Electrical Connections

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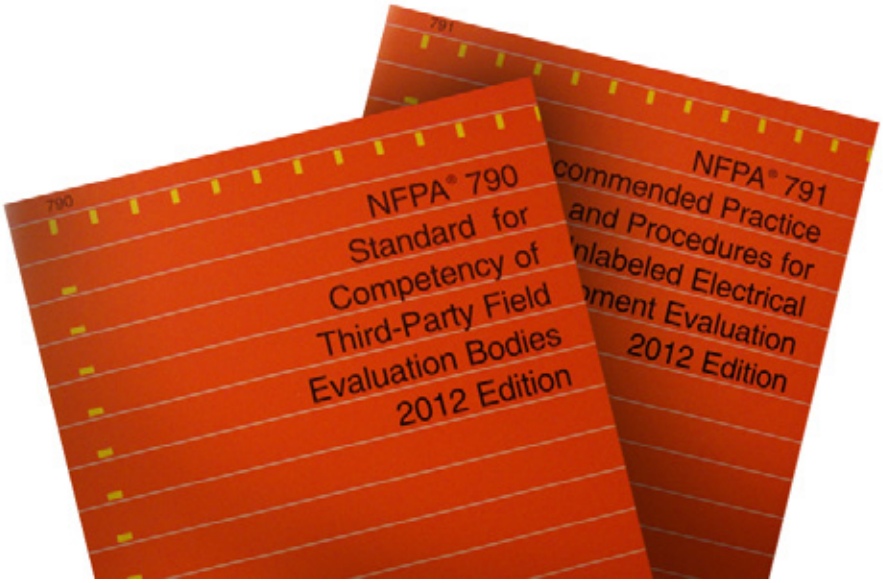
Field Evaluations — New Standards NFPA 790 and 791

The National Electrical Code® (NEC) requires listing in numerous locations and gives further guidance for judging equipment in Section 110.3(A). Occupational Safety and Health Administration (OSHA) requirements in 29CFR1910.303(a) mandate that all electrical equipment in the workplace be "approved" by being "certified" or subjected to a complete and thorough evaluation before use. Many state, county and local electrical jurisdictions have incorporated similar requirements within their own laws, ordinances and rules.



However, equipment is sometimes installed that has not been certified or has been modified after installation. In these cases, a field evaluation may be needed. The need for a field evaluation is determined by an authority having jurisdiction (AHJ), who always has final approval authority. There are dozens of testing companies, local as well as national that claim competency to conduct field evaluations of electrical equipment. In the absence of other evidence, new National Fire Protection Association (NFPA) Standards 790 and 791 can now provide a way to verify such claims.

OSHA has an accreditation program for Nationally Recognized Testing Laboratories (NRTLs), but no similar program currently exists for organizations that evaluate products in the field. While some testing organizations claim they are "recognized" to evaluate products in the field by virtue of their NRTL accreditation, the reality is that OSHA does not assess an organization's abilities or credentials to field evaluate products. Some jurisdictions have their own application and accreditation procedures, while others simply require field evaluations to be conducted only by NRTLs with accreditations for the equipment being evaluated. Recently, NFPA published two documents, NFPA 790 and 791, to provide the tools for jurisdictions to determine competency of a field evaluation body.

NFPA 790, Standard for Competency of Third-Party Field Evaluation Bodies

As the title states, this standard establishes minimum competency requirements for organizations that perform field evaluations. NFPA 790 requires that field evaluation bodies apply requirements from nationally recognized standards when evaluating installed products while demonstrating technical expertise on the equipment being evaluated. A field evaluation body is not permitted to have any conflicts of interests, such as being owned by or under control of manufacturers, suppliers or installers of equipment that it is evaluating. A field

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evaluation body may not design or complete modifications required for a product to achieve compliance.

All personnel involved in the field evaluation process are required to meet competence criteria regarding any equipment they are evaluating. All field evaluation bodies must maintain records related to technical staff qualifications, training and experience; these are subject to audit when requested.

A field evaluation may consist of a preliminary evaluation at a manufacturing location or other interim distribution facility, or at the location of the final installation. The process must always be completed with an evaluation of installed equipment at the final installation site. A copy of the field evaluation body's report, including any items needing corrective action, is provided to the AHJ at the conclusion of both preliminary and final evaluations. The format and content of the final report is defined in NFPA 791.

NFPA 791, Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation

NFPA 791 was developed to describe recommended field evaluation procedures for all field evaluation bodies. The intent of NFPA 791 is to result in consistent practices and application of requirements, all of which assist AHJs in making enforcement decisions.

A field evaluation may be conducted on either new or used equipment. Requirements for any field evaluation should be drawn principally from the applicable nationally recognized product safety standard, such as a UL Standard. A field evaluation determines that unlisted equipment can be installed in a manner to achieve compliance with an adopted code. Model codes, such as the NEC®, are installation documents and are not intended to be used as a primary assessment document for a proper field evaluation.

UL's practice is to contact an AHJ in advance of any field evaluation at the final installation site to address any concerns that the AHJ may have and to give an AHJ the opportunity to be present. NFPA 791 recommends notifying AHJs in writing.

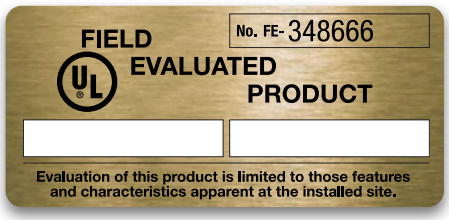
When evaluating equipment, a key requirement is that it be capable of being installed in accordance with the NEC®. This includes:

- Verifying complete equipment nameplate ratings and other required markings
- Reviewing and determining compliance with installation instructions
- Assessing availability of adequate wire bending space and field wiring terminations
- Determining the suitability of insulating and enclosure materials
- Assessing corrosion protection and suitability of equipment for the environment where it's being installed
- Verifying proper grounding and bonding
- Reviewing short circuit current ratings, overcurrent protection and disconnecting means

Given that an evaluation is completed outside of a testing laboratory and the need for the equipment to function properly at the conclusion of the testing, nondestructive electrical testing should approximate the testing required under all applicable standards as close as practical. Such testing could include:

- Insulation resistance
- Leakage current and dielectric voltage withstand
- Ground continuity
- Input voltage and current at various design loads
- Temperature rise for heat producing components
- Safety interlock and emergency stop functions
- Other testing as deemed necessary

All deficiencies are identified in a complete report that is provided to the client and the AHJ. Corrective actions may be taken to resolve such deficiencies, and when all issues are satisfactorily resolved, a label is applied – only by the field evaluation body – to the equipment.



UL has conducted field evaluations on approximately 100,000 pieces of equipment over the past five years. Statistics generated from those field evaluations show that more than 60 percent of evaluations resulted in the identification of one or more safety issues needing corrections. For more information on UL Field Evaluations, visit www.ul.com/field, or contact UL at fieldevaluations@us.ul.com or by phone at 1.877.UL.HELPS, prompt number 2.

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