL

Producers, distributors, and users of certain electrical equipment such as motor controls must adhere to **national and international standards**. While most manufacturers and companies that use heavy equipment needing motor controls employ technicians certified in each set of standards, it's helpful to have a basic understanding of standard requirements for the industry you work.

In this article

we give a basic overview of each standard's governing body, unique initial purpose, and current objectives.

SIX COMMON INDUSTRIAL STANDARDS

encompass Motor Controls in North Amercia

- **UL** — Underwriters Laboratories standards
- **IEC** — International Electrotechnical Commission norms
- **NETA** — InterNational Electrical Testing Association
  American National Standards Institute (ANSI) accredited guidelines
- **PEARL** — Professional Electrical Apparatus Reconditioning League directives
- **NOM** — Norma Oficial Mexicana standards of the Mexican government
- **CSA** — CSA Group (formerly Canadian Standards Association) standards

UL STANDARDS FOR ELECTRIC MOTORS

UL motor control safety standards and certification determine the shock and fire hazard of circuits controlling a single or assembled motor unit like industrial controllers, equipment assemblies, combination control units, and lighting or distribution panels with manual switches. This standard requires that every part of the motor control unit be inspected and certified for the entire unit to carry a UL approval label. Products with a UL listing or recognition are generally standalone consumer products. In comparison, UL classification or certification is reserved for equipment that requires more testing, like industrial control panels.

The two types of industrial testing certifications are UL508 and UL508A≠. UL508A covers the industrial control panel assembly and installation processes, and UL508 covers the panel itself. Therefore, an industrial control panel should carry both certifications to be considered UL certified.

The Underwriter Laboratories non-profit has been a prominent safety organization in the U.S. since its founding in 1894. It was established after electrical engineer William Henry Merrill took his first job as a fire insurance underwriter and later collaborated with The Chicago Underwriters Group and the Western Insurance Union to fund his safety standards idea.

Since its inception, UL has conducted research and worked with other safety standard authorities to reduce workplace and home injury.

IEC STANDARDS FOR ELECTRIC MOTORS

IEC standards denote the electrical efficiency of motors and have helped set the Minimum Energy Performance Standards (MEPS) for motors built across the world. The four levels of efficiency span IE1 to IE4; IE1 is the lowest standard efficiency, and IE4 is the highest labeled super premium efficiency. The rating is set by assessing the electrical load lost by a motor during operation. The standards are applied to single and multi-phase motors, motor controls, mechanical equipment, and driven equipment.

The motor control standards were first set in 1911 and reside in the IEC TC2 guide.

The International Electrotechnical Commission or IEC is an international group that works in conjunction with other regulatory bodies to create motor efficiency standards.

Motors worldwide are said to consume 53% of generated electricity. The USA was the first to adopt the MEPS standard of IE2 in 1997 and has since been raised to IE3. Today, countries that consume the most electricity by motor use have adopted MEPS between IE2 and IE3.

NETA STANDARDS FOR ELECTRIC MOTORS

The NETA is ANSI-accredited, so its testing standards have been developed with ANSI endorsement in mind. NETA testing standards for motor controls encompass electrical commissioning, acceptance, and maintenance testing. NETA standards give companies and certified testing technicians the tests and reporting format they need to check equipment for performance and extend lifE expectancy.

The ANSI/NETA standards are revised every four years. Regular revision ensures that testing standards keep pace with developing technology, demand, and other regulatory body expectations. In general, the NETA denotes that motor control centers undergo active maintenance to avoid downtime and employee injury due to failure. Their standards inform inspectors o the testing that should be completed to ensure the life of the motor control center and reduce the chance of failure.

The InterNational Electrical Testing Association or NETA was founded in 1972 in response to the mass migration to electric-motor-powered equipment in the 1960s and 1970s. Their first testing specification document was released in 1973, and they continued to set standards and create a technician certification program. Today, they have four primary standards covering technician certification, electrical acceptance testing, and maintenance testing and commissioning specifications for electrical power equipment and systems.

PEARL STANDARDS FOR ELECTRIC MOTORS

PEARL is also an ANSI-accredited standards development agency. It provides two sets of standards: one for inspecting and testing and the other for reconditioning. The inspecting and testing standards cover general inspection, testing, cleaning, and documentation of PEARL standard associated activities. The PEARL inspection and testing standards can be used to evaluate damage, to assess overall condition, and for general inspection of electrical equipment.

The reconditioning standards apply to the reconditioning of electrical distribution equipment and accessories, including motor controls. The standards were developed in conjunction with manufacturer specifications and other regulatory bodies, including NFPA, NETA, IEEE, and CSA. PEARL-certified reconditioned devices are expected to be more reliable and last longer due to the meticulously assembled 16 section standard requirements.

PEARL is the only ANSI-accredited organization to offer standards for the reconditioning of electrical equipment and was first convened in 1996. In addition to the standards they distribute, they also offer a reconditioning technician certification course and are well-known for their rigorous adherence to strict technical, safety, and operational guidelines.

NOM STANDARDS FOR ELECTRIC MOTORS

NOM certification is needed for a wide variety of electrical products used in Mexico. NOM certification denotes the product's safety, lifetime, and the party responsible for warranty claims. A manufacturer can't transfer a NOM certificate, but a distributor in Mexico can be extended rights to use and obtain their own product certification. NOM certification can occur anywhere in the world by a General Direction of Standards (DGN) of the Secretaría de Economía in Mexico approved Certification Body. Generally, NOM certificates are only awarded to companies outside of Mexico that maintain a free-trade agreement with Mexico.

Many of the NOM standards are based on other standard-setting authorities like UL and IEC. Therefore, NOM certification means that a motor control or other product meets the chosen standards of the Mexican government – and that the product is approved for use and fabrication in Mexico.

CSA STANDARDS FOR ELECTRIC MOTORS

CSA motor-control standards define features for motor-based systems that also satisfy the safety requirements of the National Fire Protection Association's ANSI/NFPA 70 along with NOM-001-SEDE for Mexico — as well as Canadian and U.S. national electrical codes (NECs).

More specifically, CSA C22.2 254:05 dictates the required features for low-voltage switchgear and control gear as well as motor contactors, starters, and programmable motor controllers and starters. Harmonization with UL 60947-4-2 simplifies its use for equipment sold internationally. A second part of CSA C22.2 254:05 covers motor control centers for systems having short-circuit currents not exceeding 200,000 A. A third part covers the design of single and three-phase motor controls (direct current as well as 50 and 60-Hz systems) not exceeding 1,000 Vdc or 600 Vac. Related CAN/CSA C22.2 60947-series standards dictate the design of systems employing safety signals, controls, and interlocks as well as motor controllers and starters with and without contactors to bypass the starter circuit after commencement of normal operation.

The CSA Group finds its origins in the Canadian Standards Association founded in 1919. Today, CSA Group is a not-for-profit nongovernmental organization that defines and manages more than 3,000 standards and codes to ensure the safe and reliable operation of a vast array of designs incorporating electrical components.

The CSA Group has U.S. Occupational Safety and Health Administration Nationally Recognized Testing Laboratory (NRTL) certification as well as accreditation by the Standards Council of Canada and ANSI. Many of its standards have also influenced (or are harmonized with) IEC and International Organization for Standardization (ISO) standards.

LAST THOUGHTS

Motor control and other standards are carefully written to ensure designs satisfy safety, longevity, and environmental objectives. Electrical.com only distributes products that satisfy their corresponding safety standards. In addition, Electrical.com holds itself to its own high standards – staffing knowledgeable industry experts for the best assistance and keeping the most extensive inventory of new and obsolete power distribution equipment in stock. Visit **Electrical.com** today for more information.

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