FUNDAMENTAL NEC and NRTL REQUIREMENTS

INTRODUCTION

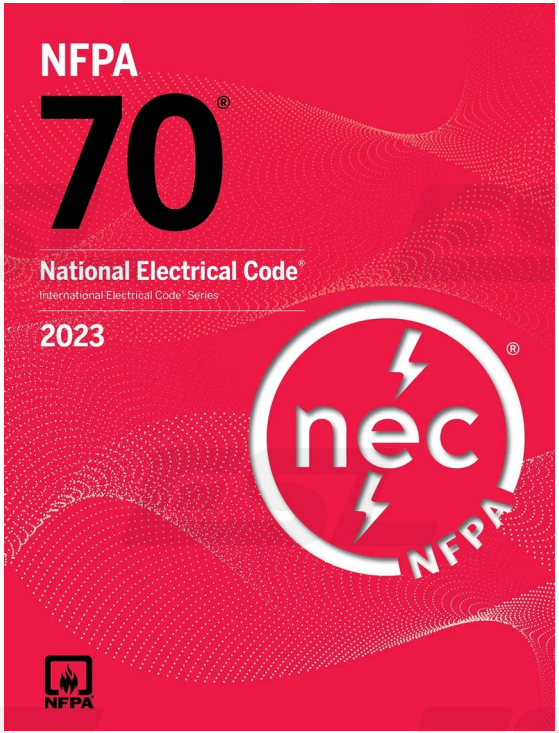
Topics Covered

- NEC Code Requirements
- 3rd Party NRTL Certification
- UL Components
- UL Standard Scope of Coverage
- UL Certification Requirements
- UL Standard and NEC Requirements

GOALS OF PRESENTATION

- Provide general understanding of the NEC (National Electric Code) and UL 3rd Party Certification Requirements.

- Increase understanding of what the UL 3rd Party Certification covers versus the NEC NFPA (National Fire Protect Association).



3rd PARTY CERTIFICATION

Products that require 3rd Party Evaluation and Testing are evaluated by one of the many accredited testing agencies.

- **UL LLC** *(Underwriters Labs)*
- **CSA** *(Canadian Standards Association)*
- **ETL** *(Electrical Testing Laboratories, Intertek)*
- **TÜV** *(Technischer Uberwachungsverein: German and Austrian product certification services)*
- **CE** *(European Conformity: Self Certification to an IEC based standard)*
- Many other smaller companies that certify various type of products

NEC CODE REQUIREMENT

- THE NEC is generally updated every 3 years and is a starting point for the AHJ's (Authority Having Jurisdiction) when conducting inspections.
- The current Edition of the NEC, NFPA 70 is 2023.
- Not all states have adopted the current edition of the NEC 2023, that was effective as of September 1, 2022, for the update process for all federal, state and local governments.
- Most states are still using the 2020 Edition of the NEC.
- The key to understand the NEC is understanding the definitions and terms used throughout the code.
- This presentation will focus on UL Certification and compliance with the NEC, as the majority of 3rd Party Agencies use UL Standards for product evaluation and testing.

3rd PARTY CERTIFICATION

- 3rd Party Certification provides evidence that a product meets the minimum construction and testing requirements.
- 3rd Party Certification provides evidence of compliance to NRTL (Nationally Recognized Testing Laboratories) Standards for compliance with the NEC requirements and are suitable for installation per the NEC for wire bending space, field wiring, enclosure type and marked ratings.

- Products are evaluated and tested for fire, shock, and casualty hazards.
- The 3rd party certification does not guarantee the product will work, only that it's safe.

UL COMPONENTS

Components used in various products are

- Listed 
- Recognized 

The above components are typically described in the product construction details of the UL Procedure Report by the UL Control Category Number (CCN), Listee (Manufacturer and UL File Number), Part Number, and Ratings details.

Be careful with manufacturer specifications that state “Designed To”, “Complies With” or similar wording. This does not mean the product is UL certified only that a UL standard was referenced for the product design.

FIELD EVALUATION

- If a product is not UL certified, it can be **Field Evaluated** (FE) at the installation site, after it has been installed and red tagged by the AHJ.

- During the **Field Evaluation** all requirements for construction are reviewed per the applicable product standard, as well as the required markings. At minimum, a successful none-destructive temperature test is deemed complete, but any testing deemed destructive is not completed. If the construction and testing are compliant with the applicable standard, the FE Product label is applied to the product and a letter report completed and provided to the AHJ. The FE Label is only applicable for the location that it was applied; if the product is moved to another location, then another FE will be required for the new location. If variances are found it's the responsibility of the customer installing the equipment to resolve the variance before the FE Label can be applied and the compliant letter report sent to the AHJ.

FACTORY INSPECTION

Another option to 3rd Party Certification, is a Factory Inspection (FI). This option requires prior approval of the AHJ.

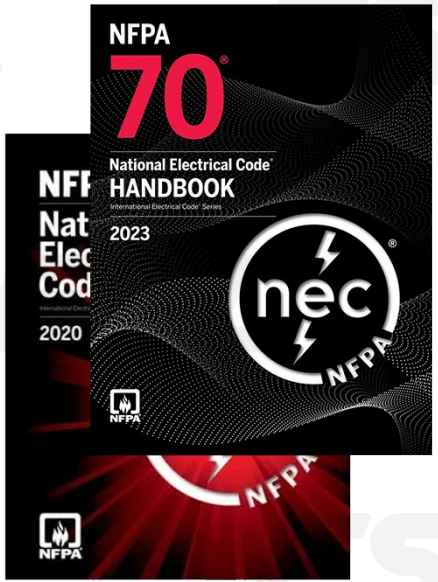
- The product is evaluated and tested at the manufacturer's facility, so if there are any variances, the manufacture can resolve them at their facility at less cost than a FE. Once the product meets the minimum construction, marking, and none destructive testing requirements of the applicable standard, a letter report is provided to the AHJ and the FI label is applied.

- The FI covers the address of the installation site and allows the product to be installed per the facility specification and inspected by the AHJ per code requirements.

UL STANDARD

CERTIFICATION REQUIREMENT PER NEC

- The scope of the UL Standard will state the maximum ratings for certification and that the certification is compliant with NFPA 70, NEC and suitable for installation.
- When each new edition of the NEC is effective, a panel of UL reviewing engineers reviews the changes of the new edition of the NEC to confirm the UL standard meets the minimum requirements of the NEC. If variations are found between the NEC and UL Standard, the changes are submitted to STP (Standards Technical Panel) for adoption and update to the UL Standard and may require an edition change to the UL standard.
- UL standards follow the current edition of the NEC. Only during field evaluations would an older edition of the NEC be referenced based upon the NEC edition being used per the state or local government.



UL CERTIFICATION REQUIREMENT

- **Listed** – Indicates the device complies with all applicable construction and testing requirements and the end user shall install and use the device per the operating and installation instructions. Also, that all connections are suitable for field connection using recognized terminal blocks with FW-2 of UG-C general industrial, UG-D industrial devices with limited ratings, or connectors that are Recognized or Listed and suitable for field connection. The majority of wiring devices are suitable for connection of Class B or C wire, other classes of wire would need to be specifically stated for use with the wiring device.
- **Recognized** – Indicates that there are conditions for using the device, the conditions of acceptability can be found in each device description report. Connections are not required to be suitable for field connections and can be stated in the condition of acceptability:
  - Mounting requirements
  - Testing required in the end-product, etc.
  - Connections are not suitable for field connections

COMPONENTS

UL LISTED

- Listing Mark, the most common mark and indicates the product meets all requirements based upon the published standards for safety.
- Listing Marks with “C” indicates compliance with Canadian Standard Certification requirements.
- New Optional UL Labels are available.
- Examples of the UL Listing Mark the AHJ and the UL Field Engineer will look for –

UL STANDARD & NEC REQUIREMENT

- Why is 3rd party certification important for the NEC.
- The AHJ has more confidence that the product with UL Listing meets the minimum requirements for installation per the NEC and very little inspection or no inspection of the equipment is generally required.
- At minimum, the UL certification requirements are more conservative, and generally the products have been subjected to Temperature, Make/Break Overload and Endurance, Short Circuit and a Dielectric Voltage Withstand Testing.
- The 3RD Party UL Certification affords the AHJ to decide to allow the product with minimum review, and usually only the field connections would need to be reviewed.

QUESTIONS

Thank You

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