

TechTopics No. 100

Third-party listing – UL, C-UL and CSA

For many years, electrical equipment for use in installations that are subject to the National Electrical Code® (NEC®, NFPA® 70) has been required to be listed in order to be accepted by the local inspection agencies (often referred to as the authority having jurisdiction (AHJ)). This requirement resulted from the original legislation establishing OSHA, the Williams-Steiger Occupational Safety and Health Act of 1970. The OSHA regulations have been updated over the years, but the fundamental requirement is contained in 29 CFR 1910.303 (available at www.osha.gov), which states (in part):

*“1910.303(a) – Approval. The conductors and equipment required or permitted by this subpart shall be **acceptable** only if approved, as defined in Sec. 1910.399.*

....

*1910.303(b)(1)(i) - Suitability for installation and use in conformity with the provisions of this subpart;
Note to paragraph (b)(1)(i) of this section: Suitability of equipment for an identified purpose may be evidenced by listing or labeling for that identified purpose.”*

The definitions of “acceptable,” “labeled” and “listed” within the meaning of the OSHA legislation, is given in 29 CFR 1910.399, which stipulates:

“1910.399 Definitions applicable to this part.

***Acceptable.** An installation or equipment is acceptable to the Assistant Secretary of Labor, and approved within the meaning of this Subpart S:*

(1) If it is accepted, or certified, or listed, or labeled, or otherwise determined to be safe by a nationally recognized testing laboratory recognized pursuant to § 1910.7; or

(2) With respect to an installation or equipment of a kind that no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, if it is inspected or tested by another Federal agency, or by a State, municipal, or other local authority responsible for enforcing occupational safety provisions of the National Electrical Code, and found in compliance with the provisions of the National Electrical Code as applied in this subpart; or

(3) With respect to custom-made equipment or related installations that are designed, fabricated for, and intended for use by a particular customer, if it is determined to be safe for its intended use by its manufacturer on the basis of test data which the employer keeps and makes available for inspection to the Assistant Secretary and his authorized representatives.

...

Labeled. Equipment is “labeled” if there is attached to it a label, symbol, or other identifying mark of a nationally recognized testing laboratory:

(1) That makes periodic inspections of the production of such equipment, and

(2) Whose labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.

Listed. Equipment is “listed” if it is of a kind mentioned in a list that:

(1) Is published by a nationally recognized laboratory that makes periodic inspection of the production of such equipment, and

(2) States that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.”

The OSHA legislation establishes the governing requirement that equipment be listed or labeled by nationally recognized testing laboratory, commonly referred to as an NRTL. OSHA has established a program to recognize NRTLs. OSHA also establishes that the fundamental basis of labeling or listing is compliance with the National Electrical Code (NFPA 70).

The OSHA website (<https://www.osha.gov/dts/otpca/nrtl/>) indicates that NRTLs are private sector organizations that are recognized by OSHA to perform certification of electrical products. OSHA also limits the scope of the activities than any individual NRTL can engage in, based on the competencies of the particular NRTL. If the certification of the product is done under the NRTL program, the certification mark (label or listing) signifies that the NRTL tested and certified the product, and that the product complies with the requirements of one or more appropriate product safety test standards. Users of the product can generally rely on the mark as evidence that the product complies with the applicable OSHA approval requirement(s) and is safe for use in the workplace.

The medium-voltage switchgear and medium-voltage controller products that Siemens offers are generally subject to the requirements of several IEEE and UL standards, including:

- IEEE C37.20.2 Metal-Clad Switchgear
- IEEE C37.20.3 Metal-Enclosed Interrupter Switchgear
- IEEE C37.20.4 Indoor AC Switches (1 kV – 38 kV) for Use in Metal-Enclosed Switchgear
- UL 347 Medium-Voltage AC Contactors, Controllers, and Control Centers.

The OSHA nationally recognized testing laboratory program lists 15 NRTLs in total, but of these, only three NRTLs are recognized by OSHA to provide certification programs for medium-voltage switchgear and only four NRTLs are recognized by OSHA to provide certification programs for medium-voltage controller products. These recognized NRTLs are:

- Canadian Standards Association (CSA)
- Intertek Testing Services NA, Inc. (ETL)
- TUV Rheinland of North America (TUV) (only for UL 347 medium-voltage controllers)
- Underwriters Laboratories Inc. (UL).

Of these, UL is by far the most widely accepted, with the CSA a bit less well accepted, with ETL and TUV even less accepted. It should be recognized that acceptance of the mark by any of the NRTLs is determined by the AHJ, and some AHJs may accept any of the firms shown above, or only some of them.

Siemens medium-voltage switchgear and medium-voltage controller products are generally listed/labeled by UL, or for some OEM products, recognized by UL.

UL and CSA have a memorandum of understanding under which a mutual acceptance program for electrical products has been established. The program allows UL to investigate and certify products for use in Canada to appropriate CSA standards, and allows CSA to investigate and certify products for use in the United States (US) to the relevant IEEE or ANSI or UL standards. Under this program, a C-UL mark (the UL mark for Canada) is accepted in Canada as equivalent to the CSA mark for products for use in Canada, and the CSA mark is accepted in the US as equivalent to the UL mark for products for use in the US.

The regulations in the US recognize the AHJ, usually the final jobsite inspection agency and enforcement organization, as the governing body. Some AHJs in particular regions or states may choose not to accept one of the NRTLs recognized by OSHA. A similar comment applies to the inspection authorities in Canada.

The discussion in this issue of TechTopics addresses only installations subject to the National Electrical Code, the NEC. In general, installations subject to the NEC are industrial, commercial, and institutional installations. Certain types of installations are excluded, such as electric utilities (when operating in their regulated utility responsibility), moving vehicles (such as diesel locomotives or ships), underground mines or mobile mining machinery, and similar installations.

While utilities are exempt in their electric utility responsibility, utility office buildings or the like are normally subject to the NEC.

Products for electric utilities used in generation, distribution or transmission, or substation control, are not subject to the NEC but are subject to the National Electrical Safety Code® (NESC®), ANSI C2. Thus medium-voltage outdoor substation type circuit breakers (Siemens type SDV7) are not required to be listed or labeled by a third party.

In the listing of standards above, one may note that the standard for arc-resistant equipment, IEEE Std. C37.20.7 is not listed. This is because UL investigates equipment for arc-resistance as supplemental activity under the other standards listed. For example, metal-clad switchgear must first be investigated to the IEEE Std. C37.20.2 requirements, and then may be investigated for supplemental characteristics, for example, outdoor construction or arc resistance. So, while not listed in the documents recognized by OSHA for individual NRTLs, listing for arc resistance is still covered as an option.

Lastly, not all equipment is available as a listed product, even within a design family which is listed. UL listing is based on a label for each vertical section (or unit) of an assembly, not a single label for an assembly of many units. If an individual unit has a construction that has not been investigated by UL, or the unit has construction not conforming to the standards for the product category, UL does not allow applying a UL label to that unit, even if all other units in the assembly are labeled. A rather common example of this situation is that of a utility revenue metering compartment in a lineup. These are constructed to unique requirements of the utility and usually are not in accordance with the requirements of the equipment standard. For example, utility revenue metering units often do not have full compartmentalization and insulation as required by IEEE Std. C37.20.2, and therefore cannot be labeled as metal-clad switchgear. Similarly, units having user-specified devices that are not UL listed or recognized usually cannot be provided with a UL label. Such devices include a few seldom-used or special-purpose protective relays, or some emerging-technology devices, that have not been investigated by UL. However, these instances of units that cannot be listed are becoming less common as time progresses.

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