REPORT ON DISCUSSIONS
DURING UL MEETINGS
WITH ELECTRICAL INSPECTORS
AT THE
2015 IAEI SECTION MEETINGS

December 7, 2015

TO: Attendees of Underwriters Laboratories Inc. Meetings with Electrical Inspectors at the 2015 IAEI Section Meetings

SUBJECT: Report of Meetings

Underwriters Laboratories held meetings with Electrical Inspectors during the 2015 IAEI Section Meetings. Historically, these meetings have provided for an open exchange between the electrical inspection community and UL regarding any subject of interest to authorities.

UL acknowledges the importance of this feedback. The electrical inspector is an integral part of the UL information loop. It is the inspector, who during the examination of the final installation, can judge under field conditions, the adequacy of the constructions and markings for proper installation. It is the inspector who can pass this installation information to UL for use in modifying product safety requirements.

The questions and answers in this Report present the items discussed during the meetings. This is not a verbatim transcript; only the pertinent points have been recorded. Each question has been identified with the designation of the Section meeting at which the subject was discussed.

UL appreciates all those who took the time to participate in these meetings and provided us with information important for our endeavors and goals toward public safety. I would appreciate hearing from you on any comments or suggestions you have on this Report or the UL/Inspectors meetings.

UNDERWRITERS LABORATORIES INC.

Reviewed By:

Jeff Fitzloff
Lead Regulatory Engineer
Regulatory Services

Tom Lichtenstein
Sr. Regulatory Engineer
Regulatory Services

FROM

UL MEETINGS WITH ELECTRICAL INSPECTORS

AT THE 2015

ANNUAL IAEI SECTION MEETINGS

This report contains questions and answers from the 2015 meetings. Where necessary, the answers have been expanded to include information that may not have been available during the meetings. Where specific actions have taken place in response to the Inspector's input, the status of the actions is indicated. This report may provide insights into UL's intent and efforts that are associated with the certification of electrical equipment so that it meets the purposes of the National Electrical Code® and is installable in accordance with it. The questions have been arranged by subject matter and are identified in the margin with an identifier for the IAEI Section where the question was raised.

UL Toll-Free Number for Code Authorities

800-595-9844

E-MAIL ADDRESSES

Below are the e-mail addresses for Regulatory Services staff.

Northbrook, IL

Rich Berman ..... Richard.J.Berman@ul.com
Tom Lichtenstein..... Thomas.R.Lichtenstein@ul.com

Kuna, ID

Jeff Fitzloff.....Jeffrey.G.Fitzloff@ul.com

Melville, NY

John Cangemi recently retired. Please contact any of the representatives detailed here for the Eastern Section

Silicon Valley, CA

Marguerite (Maggie) Carroll..... Marguerite.E.Carroll@ul.com
John Taecker ..... John.K.Taecker@ul.com

Goodyear, AZ

Jeff Fecteau .....Jeffrey.Fecteau@ul.com

View Us on the Internet At

www.ul.com

Specific Information for AHJs and Regulators on the UL Web Site

www.ul.com/codeauthorities

Access UL Product Spec "The Next Generation of the UL White Book" at www.ul.com/productspec

UL Product Spec "How to Use" videos at www.ul.com/psvideo

TABLE OF CONTENTS

IAEI Section Identifier Legend
(E) Eastern Section
(NW/W) Northwestern Section/ Western Section
(S) Southern Section
(SW) Southwestern Section

1.0 UL LISTING, CERTIFICATION, AND FIELD EVALUATION INFORMATION

1.1 (NW/W) **Q.** What UL standard is used to certify rebuilt Listed products?

A. The same standard used for certification (Listing) for new products is used for certifying (Listing) rebuilt products. If the product was new or rebuilt, they would have to comply with the same certification requirements.

Not all UL product categories have rebuilt programs associated with them. The UL product category would have to be set up for certifying (Listing) rebuilt equipment. UL certified (Listed) rebuilt products are verified to comply with the standard requirements effective at the time of rebuilding, which is important as it relates to promoting the safety of the equipment. Once the product category is set up for certifying rebuilt equipment, the UL Guide Information for the product category would indicate that the category also covers rebuilt equipment and would detail how to identify certified (Listed) rebuilt equipment for that category. Typically it would be the UL in a circle and the word rebuilt in close proximity to the word Listed or Certified and the product identity of the product, e.g. ‘‘Rebuilt Electric Motor for Hazardous Locations’’. That is the only method to identify a UL certified (Listed) rebuilt product.
For more information on certified (Listed) rebuilt equipment, see this article from The Code Authority Newsletter
http://ul.com/wp-content/uploads/2014/04/ul_RebuiltEquipment.PDF

1.2 (S) **Q.** We have seen the use of used electrical equipment increasing what concerns should we have?

A. There is nothing inherently wrong with having used equipment that has been maintained and does not show signs of contamination (e.g. flood high water marks) or other deterioration from the elements. However, caution is needed with equipment that has been modified or "refurbished" outside of a recognized 3rd party certification program. If a Listed/Certified product is rebuilt, reconditioned, refurbished or remanufactured, it is all the same thing, you have modified a Listed (certified) product and UL does not know if the product still complies with UL's Listing (certification) requirements unless the UL Listing or Certification Mark identifies the product as a Listed or Certified rebuilt, refurbished or remanufactured product as part of the UL Mark.

An authorized use of the UL Certification (Listing) Mark is the manufacturer's declaration that a product was manufactured in accordance with the applicable certification requirements, and was in compliance with those requirements when it was shipped originally from the factory. When a UL Certified (Listed) product is modified or rebuilt (including reconditioned, refurbished or remanufactured) after it leaves the original factory where the Certification (Listing) Mark was applied, UL does not know if the product continues to meet the applicable certification requirements unless the modification or rebuilding has been specifically evaluated by UL.
It is the responsibility of the Authority Having Jurisdiction to assess the acceptability of any modifications or rebuild of a product. Evidence that UL has specifically evaluated the modification or rebuilding can only be demonstrated by a product that bears the UL Certification (Listing) Mark along with the word "Rebuilt," "Refurbished" or "Remanufactured" as part of the UL Mark. Then you know the rebuilt product has been evaluated by UL to the applicable certification requirements.

If the product does not bare that mark, then the product would need to be Field Evaluated to determine that it still complies with UL's requirements. For more information on UL Field Evaluations contact UL's Customer Service at 877-854-3577, prompt #2 or go to www.ul.com/field.

Where there is no recognized program, refurbishment of equipment raises concerns about intermixing of components or parts in trying to make repairs, or use of solvents or other materials that deteriorate the original factory lubrication and similar issues should be addressed. The "refurbished" item may look almost like new on the outside but may be slowing deteriorating inside so when the item is called upon to operate under abnormal conditions it may not function as it should have.

Most jurisdictions use the adopted Building Code for their administrative

code requirements. The 2015 IBC (International Building Code) section 104.9.1 requires that used equipment and devices shall not be reused unless approved by the building official. Additionally, section 104.11.2 states that whenever there is insufficient evidence of compliance with the provisions of the code, or evidence that a material or method does not conform to the requirements of the code, or in order to substantiate claims for alternative materials or methods, the building official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction. This section also requires that the tests shall be performed by an approved agency and that reports of such tests shall be retained by the building official

1.3 (NW/W) **Q.** I see a lot of unlisted equipment from large manufacturers during my inspections. Can UL do anything to make them get Listing so that we don't have to write variances?

A. We appreciate the value you place on UL certifications (Listings). UL strives to make the acceptance process as easy as possible through issuing certifications (Listings), but ultimately the manufacturer decides if they will pursue certification (Listing) on a given product based on market factors. These market factors include model installation codes enforced by authorities having jurisdiction (AHJs) that require certification (Listing) in the installation code or local jurisdiction, or the AHJ relying on a certification (Listing) to support his or her approval decision. While not every article in the NEC requires listed products, NEC 110.3(A) requires that products comply with a list of 8 criteria. An AHJ doesn't have the time, tools or expertise to evaluate every piece of equipment that they come across, so it is common to rely on UL certification (Listing) as the basis for approval.

Promoting certification (Listing) by a certification (Listing) organization acceptable to the local AHJ, certainly supports a safe infrastructure and reinforces the market demand for certification (Listing). If the AHJ requires a certification (Listing), UL certification (Listing) of the product establishes confidence that the product has been found to comply with the appropriate safety standard. The AHJ can then focus on its installation and connection to the premises wiring in accordance with the NEC. UL offers Field Evaluations to help AHJs address challenges in addressing critical safety aspects of unlisted equipment.
More information on UL Field Evaluations can be obtained at

http://www.ul.com/field or at 877-854-3577, #2.,

1.4 (SW) **Q.** It seems like 2/3 of the products in some stores are not certified. What does UL do to monitor the retailers?

A. Except in a limited number of jurisdictions around the U.S., retailers are permitted to sell products that are not certified. The City of Los Angeles, for example, prohibits the sale, advertisement, or display for sale of any "equipment," as defined in the California Electrical Code (based on the NEC), unless approved by the City of Los Angeles. An exception is specified for equipment that is certified (Listed) by an approved laboratory and installed in conformance with its certification (Listing). UL is an approved laboratory with the City of Los Angeles.

It has been our experience that most retailers understand the safety implications and benefits of selling UL certified (Listed) products, particularly for products they perceive as high risk. For those products where the perceived risk is small or nonexistent, some retailers don't require certification. UL actively promotes UL certification with retailers, and has dedicated staff that work with both large and small retail chains to educate them about UL product certification (Listing), code requirements for certification (Listing), and the hazards that may exist with products that have not been evaluated and certified (Listed) to safety standards.

Counterfeiting of the UL Mark is an important concern, and we take that issue very seriously. Incidents regarding potentially hazardous goods bearing unauthorized UL labels have increased, and we have dedicated significant resources to combat these illegal and unsafe activities. Manufacturers, as well as distributors, consumers, and regulatory authorities rely on the UL Mark, which is why UL established a Global Security & Brand Protection program to prevent counterfeit UL labeled products from entering the market. This effort involves training of port authorities around the country as well as AHJs to recognize possible counterfeit electrical equipment before it enters the stream of commerce. Contact UL Regulatory Services staff on page 2 and 3 of this report for information on UL's anti-counterfeiting efforts and presentations available for your jurisdiction or association meetings.

1.5 (S) **Q.** If an inspector is on site when a field evaluation is completed would it be appropriate to approve the job without having the final report in hand?

A. This is entirely up to the AHJ. Provided the equipment has been labeled

per the requirements of Chapter 8 of NFPA 791(Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation) and the Field Evaluation Body (FEB) assures the AHJ that the Field Evaluation Report will be forth coming. The AHJ may approve the installation pending receipt of a final report that contains the all necessary information required by NFPA 791, Chapter 7.

Chapter 7 of NFPA 791 identifies that each evaluation should result in a complete report detailing the results of the evaluation and a statement of conformity.

Chapter 8 of NFPA 791 states that after all identified issues have been fully resolved, all electrical testing has been satisfactorily completed, and the evaluation has determined that the equipment meets the applicable requirements of the standard(s), a label should be affixed to the equipment.

1.6 (SW) **Q.** Is UL planning to develop a standard for pool lifts?

A. At present, UL conducts Field Evaluations on pool lifts but does not have a certification (Listing) program in place. Safety factors addressed in a UL Field Evaluation on pool lifts include:

Anchorage to the pool deck
Weight limits and stability testing
Structural integrity
Grounding and bonding
Corrosion protection
Operator exposure to energy
Battery safety and recharging means
Water splash onto electrical components
Operating mechanism

Specific requirements developed for UL Field Evaluations would likely be used as the basis for a new standard. However, UL presently does not have a schedule established for development of a standard for pool lifts.

1.7 **Q.** Are there “UL Authorized Service People” who can modify listed

(S) equipment in the field with no need of a field evaluation?

A. No. See the Guide Information for Electrical Equipment for use in Ordinary Locations (AALZ), under the heading Field Modifications, located on page 55 (also located on page 46) of the 2015-16 UL White Book PDFPDF located at www.ul.com/whitebook , and also on UL Product Spec at www.ul.com/productspec and enter AALZ at the category code search field.

It states that the UL Mark applies to the product as it is originally manufactured when shipped from the factory. Authorized use of the UL Mark is the manufacturer's declaration that the product was originally manufactured in accordance with the applicable requirements. UL does not know what the effect of a modification may have on the safety of the product or the continued validity of the UL certification mark unless the field modifications have been specifically investigated by UL. Unless UL investigates a modified product, UL cannot indicate that the product continues to meet UL's safety requirements. The only exception for a field modification authorized by UL is when the product has specific replacement markings. For example, a switchboard may have specific grounding kits added in the field. The switchboard is marked with a list of specific kit numbers that have been investigated for use in that particular switchboard. Only grounding kits that are included on the product have been investigated for use in that product.

If a party wishes UL to determine if the modifications made to a UL certified (Listed) product comply with UL requirements, a UL Field Evaluation can be initiated to investigate the modifications. This evaluation will only be conducted after UL consults with the AHJ to ensure that UL's evaluation addresses all areas of concern and meets all of the AHJ's needs.

To inquire about a UL Field Evaluation, contact UL Field Services at 1-877-UL-Helps (1-877-854-3577), prompt #2 or visit www.ul.com/field.

1.8 (S) **Q.** We had a project where the engineer proposed to modify three transfer switches by gutting the cabinets and using them as junction boxes. Would this need to be field evaluated?

A. The Guide Information for the main product category for Transfer Switches (WPTZ) can be located on page 548 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec and enter WPTZ at the category

code search field. The Guide Information for WPTZ details that the basic standard used to investigate Transfer Switches is ANSI/UL 1008, The Standard for Safety for Transfer Switch Equipment. ANSI/UL 1008 requires enclosures for transfer switches to comply with the requirements of ANSI/UL 50, the Standard for Safety for Enclosures for Electrical Equipment, however enclosures are normally not listed and labeled as junction boxes. The acceptability of the enclosures after the transfer switches have been removed from the enclosure would need to be determined by the AHJ.

Removing transfer switches from service is a major change to the electrical system, and would require appropriate oversight by the AHJ. The AHJ would be the one that determines if a field evaluation is required or if the installation complied with NEC 110.3(A) as well as the requirements of NEC Article 314 (Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Handhole Enclosures).

To inquire about a UL Field Evaluation, contact UL Field Services at 1-877-UL-Helps (1-877-854-3577), prompt #2(1-877-854-3577) or visit http://www.ul.com/field/.

1.9 (S) **Q.** When making line side taps to facilitate the connection of a photovoltaic system should a field evaluation be performed?

A. Per NEC Section 230.66, all service equipment shall be listed. The UL Certification (Listing) mark on the product is the manufacturers' declaration that the product was originally manufactured in accordance with the applicable requirements. The UL Mark applies to the product as it is originally manufactured when shipped from the factory.

Listed power distribution equipment may have markings identifying the location of where a tap can be located and the wiring terminals that must be used and installation instructions with specific directions on tapping the busbars. If this is the case, this equipment can be field modified, following those manufacturer's instructions and markings, in accordance with the NEC 110.3(B). Otherwise making field taps would be considered a field modification.

Unless UL investigates a modified product, UL cannot indicate that the product continues to meet UL's safety requirements. If a party wishes UL to determine if the modifications made to a UL certified (Listed) product comply with UL requirements, a UL Field Evaluation can be initiated to investigate the modifications. This investigation will only be

conducted after UL consults with the AHJ to ensure that UL's investigation addresses all areas of concern and meets all of the AHJ's needs.
To inquire about a UL Field Evaluation, contact UL Field Services at +1-877-UL-HELPS, prompt #2 (+1-877-854-3577) or visit http://www.ul.com/field/ .

1.10 (SW) **Q.** What is the turnaround time for a UL Field Evaluation quote and project?

A. Under typical (not emergency) conditions a project can be quoted in 24-48 hours. Once we have the order from the client and the business aspects are complete, a site visit generally occurs within a week. If there is an emergency (store grand opening, equipment failure with emergency repairs, etc.) we will react with an immediate quote and can be on site the same or the next day.

1.11 (SW) **Q.** For field evaluations by field evaluation bodies other than UL, how does an AHJ know that the right standard was used to evaluate the product?

A. For a UL Field Evaluation, a detailed report is required and will state the specific standard(s) used as a basis for the evaluation. In accordance with NFPA 790, the Standard for Competency of Third-Party Field Evaluation Bodies, the Field Evaluation Body (FEB) shall evaluate the products in accordance with the standard covered by the scope of the product. Per NFPA 791, the Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation, the FEB is required to select appropriate standards based on the design and application of the equipment under evaluation.

Where no single standard applies to the equipment, then applicable portions of related standards for subassemblies and supplementary standards should be applied. The primary standard is required to be a nationally recognized product safety standard, such as a UL standard.

The detailed report should cite the primary and any contributing support standards used to complete the evaluation, so that any subsequent audit by the AHJ can clearly identify the exact edition and revision of the standard(s) used.

By visiting UL Product Spec at www.ul.com/productspec, you can enter the UL product category code or product name to identify the applicable

product standard, along with a link to the standard scope.

If in doubt or the information is not clear, the AHJ can always contact the UL Regulatory Services team (contact information located on page 2 and 3 of this report) to assist in determining the correct standard(s) that would apply to the product.

1.12 (SW) **Q.** On a UL follow-up service visit to a factory, does UL open packages or otherwise review finished product samples?

A. Throughout the lifetime of a UL certification (Listing), UL protects the integrity of the UL certifications (Listings) by regularly auditing a manufacturer's facilities and products to determine continued compliance with UL requirements. The frequency of inspection is based on the type of product or number of UL Marks applied, and includes the opening of packages and review of finished product samples. UL also conducts blind sampling of certified (Listed) products chosen from the open market to assess continued compliance with UL requirements.

1.13 (SW) **Q.** When using manufacturer "cut sheets" during plan review, it is difficult for an AHJ to locate manufacturer information on the UL web page. Can UL assist?

A. UL can assist in a number of different ways.

1. UL has dedicated Regulatory Services staff located in all regions across the country, and they can be reached directly or via an 800 number located in the contact information on page 2 and 3 of this report.

2. Search UL's Online Certification Directory at www.ul.com/database. Enter the manufacturer's name in the search field and you should be able to view all product category certifications for that manufacturer. Select the file number link next to the product category name, and for many product categories, you can view the specific model designations that are certified.

3. UL has a great new online search tool called UL Product Spec, which can be accessed at www.ul.com/productspec. Search using a variety of options, including common industry keyword terms, the specific UL product category code, or browse through intuitive groups of

UL products, systems, and assemblies. You can even search using a code section. Each of those options will lead you to the appropriate product category, and all manufacturers that have current UL certifications (Listings) in that category.

For more information on using UL Product Spec, see our "How To Use UL Product Spec" videos located at www.ul.com/psvideo.

1.14 (SW) **Q.** Some products or spec sheets are marked "meets UL standard" or "complies with UL standard." Is this sufficient evidence of certification?

A. No, this is not evidence of certification. A product is not considered to be Certified (Listed) by UL unless it bears the UL Mark, which consists of the UL symbol and other elements that are described in the UL Guide Information for each product category. UL Guide Information can be located in 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL's Online Product Spec at www.ul.com/productspec. Such claims of compliance to a UL standard could be a manufacturer's self-declaration or another test lab's effort to credential themselves as qualified to evaluate such products. Products certified (Listed) by UL are typically not marked in this way.

Before a manufacturer is permitted to display the UL symbol (UL in a circle) on their spec sheets, website, product packaging, or any other published means, the product must be evaluated by UL and determined to be in compliance with all of the applicable UL safety requirements.

On a spec sheet or other published means, if you see only a statement that the product meets or complies with UL standards, this may be a manufacturer's declaration and is not sufficient evidence of a UL certification. Always look for the UL Mark on the product as evidence of UL certification (Listing).

1.15 (SW) **Q.** At plan check, we don't have installation instructions. Instead, we may have only cut sheets and websites to identify products. Does UL evaluate these?

A. No, UL does not review the information on a manufacturer's cut sheet or website. AHJs should verify UL certification information using UL's Online Certification Directory at www.ul.com/database, UL Product Spec at www.ul.com/productspec, or by contacting one of the dedicated Regulatory Services staff indicated on page 2 and 3 of this report.

If a manufacturer identifies a product as UL certified (Listed) on their cut sheets or website, and you cannot locate the certification (Listing) information on UL's website, please contact Regulatory Services staff to initiate a Product Incident Report (PIR) or file a PIR online at www.ul.com/ahjreport. By identifying improper references to UL that are published, you are helping UL Market Surveillance staff to investigate and take corrective action.

1.16 (SW) **Q.** For many products, often times the installation instructions provided with the equipment or by the installer appear to be outdated. How do we know if we are looking at the most recent version?

A. As part of a UL certification (Listing) investigation, UL reviews the installation instructions provided by the manufacturer, to determine if required information is included, as well as to make sure that the product is capable of being installed in accordance with the standard and applicable model code(s).
However, a manufacturer may make substantive changes to those instructions after the conclusion of the UL certification investigation, and may be required to resubmit those changes so that their UL file can be updated, and in some cases, additional testing performed. There have been instances where AHJs have identified such changes that were not reviewed by UL.

If it is suspected that the instructions available at the installation site do not reflect a Code compliant installation, please contact one of the dedicated Regulatory Services staff indicated on page 2 and 3 of this report for assistance.

Based on this type of input from AHJs, UL is exploring the possibility of making the manufacturer's installation instructions available on our online certification database at some point in the future.

1.17 (NW/W) **Q.** Is there an organization that collects Field Evaluation deficiencies from all test labs doing field evaluations?

A. No, not that UL is aware of. As a courtesy to AHJ's, UL provides Field Evaluation Deficiencies to AHJ's at the UL Inspector meeting at each of the U.S. IAEI Section meetings each year. This information is intended to show the frequency of deficiencies in un-certified

equipment that is Field Evaluated by UL so that AHJs can document to their inspection departments the importance of requiring certified (Listed) equipment.

1.18 (S) **Q.** In the Field Evaluation deficiency list that UL provides, how deficient are the products that are noted?

A. The field evaluation deficiency statistics do not delineate how many deficiencies or the magnitude of each deficiency. If a product is not in compliance with the any of the requirements for certification (Listing) or for field evaluation, then the product is not eligible to be certified (Listed) or have a Field Evaluation label applied

1.19 (S) **Q.** We have seen the installation of cryogenic skin rejuvenation machines does UL list these?

A. No. UL does not presently certify (List) these types of products, however, we have conducted field evaluations on some of these machines.

1.20 (NW/W) **Q.** What is an outline of investigation and how can you certify to requirements that are not a standard?

A. An Outline of Investigation (OOI) is a certification document that is often a pre-cursor to a consensus standard. It is a set of published requirements compiled by UL subject matter experts used to perform certification investigations of products when a consensus standard does not exist, before the requirements become a full standard. This enables UL to establish and document certification requirements for new and innovative products that come to market quickly while fully addressing the safety concerns for the product. An outline of investigation may be considered a standard that is not a consensus standard as it was developed outside of the ANSI consensus process. If there is enough interest in an Outline of Investigation, and many interested parties in obtaining certifications, then a decision can be made to begin the process to make an OOI into a consensus standard and it can be processed through the UL Standards

Technical Panel (STP) process and become a full standard. UL can certify (List) products to outlines of investigations OOIs as well as standards as this is a decision made by UL as the certification organization which is separate from the UL Standards consensus process. The use of an OOI for certification is a certification decision made by UL.

1.21 (E) **Q.** What is OSHA's role with Field Evaluations, do they regulate The requirements, and do they have any accreditations?

A. At this time OSHA only recognizes testing laboratories under the Nationally Recognized Testing Laboratory (NRTL) program to perform certification (Listings) for certain products used in the workplace. The certification is to ensure that they meet the requirements of both the construction and general industry OSHA electrical standards. Each NRTL has a scope of test standards that they are recognized for, and each NRTL uses its own unique registered certification mark(s) to designate product conformance to the applicable product safety test standards. After certifying a product, the NRTL authorizes the manufacturer to apply a registered certification mark to the product. Also with the authorization the NRTL must have a follow-up surveillance program meeting the OSHA directive requirements. If the certification is done under the NRTL program, this mark 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.

Presently, OSHA does not recognize Field Evaluation Bodies (FEB), but does recognize the FE label in the field. Approvals of FEBs must be done by the local AHJ.

NFPA 790, the Standard for Competency of Third-Party Field Evaluation Bodies and NFPA 791Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation should be used when an AHJ approves a FEB. These documents are ANSI approved and are under the purview of the National Fire Protection Association (NFPA) and not OSHA.

1.22 (E)

Q. We have heard discussion about NFPA 790 the Standard for Competency of Third-Party Field Evaluation Bodies and NFPA 791Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation. How do they apply to the field evaluation process?

A. NFPA 790, the Standard for Competency of Third-Party Field Evaluation Bodies is a document that an AHJ or other body seeking to use a qualified FEB, uses to evaluate whether a Field Evaluation Bodies (FEB) is competent to do field evaluations.

NFPA 791, Recommended Practice and Procedures for Unlabeled Electrical Equipment is used by the FEB to develop the detailed procedures they will use in conducting field evaluations. Also NFPA 791 is used by the AHJ to assess how the FEB is performing field evaluations and completing the required report. This document informs AHJs about recommended evaluation procedures for unlabeled or modified equipment. It is to aid in determining acceptability of evaluation results reported by FEBs and to recommend procedures for FEBs to perform evaluations in a consistent and reliable manner.

2.0 Service Equipment, Switchboards, Panelboards and Power Distribution Equipment

2.1 (S) **Q.** We have a 600 amp service installed with the wrong breaker; in order to install the required breaker the contractor drilled the buss. What should be done at this point to be assured that this will be a safe installation?

A. UL certifies (Lists) Dead-front Switchboards under the product category for Switchboards, Dead-Front (WEVZ), located on page 536 of the 2015-16 UL White Book, PDF located at www.ul.com/whitebook and also on UL Product Spec at www.ul.com/productspec and enter WEVZ at the category code search field. The UL Guide Information for WEVZ, under the heading Field Terminations details the guidelines for tapping a busbar.

Per NEC Section 230.66, all service equipment shall be listed. The certification (Listing) mark on the product is the manufacturers' declaration that the product was originally manufactured in accordance with the applicable requirements. The UL Mark applies to the product as it is originally manufactured when shipped from the factory. UL does not know what the effect of a modification may have on the safety of the product or the continued validity of the UL certification (Listing) mark unless the field modifications have been specifically investigated by UL.

Deadfront switchboards are not Listed to have their busbars tapped in the field unless there are factory provided holes in the busbars marked with the word "Tap" adjacent to the holes. And the switchboard is marked to indicate what type of wire connectors can be used to tap the bus. Other holes in the busbar that are not marked with the word "Tap" are intended for the connection of overcurrent devices, other device's as identified by the product markings and in the installation instructions, or other uses identified by the manufacturer. When the electrical equipment certification (Listing) does not include product markings or instructions for tapping busbars, this situation should be treated like any other field modification of certified (Listed) equipment.

Some UL certified (Listed) power equipment may have installation instructions with specific directions on tapping the busbars. If this is the case, this equipment can be field modified, following those manufacturer's instructions, in accordance with NEC 110.3(B).

Drilling or enlarging holes in busbars can increase the current density and reduce current carrying capacity of the busbars.

Removing busbar material can result in higher operating temperatures, and additional holes can potentially weaken the busbar, which adversely affects the short circuit rating of the equipment required by NEC 110.10. Both sufficient wiring space and wire bending space need to be provided for the conductors and the wire connector at the tap connection. In measuring the wiring space, AHJs need to consider the possibility of the connectors rotating, which may result in reduction of the spacing between uninsulated live parts of opposite polarity and uninsulated live parts and ground. The above are just a few of the concerns and items that must be inspected, checked and reviewed where such modifications are made to this type equipment.

If a party wishes UL to determine if the modifications made to a UL certified (Listed) product comply with UL requirements, they can initiate a UL Field Evaluation to investigate the modifications. This evaluation will only be conducted after UL consults with the AHJ to ensure that UL's evaluation addresses all areas of concern and meets all of the AHJ's needs.
To inquire about a UL Field Evaluation, contact UL Field Services at +1-877-UL-HELPS, prompt #2 (+1-877-854-3577) or visit http://www.ul.com/field/ .

2.2 (SW)

Q. On a meter socket adapter used for PV installations, one particular manufacturer has a neutral conductor that exits the back of the adapter and is intended to go to the panelboard. If the installer does not use this neutral conductor, does that void the listing? How can UL permit a meter socket adapter to include a circuit breaker when the standard says that these cannot include overcurrent protection?

A. The particular product referenced is a meter socket adapter intended for connection to a utility interactive alternate energy source. UL 414, the Standard for Safety for Meter Sockets, was used for the basic requirements, but since this product is a specialized adapter, and not just a meter socket, additional requirements were applied to evaluate the unique features of the product, such as the overcurrent protective device. In this case, the adapter includes a circuit breaker to allow for disconnection and protection of the wiring associated with the interactive alternate energy source. This circuit breaker is externally operable, which eliminates the concern about overcurrent devices being inaccessible because they are located behind a sealed meter.

Regarding the neutral or grounding conductor that is provided as part of

this assembly, the meter socket adapter is intended for use with a specific type of meter socket and the installer should follow all instructions provided with the meter socket adapter, including the routing and termination of these conductors.

UL Certifies (Lists) meter socket adapters under the product category for Meter-socket Accessories (PKAX), located on page 374 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec and enter PKAX at the category code search field.

2.3 (NW/W) **Q.** How do you conduct ground fault protection testing on switchgear in accordance with NEC 230.95(C)? How can we determine if the technician testing the GFP system is qualified?

A. NEC 230.95(C) requires that the ground-fault protection system shall be performance tested when first installed on site. The test shall be conducted in accordance with instructions that shall be provided with the equipment. A written record of this test shall be made and shall be available to the authority having jurisdiction. The instructions will details the mode of testing allowed which can be primary injection of current into the sensors or may be a secondary injection via a test set or monitor panel. Having a monitor panel “push to test” feature does not mean that this is the correct way to complete the test. Also, the instructions will include methods to examine and/or test the neutral with the neutral disconnect link open to prove there are no improper downstream grounding connections on the neutral.

This type of ground fault protection is certified (Listed) under the product category Ground-fault Sensing and Relaying Equipment (KDAX) which can be found on page 272 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook and can also be accessed on UL Product Spec at www.ul.com/productspec and enter KDAX at the category code search field.

This equipment is evaluated for compliance with ANSI/UL 1053, the Standard for Safety for Ground-Fault Sensing and Relaying Equipment. UL 1053 in Section 34 requires that this equipment be provided with installation test procedures that address the performance testing of the

equipment and that the instructions include the following details.

“To provide for system performance testing as required by the National Electrical Code, ANSI/NFPA 70, each ground-fault relay and any apparatus incorporating a ground-fault relay or its functions shall be provided with information sheets describing system testing instructions. These instructions shall include the following items and shall basically prescribe only that information necessary to perform the tests. The instructions shall be separate and apart from any more elaborate test detail that the manufacturer may wish to provide. The instructions shall specify that:

a) The interconnected system shall be evaluated in accordance with the manufacturer's detailed instructions, and that this evaluation is to be undertaken by qualified personnel.

b) The proper location of the sensors around the bus of circuit to be protected shall be determined. This check includes verifying that bus or cable polarity is correct when it passes through sensors and that the grounding conductor is not encompassed by the zero sequence sensor. This can be done visually, with knowledge of which bus is involved’

c) The grounding points of the system shall be verified to determine that ground paths do not exist that would bypass the sensors. The use of high-voltage testers and resistance bridges may be suggested

d) A simulated or actual controlled fault current is to be generated (by a coil around the sensors or by means of a separate test winding in the sensor). The reaction of the circuit interrupting device is to be observed for correct response to determine whether the system is functioning as intended. This test verifies that the control power transformer has adequate capacity. If the system is zone interlocked, that function should be checked to determine whether the systems function as intended

e) The results of the test are to be recorded on a test form that shall be provided with the instructions. The form shall include a space

for the date the test was performed and the results, and shall state that the form should be retained by those in charge of the building's electrical installation in order to be available to the authority having jurisdiction

These instructions are required to be provided with the certified (Listed) equipment and should be available to the AHJ for review. If they cannot be located this information may also be available on the manufacturer's website.

Judging if the technician doing the GFP testing is qualified is a judgment call by the AHJ. It is logical that that where a new technician is demonstrating the test, the AHJ witness and verify their qualifications. As part of the assessment, the AHJ should have confidence that the person conducting the test has an understanding of basic ground fault protection concepts and can explain the equipment ground fault sensing scheme being used for the equipment. The explanation should specifically detail how the testing demonstrates that the equipment ground fault system is performing correctly per the manufacturers test instructions. Elements of a ground fault circuit test should include proper performance (trip test) in accordance with the manufacturer test instructions, grounding and bonding installation in accordance with the NEC, and the neutral, if installed, is not re-grounded downstream of the neutral disconnect link.

2.4 (E) **Q.** While inspecting remodeled homes, I have seen branch circuit panelboards made by manufacturers who are no longer in business.. The nomenclature for the circuit breakers that are listed for these panels do not include GFCI or AFCI breakers. Does UL certify replacement circuit breakers for use in these obsolete panelboards?

A. Yes, UL certifies (Classifies) these type of replacement circuit breakers under the product category Circuit Breakers, Molded Case, Classified for Use in Specified Equipment (DIXF), located on page 123 of the 2015-16 UL White Book located at www.ul.com/whitebook, and also on UL Product Spec at: www.ul.com/productspec and enter DIXF at the category code search field. This category also allows for AFCI and GFCI circuit breakers.

.

These certified (Classified) circuit breakers will be marked on the side with the statement "Certified (Classified) for use only in specified panelboards where the available short-circuit current is 10 kA, 120/240 volts ac or less. Do not use in equipment connected to circuits having an available system short-circuit current in excess of 10 kA, 120/240 volts ac. For catalog numbers (or equivalent) of specified panelboards, refer to Publication No._____ provided with this circuit breaker. If additional information is necessary, contact [certified (Classified) circuit breaker manufacturer's name]."

The referenced publication is a compatibility list which tabulates the company name, catalog number, number of poles and electrical ratings of the certified (Classified) circuit breaker, in addition to the company name and catalog number of the applicable UL certified (Listed) panelboards, and corresponding UL certified (Listed) circuit breakers in place of which the certified (Classified) circuit breaker has been investigated. The compatibility list also details the maximum permissible voltage and maximum available short circuit current of the supply system to the panelboard. The certified (Classified) circuit breaker is not suitable for the specified application if the system supply characteristics exceed the maximum values indicated in the compatibility list. One copy of the compatibility list is provided with each circuit breaker. The compatibility list is intended to be placed inside the panelboard for future reference.

In order to find the appropriate circuit breaker for a load center that is no longer manufactured you will need to check with the manufacturers of circuit breakers under the DIXF category.

2.5 (NW/W) **Q.** Does UL List rebuilt molded case circuit breakers?

A. No, UL does not List (certify) rebuilt molded case circuit breakers.

In order for UL to be able to certify (List) rebuilt products, the product has to comply with the same certification (Listing) requirements as brand new products. Presently, there is no way to determine the amount of misuse or abuse that a molded case circuit breakers has under gone during its previous use and the effect each has on the operation and

calibration of the circuit breaker. Molded case circuit breakers are certified (Listed) under the product category Circuit Breakers, Molded-case and Circuit Breaker Enclosures (DIVQ) and are evaluated for compliance with the Standard for Safety for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, ANSI/ UL 489. The UL Guide information and certification (Listings) can be viewed on UL Product Spec at www.ul.com/productspec and enter DIVQ at the category code search or on page 121 of the 2015-16 UL White Book PDF at www.ul.com/whitebook .

3.0 Industrial Controls

3.1 (S) **Q.** Is it permitted for Listed UL 508A industrial control panel manufacturers to modify their own panels in the field without the need for a field evaluation to evaluate the modifications? They are claiming they can do this.

A. No, manufacturers are not permitted to modify their panel in the field without impacting the continued compliance with UL requirements. .

The UL Mark applies to the product as it is originally manufactured when shipped from the factory. Authorized use of the UL Mark is the manufacturer's declaration that the product was originally manufactured in accordance with the applicable requirements. UL does not know what the effect of a modification may have on the safety of the product or the continued validity of the UL certification mark unless the field modifications have been specifically investigated by UL. Unless UL investigates a modified product, UL cannot indicate that the product continues to meet UL's safety requirements. The only exception for a field modification authorized by UL is when the product has specific replacement markings. For example, a switchboard may have specific grounding kits added in the field. The switchboard is marked with a list of specific kit numbers that have been investigated for use in that particular switchboard. Only grounding kits that are included on the product have been investigated for use in that product.

UL Certifies (Lists) Industrial Control Panels under the product category for Industrial Control Panels (NITW), located on page 316 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec and enter NITW at the category code search field.

If a party wishes UL to determine if the modifications made to a UL Certified (Listed) product comply with UL requirements, a UL Field Evaluation can be initiated to evaluate the modifications. This evaluation will only be conducted after UL consults with the AHJ to ensure that UL's evaluation addresses all areas of concern and meets all of the AHJ's needs.
To inquire about a UL Field Evaluation, contact UL Field Services at +1-877-UL-HELPS, prompt #2 (+1-877-854-3577) or visit http://www.ul.com/field/ .

4.0 Luminaires and Signs

4.1 (SW) **Q.** Can a UL certified sign or luminaire retrofit kit be used on any sign or luminaire, or only on specific models?

A. UL certified (Classified) sign or luminaire retrofit kits can be identified for use with a specific sign or luminaire model number, or alternatively with a sign or luminaire of a generic construction type or technology in accordance with their installation instructions. Sign or luminaire retrofit kits that are certified (Listed) by UL are required to be provided with a set of installation instructions, which identify, among other things, the intended use of the kit. The intended use may also be included as part of the kit's UL Certification (Classification) Mark.

UL certifies (Classifies) retrofit kits for electric signs under the product category Sign Conversions, Retrofit (UYWU) and luminaires under Light-emitting-diode Luminaire Retrofit Kits (IFAR), located on pages 520 and 228, respectively, of the 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec. Enter UYWU or IFAR at the category code search field.

4.2 (NW/W) **Q.** Do sign retrofit conversion kits require the manufacturer to re-label the sign?

A. No, sign retrofit conversion kits do not require the manufacturer to re-label the sign. UL certified (Classified) retrofit kits are evaluated for installation in signs that are already certified (Listed). In order to retrofit a sign with a retrofit kit, the original sign must be certified (Listed) to begin with, then there will be markings on the retrofit kit identifying it as a certified (Classified) retrofit kit. A completed retrofitted sign will continue to bear the original sign certification (Listing) mark as well as and a separate UL certification (Classification) mark will appear on a subassembly of the retrofit kit identifying it as a certified (Classified) retrofit kit.
Sign retrofit kits are certified (Classified) under the product category Sign Conversions and Retrofits (UYWU), the Guide Information for the category is located on page 520 of the 2015-16 UL White Book PDF located www.ul.com/whitebook or on UL Product Spec at

www.ul.com/productspec and enter UYWU at the category code search.

The Guide Information for (UYWU) states that the Certification or Classification Mark of UL on the product is the only method provided by UL to identify products manufactured under its Certification (Classification) program and the following additional information:

RETROFIT SIGN CONVERSION
FOR USE ONLY WITH SIGN
MODEL ____ MANUFACTURED BY ____
or
RETROFIT SIGN CONVERSION LED KIT
FOR USE ONLY IN ACCORDANCE WITH KIT INSTRUCTIONS

5.0 Wiring Systems and Wiring Devices

5.1 (NW/W) **Q.** The NEC requires GFCI protection for drinking fountains, however, the skirts of some UL Listed units cover the receptacles making them inaccessible as required by the NEC. What can we do when we run into this situation?

A. NEC 422.52 requires that electric drinking fountains be provided with ground fault circuit interrupter (GFCI) protection. If the drinking fountain is provided with a skirt that ends up installed over the receptacle that provides power to the drinking fountain, then utilizing a GFCI circuit breaker is the best option since a GFCI receptacle would not be readily accessible after installation as required by NEC 422.5. Some other options would be for the installer to slightly relocate the drinking fountain so the GFCI receptacle is exposed or for the installer to source a drinking fountain that incorporates GFCI protection.
UL certifies (Lists) electric drinking fountains under the product category Drinking-water Coolers (SRJX) which can be found on page 480 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook and can also be accessed on UL Product Spec at www.ul.com/productspec and enter SRJX at the category code search field. GFCI circuit breakers are certified (Listed) under the category Circuit Breakers and Ground-fault Circuit Interrupters (DKUY) located on page 125 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook and can also be accessed on UL Product Spec at www.ul.com/productspec and enter DKUY at the category code search field.

5.2 (E) **Q.** We are seeing NM cable used to interconnect the units of mini-split room air conditioners. Is it permissible to use NM cable in a wet location either inside or outside of conduit?

A. No it is not permissible to use Type NM cable in a wet location. NEC 300.9, Raceways in Wet Locations Above Grade states: Where raceways are installed in wet locations above grade, the interior of these raceways shall be considered to be a wet location. Insulated conductors and cables installed in raceways in wet locations above grade shall comply with 310.10(C).

UL certifies (Lists) Type NM cable under the product category Nonmetallic-

sheathed Cable (PWVX) which can be found on page 389 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook and can also be accessed on UL Product Spec at www.ul.com/productspec and enter PWVX at the category code search The Guide Information for PWVX states that these cables are intended for use in accordance with Article 334 of the National Electrical Code (NEC), NFPA 70. NEC 334.12 (B) prohibits Type NM cable from being used in wet or damp locations

5.3 (E) **Q.** Is it permissible to use service entrance cable (Type SE) for a feeder or branch circuit? By the name you would think that it is for services only?

A. Service-entrance cable Type SE may be used for feeders and branch circuits where permitted in accordance with NEC 338.10(B).

UL certifies (Lists) service-entrance cable, under the product category for Service-entrance Cable (TYLZ), located on page 507 of the 2015-16 UL White Book, located at www.ul.com/whitebook and also on UL Product Spec at www.ul.com/productspec and enter TYLZ at the category code search field.

5.4 (E) **Q.** We have seen in the field that some NRTL's are Listing a wiring kit intended for providing a device box enclosing a receptacle behind a wide screen TV. The kit includes dropping a length of flexible cord down inside the wall cavity and terminating it in a device box enclosing a power inlet. This violates the NEC as flexible cord is not permitted to be concealed and not permitted as a substitute for permanent wiring. Additionally, it appears that they only evaluated the kit for compliance with UL514C, the Standard for Safety for Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers. Has UL developed Listing requirements for these kits? Has UL Listed such a kit?

A. Presently, there are no UL certified (Listed) kits for this purpose. Yes, UL has certification (Listing) requirements in place for these kits. UL 498, the Standard for Safety for Attachment Plugs and Receptacles has been updated to add a Supplement SG that details the requirements for these products. The requirements of this supplement cover a kit intended to facilitate the extension of a branch circuit for use with a flat-screen television or other electrical utilization equipment intended for wall or ceiling mounting in accordance with the National Electrical Code, NFPA 70. The kit is only intended for use with copper conductors and installation in dry

locations. The kit consists of a recessed inlet, a detachable power supply cord, a length of non-metallic sheathed cable or armored cable with cable bushing, and a recessed outlet.

5.5 (E) **Q.** Some wire lugs always seem to require paint removal. Has UL ever conducted short circuit tests "with" the paint in place so that the paint does not have to be removed

A. Wire connector lugs have always been tested on bare metal or galvanized metal since galvanization is conductive and the conditions are repeatable. Paint is not conductive and would not comply with NEC 250.12, which requires that nonconductive coatings such as paint on equipment to be removed from threads and other contact surfaces on equipment to be grounded to ensure good electrical continuity or be connected by means of fittings designed so as to make such removal unnecessary.

5.6 (E) **Q.** Why are disconnect switches sold without grounding terminals? A grounding terminal is then required to be purchased, and then some of them use a sheet metal screw to mount them. I thought sheet metal screws were not acceptable for this use.

A. UL certifies (Lists) disconnect switches, under the product category Switches, Enclosed (WIAX), located on page 541 of the 2015-16 UL White Book, located at www.ul.com/whitebook and also on UL Product Spec at www.ul.com/productspec and enter WIAX at the category code search field. Enclosed switches may be used as a service or feeder disconnect and may be used with metal wiring methods where the grounding terminal may or not may not be necessary. Therefore, depending on the application and wiring method used, an additional grounding kit may be required as marked on the switch. A sheet metal screw cannot be used to mount the grounding terminal unless there is a separate bonding means between the terminal and the enclosure. If you encounter grounding terminals secured with sheet metal screws, please contact Regulatory Services Staff (see page 2 and 3 for contact information) to determine if a Product Incident Report (PIR) would be appropriate.

6.0 Appliances and Utilization Equipment

6.1 (S)

Q. We have seen air compressors installed in truck shops that are unlisted, they are claiming that this is an industrial compressor and there are no listings, is this true.

A. UL certifies (Lists) air compressors under the product category for Compressors, Vacuum Pumps and Pneumatic Paint Sprayers (QDGS), located on page 407 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec and enter QDGS at the category code search field.

The UL Guide Information for QDGS states that due to the customized nature of some industrial one-of-a-kind compressors, these requirements do not cover industrial compressors that are primarily supplied to an individual customer specification with regard to pressure, flow, electrical supply, or optional equipment. A UL Field Evaluation can be conducted on this type of industrial air compressor.

The intent is that if these are one of a kind, large industrial compressors then a Field Evaluation may be conducted since they are not being mass produced. If they are not being mass produced, then certification (Listing) of a one-off may not be practical.

6.2 (NW/W)

Q. I have seen mini-split air conditioners certified by other NRTL's that are provided with installation instructions that recommend field wiring between the inside and outside units that doesn't comply with the NEC. Does the standard address installation instructions?

A. Yes the standard does address installation instructions.
UL does permit the interconnecting wiring to be provided by the manufacturer, however, the field wiring would have to comply with the NEC. Typically the wiring would have to be installed in a raceway system in accordance with the NEC.

UL certifies (Lists) mini-split air conditioners under the product category Air Conditioners, Room (ACOT). The Guide Information is located on page 64 in the 2015-16 UL White Book PDF at www.ul.com/whitebook and on UL Product Spec at www.ul.com/productspec and enter ACOT at

the category code search. .

6.3 (E)

Q. We are seeing that some are using unprotected tray cable to interconnect the units of mini-split room air conditioners, is it permissible to use Type TC in this manner?

A. No. Typically, the mini-split units are installed outdoors and are not in an industrial application nor is the wiring typically installed in a tray. Section 336.12 of the 2014 NEC indicates uses not permitted. These include:

- Installed where it will be exposed to physical damage
- Installed outside a raceway or cable tray system except as permitted in 336.10(4) and 336.10(7)
- Used in direct sun, unless identified as sunlight resistant
- Direct buried, unless identified for such use

NEC 336.10(4) indicates that TC, if installed in outdoor locations must be supported by messenger wire. NEC 336.10(7) indicates that TC may be used in industrial establishments where conditions of maintenance and supervision ensure that only qualified persons service the installation.

UL certifies (Lists) tray cable, under the product category for Power and Control Tray Cable (QPOR), located on page 436 of the 2015-16 UL White Book, located at www.ul.com/whitebook and also on UL's Online Product Spec at www.ul.com/productspec and enter QPOR at the category code search field. This category covers Type TC power and control tray cable intended for use in accordance with Article 336 of ANSI/NFPA 70, "National Electrical Code" (NEC).

6.4 (E)

Q. During our inspections we have found cord connected medical equipment where a tag on the cord states "Grounding Can Only Be Achieved with Hospital Grade Receptacle". Is the use of the Hospital Grade Receptacle part of that product, and/or Listing per NEC 110.3(B)?

A. UL certifies (Classifies) medical equipment under the product category Medical Equipment (PIDF) located on page 367 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec and enter PIDF at the category code search field.

The cord tag is in accordance with the Standard for Safety Medical Electrical Equipment, Part 1: General Requirements for Safety, UL 60601-1. Cord connected equipment employing "Hospital Only" or "Hospital Grade" attachment plugs shall be provided with instructions to indicate that grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked "Hospital Only" or "Hospital Grade". The necessary instructions shall be included on the EQUIPMENT itself or on a tag attached to the supply cord of the EQUIPMENT.

The marking indicates that in order to achieve the same level of grounding reliability provided by the hospital grade plug on the equipment is to connect it to a certified (Listed) hospital grade receptacle.

Hospital grade plugs and receptacles are evaluated to more robust construction and performance requirements than standard plugs and receptacles in order to ensure grounding reliability for medical equipment in healthcare facilities and the abuse that the plugs and receptacles may endure in healthcare facilities.

While the equipment would still be grounded if connected to a standard grounding type receptacle, NEC 110.3(B) would require it to be connected to a hospital grade receptacle to maintain the grounding reliability anticipated by certified (Classified) medical equipment.

7.0 Photovoltaic Equipment

7.1 (S)

Q. We have seen photovoltaic powered roof vents in 20, 30, and 40 watt ratings. What product category covers these and what standard is used to evaluate these?

A. UL certifies (Lists) this type of product under the product category Fans, Electric, Permanently Installed Type (GPWX), located on page 214 of the 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec and enter GPWX at the category code search field. The basic standard used to investigate products in this category is ANSI/UL 507, the Standard for Safety for Electric Fans.

7.2 (SW)

Q. A PV module manufacturer provides means to clip the factory cables to the back of the module. When there is tension placed on the cables in order to make the field connection to the next module, the clips either break or fail to retain the cable, causing the cable to hang loose and potentially rub on the roof surface. This could abrade the insulation on the cables over time. Does UL evaluate this method for securing the cables?

A. Cable routing clips provided by the manufacturer are not included as part of the UL certification (Listing) of the modules. The routing and securement of the cables is the responsibility of the installer in the field and is not addressed in the Standard for Safety for Flat-Plate Photovoltaic Modules and Panels, UL 1703. System installation, including the securement of cables, is subject to the approval of the local AHJ.

Currently, the Standard for Safety for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels, UL 2703, does include some requirements for cable routing, but these requirements are primarily related to the mitigation of the likelihood of a non-conductive part becoming energized.

UL certifies (Lists) PV modules under the product category for Photovoltaic Modules and Panels (QIGU) and PV racking systems under the product category for Mounting Systems, Mounting Devices, Clamping Devices and Ground Lugs for Use With Photovoltaic Modules and Panels (QIMS), located on pages 418 and 426 respectively of the 2015-16 UL White Book PDF located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec and enter QIGU or QIMS at the category code search field.

7.3 (E) **Q.** Since NEC 690.4 (B) requires that equipment used in photovoltaic systems be listed for PV applications, does UL have requirements for locating rapid shutdown of PV systems equipment? NEC 690.12 requires such equipment, but does not specify any location.

A. 2014 NEC 690.12 requires PV systems circuits include a rapid shutdown function so that any conductors that extend more than 5 feet inside or more than 10 feet from the PV array be limited to not more than 30 volts and 240 volt-amperes within 10 seconds of rapid shutdown.

UL has two categories that cover this type of installation. UL certifies (Lists) photovoltaic rapid shutdown systems under the product category Photovoltaic Rapid Shutdown Systems (QIJS), And photovoltaic rapid shutdown system equipment under the product category Photovoltaic Rapid Shutdown System Equipment (QIJW), located on page 421 and 422 respectively of the 2015-16 UL White Book located at www.ul.com/whitebook, and also on UL Product Spec at www.ul.com/productspec and enter QIJS or QIJW at the category code search field.