



**REPORT ON DISCUSSIONS
DURING UL MEETINGS
WITH ELECTRICAL INSPECTORS
AT THE
2006 IAEI SECTION MEETINGS**



March 28, 2007

TO: Attendees of Underwriters Laboratories Inc. Meetings with Electrical Inspectors at the 2006 IAEI Section Meetings

SUBJECT: Report of Meetings

Underwriters Laboratories held meetings with Electrical Inspectors during the 2006 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 meeting 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.

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FROM

UL MEETINGS WITH ELECTRICAL INSPECTORS

AT THE 2006

ANNUAL IAEI SECTION MEETINGS

This report contains questions and answers from the 2006 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 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 the Section identifier.

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IAEI Section Identifier Legend

- (E)** Eastern Section
- (NW)** North Western Section
- (S)** Southern Section
- (SW)** South Western Section
- (W)** Western Section

1.0 UL LISTING, CLASSIFICATION, AND FIELD EVALUATION INFORMATION

1.1 (NW) (W) Q. **Manufacturer's installation instructions "recommendations."** Some manufacturer's installation instructions include "recommendations" that are not required by the NEC® or other Model Code. How does UL view such "recommendations?" Specifically, for a hydromassage bathtub, the NEC® requires accessibility. A manufacturer's installation instructions recommend a certain sized opening for such accessibility, but don't say that it is mandatory. Instructions for smoke alarms "recommend" a detector in every room, which is not required by building or fire codes. Does the AHJ have the authority to ask for the installation instructions? Is UL doing anything to standardize the terminology that installation instructions use?

A. Installation instructions provided with UL Listed products are reviewed as part of the Listing investigation. Manufacturer's recommendations that are part of the installation instructions should be followed in order to comply with NEC® Section 110.3(B). The AHJ should expect all installation instructions provided with UL Listed equipment to be available for review at the time of inspection.

If an AHJ believes that the manufacturer's recommendations in the installation instructions exceed what is necessary for a safe installation; then NEC® Section 90.4 gives the AHJ the prerogative to approve the installation.

More than one Model Code regulates many different installations in the built environment. Smoke alarms are an excellent example of this, since multiple Model Codes address requirements for their installation; including the International Residential Code® (IRC®) and NFPA 72, the National Fire Alarm Code®. When this situation exists, the installation instructions will then reflect the installation requirements found in each of the governing Codes.

If an AHJ believes that a product's installation instructions conflict with the NEC® or other Model Code, please contact a Regulatory Services staff member at **1-800-595-9844**.

1.2 (NW) Q. **How does UL charge for placing a UL Mark on a product?** Many manufacturers claim that it costs substantially more to sell a product with a UL Listing Mark compared to the same product without the mark. How does UL charge a manufacturer for use of the UL Mark? Is there a cost per Mark, or can a manufacturer place the UL Mark on as many products as they like for a flat fee? What about the cost associated with the placement of a factory label in the field?

A. For Label Service fees, UL does not have one set fee. Each product category can have a unique fee schedule that can differ further based on the volume of Label usage by a given manufacturer. For many Label Service categories the price of the label itself is nominal, literally the cost of printing the label. For some categories where the label usage is generally low, the label cost is

higher to cover UL's costs for follow-up inspection services for that category.

For products that do not bear the UL Mark, but were eligible to bear that mark when they left the factory, a UL Field Inspection is then necessary to label that product in the field. UL's Field Inspection service consists of a UL Field Representative conducting an on-site safety inspection of the product, just as they would for a Follow-Up service inspection in the factory. If the product is found to comply with UL's requirements, a manufacturer's representative is then permitted to apply a UL Mark on the product in the field, while in the presence of the UL representative.

Local AHJs are always notified when a UL Field Representative conducts any type of inspection service in their jurisdiction. The costs for these inspections are based on the product category and the location of the equipment. Only the manufacturer can request a Field Inspection.

Additional information on Field Inspections and Field Labeling can be found on UL's web site at: www.ul.com/regulators/modification.cfm - field and at: www.ul.com/fieldinspections/ulfi.nsf. General information on this topic is also included in the introductory portion of the 2006 UL White Book under the section, "*Important Information for Users of the White Book*", beginning on page xxxi.

- 1.3 (NW)**
- Q. Where can the AHJ find the installation instructions?** Can the installation instructions be found on the UL web site? Who is responsible for providing the installation instructions to the electricians doing the work?
- A.** UL requires Listed products to be provided with installation instructions when necessary so that the product can be properly installed in accordance with the manufacturer's recommendations as well as the applicable Model Code. The installing electrician should receive a copy of the installation instructions with the product.

Last year over 20 billion UL Marks appeared on products from over 71,000 manufacturers. Providing each product's installation instructions on UL's website is not feasible. Manufacturers typically provide access to installation instructions on their web sites and offer easy access to those instructions.

While it is difficult to install or inspect an installation when no installation instructions are present, it is the responsibility of the installer to insure that the product's installation instructions are provided to the AHJ in order to determine compliance with NEC® Section 110.3(B).

The UL White Book is also an important tool for determining compliance with NEC® Section 110.3(B) by locating the appropriate Guide Information for the product category. The Guide Information will provide important information on the installation of the product as well as the product's markings, etc. If you would like a complimentary copy of the UL White Book, you can pick one up at

your local IAEI Chapter Meeting or contact a member of UL's Regulatory Services Staff at **1-800-595-9844**.

1.4 (NW) Q. **Are seismic requirements evaluated?** Do UL Listed products include an evaluation for seismic requirements when applicable?

A. As a general rule UL Listed products are not evaluated for seismic requirements. However, sometimes UL is requested to List or Classify products to address specific conditions. Often UL can develop evaluation requirements that address conditions such as seismic requirements. If a product has been evaluated for specific seismic conditions this will be marked on the product.

1.5 (NW) (S) Q. **AHJ notification of field evaluations.** Can UL notify the local AHJ when a Field Evaluation is in process and provide ongoing status information? When a field evaluation is requested, what information is given to the AHJ relative to documentation and status of completion? Additionally, during the Field Evaluation process, what can be done to improve the information flow between UL and the local AHJ? Increased communication will enable the local AHJ to stay informed on the status of field-evaluated products in his/her area.

A. UL sends the AHJ a notification letter as soon as UL receives the order and authorization to begin a Field Evaluation project. This letter provides the client name, the site location and the equipment included in the scope. Prior to going to the site, the UL Field Evaluation Engineer will try and make contact with the local AHJ to let them know of the schedule and to ensure that all of the AHJ's concerns are understood. UL will provide Field Evaluation Reports to the AHJ at the conclusion of the preliminary investigation and again when the equipment has had the final inspection and testing. Our goal is to provide these reports no later than five days after completion of the on site inspection.

UL now maintains a database of all Field Evaluation projects and can provide information as to the number of projects in a geographic area. UL is not currently set up to provide this information on a regular basis but will provide it when requested. All US Field Evaluation staff currently report to Chuck Mello to ensure that UL's response provides the consistency and quality that is required for the AHJ to make an informed decision on the acceptance of an installation. Please note that when UL is requested to do a Field Evaluation, only a UL employee can attach the UL Field Evaluation Label to the equipment being evaluated. The builder, supplier, maintenance employee etc. cannot attach a label in the field. For equipment that was eligible to bear the UL Listing Mark, but for whatever reason left the factory without the UL Mark, a Field Inspection can be performed. If the product is found to comply with UL's Listing requirements, a UL representative will authorize the placement of the manufacturer's UL Mark in his/her presence on the equipment in the field.

One last note, when the final Field Evaluation reports are sent out, there is a customer comment form provided to both the client and the AHJ. Please take a

moment to give us with your feedback, comments or concerns with the Field Evaluation process. Your responses will assist us in identifying what parts of the Field Evaluation program are working and what elements may need improvements. UL's goal is to continually improve the Field Evaluation process.

For additional information on UL Field Evaluation Services please contact UL's Field Evaluation customer service at **1-877-UL-HELPS (1-877-854-3577)** and select prompt "2".

1.6 (W) **Q. OSHA generated Field Evaluations.** OSHA has an inspection department and approves NRTLs. Annually, how many requests for field evaluations come from OSHA?

A. OSHA has a technical division or department that oversees the NRTL program and the NRTLs as well as some of the other technical aspects, but that department does not provide any enforcement of OSHA regulations for safety in the workplace. There is a totally separate compliance department that has the inspectors that go into the workplace and enforce the regulations. The OSHA inspectors in the enforcement department cover all the aspects of workplace safety including chemical hazard communication, fall protection, respiratory protection, fire issues, scaffolding and many others including electrical.

Suffice it to say that OSHA inspectors cannot be experts and knowledgeable in all of these many disciplines. To specifically answer the question, UL doesn't know of any Field Evaluations that have happened directly due to OSHA inspections. We do know of a few Field Evaluation projects that have occurred when individuals had completed some OSHA training and subsequently took a proactive approach to work place electrical safety instead of waiting for an enforcement action.

1.7 (E) **Q. Statistical information on equipment bearing the "CE" Mark.** Can AHJs get stats on how many noncompliant products have CE Marks? This would help us to oppose proposals to allow approval of equipment based solely on having a CE Mark.

A. At this time, we are not tracking products with the "CE" Mark applied. Starting in 2007, we will add a checkpoint on the database to note if a "CE" Mark existed on the overall product being evaluated. With this added data point, we can filter and provide reporting on issues found with products overall and a subset of products that have the "CE" Mark showing.

As you are aware the CE Mark is not a product safety marking and does not demonstrate compliance to North American safety standards or installation codes. For more information on the CE Mark and what it represents, please refer to page xxxvii, in the introductory section of the 2006 UL White Book, or online at UL's Regulators web site at:

<http://www.ul.com/regulators/CEmarkinfo.cfm>.

1.8 (E) Q. **Field Evaluation requests.** Who can request a Field Evaluation, and is the AHJ usually involved?

A. Anyone can request a UL Field Evaluation project, including the manufacturer, distributor, importer, installer, end user, or Authority Having Jurisdiction. The entity making the request would be taking financial responsibility for the services performed and would receive the technical reports. In addition, the AHJ is always included in the technical report distribution.

As to the AHJ's involvement, upon receipt of the authorization to proceed from the customer, a letter is prepared and sent to the AHJ with notification of the project. This letter provides the customer name, the installation site location and the equipment included in the scope of the Field Evaluation. A call is placed to the AHJ when the schedule is firm to determine if there are specific issues or questions to answer as well as to notify the AHJ in the event that they want to be present. If direct contact cannot be completed, a message is left. The technical reports, Preliminary Findings Report and the Final Report, are provided directly to the AHJ and the customer at the same time.

For additional information on UL Field Evaluation Services please contact UL's Field Evaluation customer service at **1-877-UL-HELPS (1-877-854-3577)** and select prompt "2".

1.9 (S) Q. **Sharing information from the Field Evaluation Deficiency Statistics report.** Can you make the field evaluation report available to communities and especially to the Economic Development committee's of those communities showing the number of violations and the especially the related hazards with equipment that only bears the CE Mark?

A. We assume this is in reference to the Field Evaluation statistics report presented at the IAEI Section meetings. In that case the material was provided to those present to assist in supporting the needs for listing or evaluating electrical equipment particularly in the commercial and industrial environment, where most Field Evaluations take place. The material is copyrighted but by contacting UL's Field Evaluation management, a copyright release can be obtained where the information is being used and represented as intended. We are revising the database system to now record those items found non-compliant that had the "CE" mark applied. In the future we will be able to provide some statistical data as requested.

For additional information please contact UL's Field Evaluation customer service at **1-877-UL-HELPS (1-877-854-3577)** and select prompt "2".

- 1.10 (S) Q. **Clarifying Field Evaluation deficiency statistics.** In review of the UL Field Evaluation Deficiency Statistic Form that was provided to AHJs at the Section Meetings, the District of Columbia has two items 0% in all fields, and Arkansas has one item and 0% in all fields, what does this mean?
- A. These two areas had a total of 3 pieces of equipment evaluated. What the statistics are stating in these two cases is that there were no identified deficiencies found for the equipment evaluated. In other words, there were no issues found (first column) and therefore there were no issues in the identified categories for the other columns.
- 1.11 (S) Q. **Fire hazards found in field evaluated products.** In the Field Evaluation Discrepancy Statistic Form the column header for Fire Hazards indicates 18%, what does this mean?
- A. It means that for the quantity of equipment evaluated, the engineering staff doing the evaluation found discrepancies that create potential fire hazards. The 18% number would represent that for each 100 items of equipment evaluated, 18 had one or more fire hazards identified such as improper or missing overcurrent protection. Each of the discrepancy items are described on the introductory page to the handout.
- 1.12 (S) Q. **Additional information on deficiencies found in field evaluated products.** Is there a method to further breakdown the information from the FE Deficiency database to include some specific items such as: industrial control panels, HVAC equipment, cooking equipment, etc. This breakdown could give us some additional information so that we may be aware of potential problem areas?
- A. At this time we are gathering the data on an equipment quantity basis only and the analysis is solely numerical. We will explore this option to see what effort it would take to produce and may provide that option in future reports.
- 1.13 (S) Q. **Applying the UL Mark in the field.** When a contractor or a manufacturer has installed UL labels in the field on a particular product what course of action does UL pursue with regards to the manufacturer or the contractor who installed the labels in the field?
- A. First, to reiterate policy, UL does not allow anyone to apply the UL Mark in the field except under the direct supervision of a UL employee through a Field Inspection. If a Field Evaluation is completed the UL Field Evaluated Product label will be applied by the UL engineer completing the evaluation.

If the AHJ observes or suspects that a product has been labeled in the field, please submit a UL Field Report immediately. UL's electronic Field Report form can be accessed at: www.ul.com/regulators/ahjprod.cfm.

You can also deny “approval” of the installation since the UL label that is indicating compliance for the product is in question. Additionally, you can contact UL’s Regulatory Services at **1-800-595-9844** for assistance.

UL has several options in addressing manufacturers that do not control their labels. These options range from increased follow-up inspections up to and including withdrawal of the manufacturer’s UL Listing and confiscation of any remaining labels. UL takes label control very seriously and appreciates all of the assistance that the AHJ community provides.

Additional information on Field Labeling can be found on UL’s web site at: www.ul.com/regulators/modification.cfm - **field**. General information on Field Labeling is also included in the introductory portion of the 2006 UL White Book beginning on page xxxvii.

1.14 (S) Q. Equipment markings vs. installation instructions. I recently inspected a HVAC air handler unit where the nameplate was marked “Use Copper Conductors Only.” The contractor had connected aluminum conductors to the unit. The installation was rejected. The contractor produced an instruction booklet that said suitable for copper or aluminum. Which installation criteria are correct, the nameplate or the printed installation instructions supplied with the unit?

A. Without more detailed information on the specific manufacturer and product, it is impossible to provide only one answer. In general, the markings on the product, including the nameplate, should be followed over the installation instructions if a conflict is discovered. Installation instruction books are often produced to cover many different models and therefore the instructions may be generic whereas the actual markings on the unit itself are product specific.

Additionally, the conductor material markings are verified as part of the UL Procedure for conducting the routine follow-up inspections at the manufacturer’s facility.

If an AHJ discovers this type of conflict between the equipment marking and the installation instructions, please submit a UL Field Report so that we can investigate the information that is included in the manufacturer’s installation instructions. UL’s electronic Field Report form can be accessed at: www.ul.com/regulators/ahjprod.cfm or you can contact UL’s Regulatory Services at **1-800-595-9844** for assistance.

1.15 (S) Q. Adding product categories to the UL label. Is there any way to add the product Category Codes on the UL label so that it is easily recognizable to those of us who are familiar with the White Book? This would make the inspection process much easier.

A. Last year over 20 Billion UL Marks were applied to UL Certified products. While adding the category code to the Listing Mark label is a good idea, it would result in a tremendous additional cost for the manufacturers to make the changes to all of their UL files and labels. While it isn't feasible at this time, perhaps this can be explored in the future.

In order to make it easier for AHJs to find the Product Category information, starting in 2008, future editions of the UL White Book will include an expanded Index of Product Categories. This addition to the UL White Book should make it more useful to the AHJ community and will hopefully pick up more of the product identities that may appear on UL labels. This expanded Index of Product Categories will make it more likely that the product identity on the UL Mark will match up with the Index of Product Categories that are included in the White Book.

1.16 (SW) Q. Can UL still perform a field evaluation on a piece of industrial equipment even when there is not a specific standard for conducting the evaluation?

A. Yes, the UL's Field Evaluation customer service staff in conjunction with the Field Evaluation engineer can determine what specific Standards would be applicable to the equipment being evaluated.

For additional information on UL's Field Evaluation Program please contact UL's Field Evaluation customer service at **1-877-UL-HELPS (1-877-854-3577)** and select prompt "2".

1.17 (SW) Q. Finding the UL Mark on a product. Why don't the product standards clearly state where the UL Listing Mark has to be located and that it must be visible after installation? I end up spending 15-minutes or more looking all over a piece of utilization equipment to find the UL Mark.

A. There are several types of UL Marks. Each has its own specific meaning and significance. The only way to determine if a product has been certified by UL is to look for the UL Mark on the product itself.

The UL Mark is required to appear on the product where readily visible after installation. A location adjacent to the field-wiring compartment or to the manufacturer's name, model number and electrical ratings is generally considered to be "readily visible."

In a very small number of product categories UL has authorized the

manufacturer to place the UL Mark on the smallest unit packaging in lieu of appearing on the product. This alternate means of identifying the product as covered under UL programs is limited to those products where the size, shape or physical composition of the end product prohibits the application of the complete UL Mark on the product. The UL Guide Information in the White Book will identify if this alternate marking method is acceptable.

The UL Mark on a product means that UL has tested and evaluated representative samples of that product and determined that they meet UL's requirements. Under UL's follow-up inspection programs, products are periodically checked by UL at the manufacturing facility to verify that they continue to meet UL requirements.

Additional information on the different UL Marks and their meaning can be found on UL's web site at: www.ul.com/marks_labels/. General information on UL's Marks is also included in the introductory portion of the 2006 UL White Book beginning on page xxxi.

1.18 (SW) **Q. Maintaining the integrity of the UL Mark.** What can the AHJ community do to assist UL in maintaining the integrity of their Mark?

A. The AHJ community can assist UL by using the Field Report system to report when installations appear to conflict with Model Code requirements or when Field Labeling is suspected. Field Reports assist UL in determining the root cause of issues or problems. UL's electronic Field Report form can be accessed at: www.ul.com/regulators/ahjprod.cfm.

When Field Reports are provided, UL can then ascertain if the apparent noncompliance issues are occurring with a specific manufacturer or if the Standard needs to be reviewed for possible revision.

For additional information please contact UL's Regulatory Services at **1-800-595-9844** for assistance.

2.0 UL FIELD REPORTS SYSTEM

2.1 Q. **Field Report follow-up.** When an AHJ submits a Field Report, the AHJ needs to remain informed on the status or outcome of the investigation. What is UL (NW) (SW) doing to improve the level of communication between UL and AHJs that submit Field Reports? How can an AHJ request this information?

A. UL's Field Report Department strives to ensure the integrity of the UL Mark and UL product certifications. If an AHJ observes a situation in which the UL Mark has been applied in the field, the UL Mark is being misused, a company's reference to UL is misleading, a UL Listed product appears to conflict with one of the Model Codes, or a UL Listed product has failed to operate safely, UL asks that you please submit a Field Report. UL's electronic Field Report form can be accessed at: www.ul.com/regulators/ahjprod.cfm.

When a Field Report is submitted the investigation process is as follows:

- Investigation of the validity of the field report;
- Identification of any nonconformity with the relevant requirements;
- Determination of the level of potential hazard;
- Mitigation of the identified potential hazard;
- Determination as to why the nonconformity occurred;
- Identification of means to keep the nonconformity from reoccurring;
- Identification of the appropriate corrective action;
- Verification by objective evidence that the corrective action has been implemented in practice.

When an AHJ submits a Field Report they will receive an acknowledgement letter and may receive requests for additional information or a close out letter at the end of the investigation.

Please be aware that the follow up actions taken and/or the final outcome of the Field Report investigation may involve information that is proprietary in nature. UL has a contractual obligation with the Listee not to disclose information that is proprietary to the specific manufacturer. However, you can rest assured that UL will conduct a comprehensive investigation of the issues raised in any Field Report that is submitted.

Every effort is made to provide exceptional customer service and follow up with the AHJ community. If an AHJ has questions concerning the status or outcome of a field report, please contact UL's Regulatory Services at **1-800-595-9844** for assistance.

2.2
(SW)

Q. Submitting Field Reports. If I end up completing a final inspection and approving a product, but I question the validity of the UL Mark, can I still get UL to open an investigation and look at the product?

A. Yes, AHJ submitted Field Reports assist UL in maintaining the integrity of our product certifications. Field Reports assist UL in determining the root cause of issues or problems. When Field Reports are initiated, UL can then ascertain if the product has a valid UL Mark, or if apparent noncompliance issues are occurring with a specific manufacturer, or if the applicable Standard needs to be reviewed for possible revision.

UL's electronic Field Report form can be accessed at: www.ul.com/regulators/ahjprod.cfm. If an AHJ would like assistance in submitting a Field Report, please contact UL's Regulatory Services at **1-800-595-9844**.

3.0 SERVICE EQUIPMENT, SWITCHBOARDS, PANELBOARDS AND POWER DISTRIBUTION EQUIPMENT

3.1 (W) Q. **Surface-type enclosures mounted in damp or wet locations.** Section 312.2(A) of the NEC® requires surface-type enclosures mounted in damp or wet locations to be mounted so that there is at least a ¼ inch air space between the enclosure and the wall or supporting surface. Do the screw-mount indents satisfy this requirement?

A. Screw-mount indents may satisfy this requirement; however, there is no requirement in the UL Standard of Safety for Enclosures for Electrical Equipment, UL 50, that an indent be provided. In addition, there is no requirement that should an indent be provided, that the indent will provide the 1/4 inch of air space specified by the NEC®. Satisfying NEC® Section 312.2(A) is an installation issue and any indent provided as part of the enclosure may be used (in conjunction with other spacers if necessary) to satisfy this section.

3.2 (W) Q. **NEC® 110.16 Flash Protection marking.** What markings are required to be installed on distribution equipment regarding protection from arc-flash hazards?

A. NEC® Section 110.16 requires a field installed marking that warns qualified persons of potential arc-flash hazards. The NEC® does not specifically detail this marking, but does provide a Fine Print Note (FPN) referencing ANSI Z535.4, Product Safety Signs and Labels. Additionally, a FPN is provided referencing NFPA 70E, the Standard for Electrical Safety in the Workplace.

The installed warning label must be approved by the AHJ and it is the AHJ's responsibility for verifying that the warning label is located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment. Per NEC® Section 110.16, this warning is required on switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers located in other than dwelling occupancies.

3.3 (W) Q. **Concentric and eccentric knockouts.** Are concentric and eccentric knockouts on panelboards Listed for bonding at over 250-Volts?

A. No. Enclosures for Panelboards as well as enclosed switches are evaluated using requirements in the UL Standard of Safety for Enclosures for Electrical Equipment, UL 50. Requirements in UL 50 do not include an evaluation of concentric and/or eccentric (also known as Tangential) knockouts for bonding. UL did have requirements in place at one time, which detailed construction, and performance requirements for evaluating concentric and/or eccentric knockouts for this purpose. Subsequent to actions taken by the UL 50 Standards Technical Panel (STP), these requirements were withdrawn.

It should be noted that there are products in the field, which were manufactured and marked for this purpose. Devices evaluated by UL for this purpose and marked for this use have been evaluated for the suitability of the knockouts in the bonding path and are UL Listed for this purpose. Since the action taken by the STP for UL 50 (in late 2005), enclosed switches are no longer permitted to be marked indicating the use of concentric and/or eccentric knockouts for bonding purposes.

3.4 (W) Q. Panelboard neutral and grounding conductor terminations. For panelboards, how many grounding and neutral bar conductors can you use under each terminal screw?

A. UL Lists Panelboards under the product category “Panelboards (QEUY).” Guide Information can be found in UL’s Online Certification Directory at www.ul.com/database, and on page 196 in the 2006 UL White Book. Panelboards are required to be marked with the number and size of conductors for each terminal on the grounding or neutral bus.

For panelboards, UL requires that an individual terminal be provided for the connection of each branch-circuit neutral conductor and, with one exception, that the number of individual terminals be not less than 75 percent of the total number of individual fuseholder or circuit-breaker poles capable of being installed in the panelboard. Under the exception, the number of terminals may be reduced to 50 percent if the panelboard is marked to indicate the maximum number of circuits and the need to use multipole branch-circuit units to limit the number of terminals to a specified number.

As indicated in the UL Guide Information for “Electrical Equipment for Use in Ordinary Locations (AALZ)” product terminals are acceptable for connection of only one conductor, unless there is a marking or wiring diagram indicating the number of conductors, which may be connected.

Always comply with any markings located on the panelboard; these markings will identify the number and size of conductors permitted for each terminal.

3.5 (S) Q. UL “Green Label?” In a recent inspection of an installation of a UL listed and labeled transfer switch the project was rejected because it didn't have the UL green label. Can you explain why it was rejected and what is a green label?

A. The UL Mark requirements would permit the UL symbol to be green, as long as it was on a contrasting background, such as white. Rejection of an installation should be based on non-compliance with the NEC® and not on basic label color. The green “Energy Star” label has no UL affiliation.

3.6
(SW)

Q. Modifying UL Listed panelboards. It is a common practice in my jurisdiction for contractors to remove the cross bus in one manufacturer's UL Listed panelboards that joins the two neutral or grounded conductor termination points. These panelboards have one termination bar located on each side of the equipment for the grounded circuit conductor. One of these two separated bus bars is then used for the grounded or neutral conductor terminations and the other is used as either an isolated equipment ground bus or the normal equipment grounding bus with the bonding screw added. Is this installation in compliance with the product standards used to evaluate a UL Listed panelboard?

A. UL Lists Panelboards under the product category "Panelboards (QEUY)." Guide Information can be found in UL's Online Certification Directory at www.ul.com/database, and on page 196 in the 2006 UL White Book. UL Listed Panelboards are evaluated using UL 67, the Standard of Safety for Panelboards. Construction and performance requirements in this Standard determines the suitability of the busing and internal components. The manufacturer's installation instructions identify these bus bars as grounded or neutral conductor terminations. The panelboard has not been evaluated with the cross bus removed.

UL does not know what the effect of a field modification, such as the relocation or removal of a bus bar, would have on the safety of the product or the product's continued compliance with the UL Standard. To ensure the continued validity of the UL certification mark, such field modifications would need to be specifically investigated by UL under a Field Evaluation.

Additional information on field modifications to Listed equipment can be found on UL's web site at: www.ul.com/regulators/modification.cfm. General information on this topic is also included in the introductory portion of the 2006 UL White Book under the section, "*Important Information for Users of the White Book*", on page xxxvii.

For information on UL's Field Evaluation Program please contact UL's Field Evaluation customer service at **1-877-UL-HELPS (1-877-854-3577)** and select prompt "2".

4.0 CIRCUIT BREAKERS AND AFCIs

4.1 Q. **AFCIs and “glowing” connections.** Do AFCI devices protect against glowing connections?
(E)

A. No. An AFCI is not intended to detect glowing connections. This is stated in the scope of UL 1699, the Standard of Safety for Arc-Fault Circuit-Interrupters. However, due to the high resistance and heating of a glowing connection, the eventual result might be current leakage or arcing that may reach a level detected by the protective equipment installed in the circuit.

UL Lists six different types of AFCI devices. Guide Information for these AFCI product categories can be found in UL's Online Certification Directory at www.ul.com/database, and on pages 19 and 20 in the 2006 UL White Book.

UL's product categories for Arc-Fault Circuit-Interrupters are:

- **Branch/Feeder Type AFCIs (AVZO)**
- **Combination Type AFCIs (AWAH)**
- **Cord Type AFCIs (AWAY)**
- **Outlet Branch Circuit Type AFCIs (AWBZ)**
- **Outlet Circuit Type AFCIs (AWCG)**
- **Portable Type AFCIs (AWDO)**

Additional information on AFCI technology and products is available on the UL web site at: www.ul.com/regulators/afci/.

5.0 DISTRIBUTED ENERGY SYSTEMS

5.1 (W) Q. **Questions and advice on photovoltaic equipment.** We're seeing more and more photovoltaic equipment. Who can we talk to at UL if we have issues with respect to the UL Listings?

A. For regulatory officials, your first point of contact is UL's Regulatory Services at **1-800-595-9844**. Individual contact information for UL's Regulatory Services Staff is located on the UL website at: www.ul.com/auth/regcon.cfm.

UL currently has Listings for Photovoltaic Power Systems under the following product categories:

- **Building-Integrated Photovoltaic Modules and Panels (QHZK)**
- **Building-Integrated Photovoltaic Mounting Systems (QHZZ)**
- **Photovoltaic Charge Controllers (QIBP)**
- **Photovoltaic Modules and Panels (QIGU)**
- **Photovoltaic Wire (ZKLA)**

This list of Photovoltaic product categories can be found in the table of contents portion of the 2006 UL White Book on page xxx. Additionally, UL Lists Distributed Resource Power Systems (QIJL), and other related equipment. Photovoltaic Power Systems and Distributed Resource Power Systems are evaluated using UL 1703, the Standard of Safety for Flat-Plate Photovoltaic Modules and Panels along with other UL Standards as specified in the individual Guide Information.

Guide Information for these product categories can be found in UL's Online Certification Directory at www.ul.com/database. A List of Distributed Power Generation System Equipment, including the Photovoltaic categories, can be found in the table of contents portion of the 2006 UL White Book under the section, beginning on page xxix.

For specific questions or additional information on photovoltaic (PV) modules, you may contact Tim Zgonena in Northbrook, IL, by phone at **+1-847-664-3051**, or by e-mail at Timothy.P.Zgonena@us.ul.com.

6.0 INDUSTRIAL CONTROL EQUIPMENT

6.1 (SW) Q. **Determining if an industrial control panel has been modified.** How can the AHJ in the field determine what portion of an industrial control panel assembly has been evaluated as part of the Listing and what portions are field installed or modifications to the assembly?

A. Underwriters Laboratories Inc. Lists Industrial Control Panels under the product category "Industrial Control Panels (NITW)." Guide Information can be found in UL's Online Certification Directory at www.ul.com/database, and on page 150 in the 2006 UL White Book. UL Listed Industrial Control Panels are evaluated using UL 508A, the Standard of Safety for Industrial Control Panels.

Guide Information for Industrial Control Panels specifies that a complete schematic diagram of the panel as built by the manufacturer be provided. When this schematic wiring diagram includes components that are not supplied with the industrial control panel, a notation or similar means is used to identify such components.

Additionally, Section 61.1 of UL Standard 508A requires that an industrial control panel be provided with a complete electrical schematic wiring diagram including all components provided by the manufacturer. In addition, Section 60.3 of UL Standard 508A requires an industrial control panel schematic wiring diagram that includes devices that are not provided with the industrial control panel to be marked to indicate that these devices shall be provided by the installer.

If an AHJ has concerns with the components installed in an industrial control panel, your first point of contact is UL's Regulatory Services at **1-800-595-9844**. Individual contact information for UL's Regulatory Services Staff can be accessed on the UL website at: www.ul.com/auth/regcon.cfm.

7.0 LUMINAIRES AND SIGNS

7.1 (W) Q. **Determining if a luminaire is Listed as an assembly.** On a pendant luminaire, I only see a UL in a circle on the lampholder. Does this mean that the entire luminaire is Listed?

A. No. For this example, the lampholder is a Listed component, but the overall luminaire is not UL Listed. Evidence of UL Listing covering the entire pendant luminaire assembly would include a UL Luminaire Listing Mark and the word incandescent adjacent to it that would indicate that the overall luminaire was evaluated.

For more information on how to identify if incandescent pendant luminaires are Listed as a complete assembly, see the Guide Information for product category "Incandescent Surface Mounted Luminaires (IEZR)." Guide Information for this product category can be found in UL's Online Certification Directory at www.ul.com/database, and on page 98 in the 2006 UL White Book.

7.2 (E) Q. **Are installation instructions required?** For a UL Listed fiber optic swimming pool light, the manufacturer did not provide installation instructions. Are these instructions required, and in the absence of instructions, how can I determine that the light has been installed correctly?

A. UL Lists fiber optic luminaires for swimming pools and spas under the product category "Luminaires and Forming Shells for Swimming Pool and Spas (WBDT)." Guide Information for this product category can be found in UL's Online Certification Directory at www.ul.com/database, and on page 260 in the 2006 UL White Book. These luminaires are evaluated using UL 676, the Standard of Safety for Underwater Luminaires and Submersible Junction Boxes. UL 676 specifies that installation instructions be included with the product that informs the installer of the following installation requirements:

- The lamp/electrical enclosure is only for permanent mounting not less than 1.5 m (5 ft) from the pool or spa wall.
- Only the fiber optic element and associated fittings to transmit the light to the pool or spa are installed within this zone and to the pool wall.
- The lamp/electrical enclosure needs to be installed above the level at which water splashed from the pool or spa or from another source may collect.

Additionally, the installation instructions are also required to include:

- Typical basic instructions about installation of electrical equipment, such as intended means for fastening to the mounting service,
- Any orientation required,
- Identification of which terminals or leads are assigned to each branch circuit conductor,
- How lamp replacement is accomplished, and

- Fuse replacement.

Some fiber optic luminaires are both:

- 1) Listed as an Incandescent Luminaire (Category Codes IEZR or IEZX) or HID Luminaire (IEWX or IEXZ) and accordingly, are provided with installation instructions required for those categories; and
- 2) Complementary Listed as a Fiber Optic Luminaire under the category Luminaires and Forming Shells for Swimming Pool and Spas (WBDT), with the associated additional installation instructions identified above included.

The Listings in product categories IEZR, IEZX, IEWX, and IEXZ are for when the luminaire is used to provide non-pool/spa lighting for interior or exterior locations. When the manufacturer identifies the luminaire as suitable for also serving (alone or in addition) as a swimming pool and spa luminaire, then the Complementary Listing and added installation instructions are required. Since fiber optic illuminators for outdoor use are typically intended for both the pool/spa luminaire use and other lighting uses, Complementary Listing is usually involved.

Guide Information for these incandescent and HID luminaire product categories can be found in UL's Online Certification Directory at www.ul.com/database, and in the 2006 UL White Book on page 97 for IEWX and IEXZ, page 98 for IEZR, and page 99 for IEZX. These luminaires are evaluated using UL 1598, the Standard of Safety for Luminaires.

Relatively few fiber optic illuminators are designed strictly for use only to provide illumination in a pool or spa.

- 7.3 (E) Q. **Wiring methods for Portable Cabinet Luminaires.** For "hockey puck" type low voltage lighting, there is rampant failure in the field to use the correct wiring methods, particularly when the wiring is routed concealed behind a wall or through a cabinet. Can UL strengthen requirements for markings and/or installation instructions to help reduce the number of violations discovered on final inspection?
- A. Puck lights that are typically provided with flexible cord are Listed under the product category "Portable Cabinet Lights (QOVJ)." Guide Information for this product category can be found in UL's Online Certification Directory at www.ul.com/database, and on page 206 in the 2006 UL White Book. These lights are evaluated for compliance with the Standard of Safety for Portable Luminaires, UL 153. To address the wiring method issue, the Standard of Safety for Portable Luminaires, UL153, was recently revised to require installation instructions to alert users as follows:

"The National Electrical Code® (NEC®) does not permit cords to be

concealed where damage to insulation may go unnoticed. To prevent fire danger, do not run cord behind walls, ceilings, soffits, or cabinets where it may be inaccessible for examination. Cords should be visually examined periodically and immediately replaced when any damage is noted."

If the cord type is a Listed type CL2X or better cable and the power unit is Class 2, additional instructions are provided to indicate that the above requirement does not apply to the wiring between the cabinet light and the power unit.

The UL Guide Information for Portable Cabinet Luminaires (QOVJ) also indicates the following:

"A portable cabinet luminaire connected to a Class 2 power supply that is suitable for installation inside a kitchen cabinet or other built-in furnishing is provided with instructions that advise:

1. The Class 2 power supply shall be located outside the cabinet and not concealed, and
2. The line voltage power supply cord shall not be concealed or run through openings in the cabinets, walls, ceilings, or floors."

NEC® 411.4(A) provides the requirements for the wiring methods used for low voltage lighting systems. A wiring method from Chapter 3 of the NEC® is required where concealed or a Class 2 wiring method, in accordance with Article 725 of the NEC®, where supplied from a Listed Class 2 power supply.

7.4 (E) Q. Supply wire temperature markings. Luminaires are required by UL to be provided with a supply wire temperature rating, which is sometimes difficult to locate. Can these markings be required to be more clearly and prominently displayed?

A. UL 1598, the Standard of Safety for Luminaires, specifies that the supply wire temperature marking be visible during installation and inspection of the wire connections. The UL field representative checks this during their follow up inspections. The marking is not required to be visible after installation.

If you encounter a luminaire in the field that is not marked with the supply wire markings, please submit a Field Report. UL's electronic Field Report form can be accessed at: www.ul.com/regulators/ahjprod.cfm. If an AHJ would like assistance in submitting a Field Report, please contact UL's Regulatory Services at **1-800-595-9844**.

7.5 (E) Q. Conflict between the NEC® and UL 1598? Section 410.14(B) of the NEC® requires that if an electric-discharge luminaire is surface-mounted over a concealed outlet box and designed not to be supported solely by the outlet box, then it shall be provided with suitable openings in the back of the luminaire to provide access to the wiring in the box. UL Lists such luminaires without this required access opening, and has indicated that the UL 1598 Standard permits such Listing if the luminaire weighs less than 10 lb. As this weight exception does not appear in the Code, there is a conflict between the NEC® and the UL Standard. What can be done to get the UL Standard changed to be consistent with the Code?

A. The requirements in UL 1598, the Standard of Safety for Luminaires, addressing the Code requirement for access to the wiring compartment, have been in place for many years. In the UL 1570 series of Standards, the predecessors of the current UL 1598 Standard, the weight limit was 25 pounds before an access opening was required.

NEC® Section 410.16(B) addresses inspection of splices for all luminaires. This section requires that the splices be capable of being inspected without disconnecting any part of the wiring system. The developers of the harmonized UL 1598 Luminaire Standard recognized the need to have a practical means to do this, and a maximum weight limit of 10 pounds was the result.

Since these luminaires are not provided with a means to mount them directly to an outlet or junction box, no access openings are incorporated into the design. Luminaires of this type are constructed with “knock out” type entries for the supply wiring method, they are not intended for use where installed over an outlet or junction box. The wiring method must be run to the luminaire and terminations made inside the luminaire itself.

One way to gauge whether there is consensus for requiring access to the wiring in the box, even with a luminaire weighing 10 pounds or less, is to submit a proposal to revise UL Standard 1598. Information on how to access the UL Collaborative Standards Development System (CSDS) and participate in the UL standards development process can be found on page 383 of the 2006 UL White Book.

7.3 (S) Q. Labeling of signs. If a company is a Listed UL 48 sign shop, can they produce signs without the UL label? How do you control the application of the UL Mark when a sign shop produces both Listed and unlisted signs?

A. A manufacturer is free to produce any product they wish. UL has no interest in products that do not bear a UL Mark. As long as the manufacturer does not apply the UL Mark or engage in promotion of advertising activities that imply the product is Listed, they may produce whatever unlisted products they desire.

UL evaluates and provides Follow-up Services only for products, which bear the UL Mark. All products that are produced and have the UL Mark applied must comply with the UL Report (Follow-up Procedure) for that product category and are subject to follow-up inspections.

Manufacturers are required to maintain records of all production items that had the UL Mark applied. These records are reviewed as part of the follow-up inspections conducted at the manufacturing facility.

When there is suspicion or allegations that UL Marks are being misapplied, either through field reports or other means, the instances are then thoroughly investigated and corrective actions taken as necessary.

8.0 WIRING SYSTEMS AND WIRING DEVICES

8.1 (E) Q. **Testing of grounding electrode systems.** Are there differences between testing of different types of Listed grounding electrodes, and does this correlate with Section 250.66 of the NEC®?

A. Grounding electrode system components, such as ground rods are Listed under the product category “Grounding and Bonding Equipment (KDER).” Guide Information for this product category can be found in UL’s Online Certification Directory at www.ul.com/database, and on page 122 in the 2006 UL White Book. Grounding and bonding equipment is evaluated for compliance with UL 467, the Standard of Safety for Grounding and Bonding Equipment. A Listed ground rod is subjected to the same short-time current test regardless of the material that it is constructed of.

Regarding different materials, such as copper clad steel vs. stainless steel vs. galvanized steel, Ground Rods constructed of copper clad steel or galvanized steel are subjected to the same performance testing. However, stainless steel ground rods are not tested. Nonetheless, all three types of Listed ground rod constructions have different minimum levels of required coatings.

8.2 (E) Q. **Splicing equipment grounding conductors.** Are all splicing devices, wire nuts, etc., suitable for splicing equipment grounding conductors, as well as other circuit conductors? The red wire nut carries the fault current just the same as the green one.

A. Wire connectors are Listed by UL under the product category “Wire Connectors and Soldering Lugs (ZMVV).” Guide Information for this product category can be found in UL’s Online Certification Directory at www.ul.com/database, and on page 307 in the 2006 UL White Book.

Not all Listed wire connectors are rated for splicing the grounding conductor. Only those that are additionally Listed for this application have been evaluated for this purpose. These are the green ones as mentioned, but also those other multi-colored twist-on type that are identified as **both** Wire Connectors (ZMVV) **and** Grounding and Bonding Equipment (KDER) as part of the UL Listing Mark found on the unit container.

Only those products so identified have been performance tested for the short time current test in UL 467, the Standard of Safety for Grounding and Bonding Equipment. Wire splicing devices that are only identified as Wire Connectors have not been subjected to this test. Wire connectors also evaluated for grounding are Listed under the product category “Grounding and Bonding Equipment (KDER).” Guide Information for this product category can be found in UL’s Online Certification Directory at www.ul.com/database, and on page 122 in the 2006 UL White Book.

8.3 (E) Q. Direct-burial split bolts. Does UL have any Listings for direct-buried split bolts for use with steel? Can you tie rebar to the wire mesh and use a direct-buried split bolt?

A. UL does have Listings for direct-buried split bolt connectors for use with rebar, they are Listed under the product category “Grounding and Bonding Equipment (KDER).” Guide Information for this product category can be found in UL’s Online Certification Directory at www.ul.com/database, and on page 122 in the 2006 UL White Book.

Split bolt type connectors that have been evaluated for this use will be marked or provided with a tag that identifies the size range of the conductor as well as the size range of the rebar they were Listed for use with. In addition, they would be marked “Direct Burial”, “DB,” or “Dir Bur.” All components, including body, screws, bolts, and spacers, of split bolt type connectors intended for use in this type of application, must be constructed from copper or copper alloy containing not less than 80% copper or from stainless steel.

Regular split bolts are not Listed for this application. They are typically Listed as Wire Connectors (ZMVV), located on page 307 in the 2006 UL White Book, for splicing conductors together inside equipment in ordinary dry locations. These types of split bolts have not been evaluated as Grounding and Bonding Equipment and have not been subjected to the Short Time Current test found in UL 467. However, there are some split bolt connectors that have dual coverage in both categories. These would need to be properly identified as part of the Listing Mark.

8.4 (E) Q. UL Listed receptacles. Has UL Listed a receptacle with a built-in thermal protector?

A. No. Presently, there are no UL Listed receptacles that employ a built-in thermal protector.

8.5 (E) Q. 2008 NEC® requirements for termination of equipment grounding conductors. For the 2008 NEC®, a sizable change proposed for Section 250.8 allows a self-tapping screw to be permitted for the connection of a grounding conductor. As an AHJ, how can I determine if a screw has the proper thread pitch and engagement?

A. The NEC requirement that sheet metal screws are not acceptable has led to many varying interpretations of what is a “sheet metal screw.” It has also resulted in questions about the acceptability of wood screws, Tek screws, drywall screws and a myriad of other types of screws. For the 2008 NEC®, what CMP-5 did in Section 250.8 was to reverse the language and instead of stating what is not acceptable, the panel has now identified what is acceptable.

In the most simplistic terms, the only screw type that is acceptable has machine-type screw threads. This is well defined in the various SAE

standards. This would include machine screws that are self-tapping as long as the other requirements are met. In addition, the machine screw type thread must have two full threads of engagement in the metal enclosure for securement. The AHJ should be able to visually determine if a machine-type screw was used and can spot check for two full threads by checking the sheet metal thickness. Machine screw threads, such as a 10-32 screw have 32 threads per inch and therefore 2 full threads would require a metal thickness of at least 1/16 inch or about 14 Gauge sheet metal. This should help clarify this section and eliminate the questions about sheet metal screws, wood screws, drywall screws, Tek screws etc., that do not have “machine-type screw threads.”

8.6 (E) Q. Termination of equipment grounding conductors. Can the clamp screws in an outlet box be used to secure the grounding conductors? They appear to be 10-32.

A. No. The clamp screws are provided solely for the cable or conduit securement means. The clamps are considered suitable only for grounding of the cable or conduit system. Per NEC Section 250.148(C), the connection made between the equipment grounding conductor(s) and a metal box shall be by means of a grounding screw used for no other purpose.

8.7 (E) Q. Receptacles with screw less terminal connectors. Receptacle push-in terminals are still causing fires. Can you describe the changes that UL has made to the UL Standard to improve the safety of these products?

A. UL has not been able to verify this claim and the submitter is encouraged to provide further detail by submitting a Field Report. UL’s electronic Field Report form can be accessed at: www.ul.com/regulators/ahjprod.cfm.

Push-in terminals are now restricted to 15-Amp branch circuits and are for connection using 14 AWG solid copper wire only, as indicated in the UL Guide Information for Receptacles for Plugs and Attachment Plugs (RTRT) located on page 227 in the 2006 UL White Book. They are **not** intended for use with aluminum or copper-clad aluminum wire, 14 AWG stranded copper wire, or 12 AWG solid or stranded copper wire.

8.8 (E) Q. Shielded NM Cable. Does UL still List shielded NM cable? Is it still referenced in the White Book?

A. Type SNM, Shielded Nonmetallic-Sheathed Cable, first appeared in the 1971 NEC® as Article 337. The product was UL Listed at that time, but was not widely used. Eventually it was removed from the NEC® in the 1996 edition as an obsolete product. UL no longer Lists Type SNM cable and therefore it no longer appears in the UL White Book.

8.9 (E) Q. **Weather-resistant receptacles.** Are there any UL Listed weather-resistant receptacles?

A. UL Lists receptacles under the product category “Receptacles for Plugs and Attachment Plugs, (RTRT).” Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 227 of the 2006 UL White Book. The basic Standard used to evaluate receptacles is UL 498, the Standard of Safety for Attachment Plugs and Receptacles.

At present there are no UL Listings for weather-resistant receptacles. However, UL does have a proposal on the UL Collaborative Standards Development System (CSDS) seeking comment on a proposed supplement to UL 498 the Standard of Safety for Attachment Plugs and Receptacles on this subject. To view proposals and participate in the UL standards development process can be found on page 383 of the 2006 UL White Book.

8.10 (SW) Q. **Determining if a manufactured wiring system is an assembly.** The use of manufactured wiring systems is becoming more popular. How can the AHJ in the field determine what portion of the wiring system has been evaluated and Listed as an assembly?

A. Manufactured Wiring Systems are Listed by UL under the product category “Manufactured Wiring Systems, (QQVX).” Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 214 of the 2006 UL White Book. The basic Standard used to evaluate Manufactured Wiring Systems is UL 183, the Standard of Safety for Manufactured Wiring Systems.

Manufactured Wiring Systems are intended for installation, rearrangement, and inspection in accessible locations in accordance with Article 604 of the National Electrical Code® and are subject to approval by the authority having jurisdiction.

The UL Mark is required to appear on the product where readily visible after installation. Only those assemblies bearing the UL Listing Mark are considered to be Listed. The Listing Mark will identify the assembly as a manufactured wiring assembly. Further information can also be found in the product's installation instructions, which will identify what parts the system is comprised of.

9.0 APPLIANCES AND UTILIZATION EQUIPMENT

- 9.2 (W) Q. **NEC® requirements for receptacle outlets.** If a GFCI receptacle is mounted on a rooftop air conditioning unit, which is connected to the load side of the disconnect, can it serve as the required receptacle within 25 ft. of the unit?
- A. No. A convenience receptacle is permitted to be mounted to the unit, but per Section 210.63 of the NEC®, the required receptacle outlet cannot be connected to the load side of the equipment disconnecting means.
- 9.4 (E) Q. **Field installed power supply cords.** Per Section 422.16 in the NEC®, can a manufacturer allow a power supply cord for an appliance to be provided in the field by the installer?
- A. No. The power supply cord for a UL Listed appliance is required to be provided by the appliance manufacturer, typically in a Listed kit.
- 9.5 (E) Q. **Installation using flexible cord or a permanent wiring method.** Does the presence of a knockout or U-shaped opening in the field wiring compartment of a piece of equipment give the installer discretion to install the equipment using either a cord or permanent wiring method?
- A. Listed equipment with a knockout or other opening in a field wiring compartment is intended to be connected using a permanent wiring method as detailed in the installation instructions and permitted by the NEC®, unless markings or instructions for the equipment specifically identify another method.

10.0 COUNTERFEITING AND OTHER TOPICS

10.1 (NW) Q. **CSA product markings for the US market.** Are products that have only a CSA listing mark, without either the “US” or “NRTL” designation, acceptable for use in the US? Is there a standard or requirement that all of the testing labs must use the same marking scheme, by adding the “US” or “NRTL” designation for US products and adding the “C” for Canadian products?

A. Products marked with only the CSA Mark, without either the “US” or “NRTL” marking, designates that the product is evaluated based on Canadian standards for installation using the Canadian Electrical Code®. Products that bear only the CSA mark are not evaluated to meet US standards.

Products for use in the US are evaluated to meet US standards for installation using the National Electrical Code®. The industry has voluntarily decided to use a “US” or “NRTL” marking for US products and the “C” for Canadian products.

The use of the “NRTL” designation started in 1995 when OSHA required that all of the Nationally Recognized Testing Laboratories (NRTL), except for UL and FM, add the “NRTL” designation to their listing marks. Shortly after this, UL began evaluating products based on Canadian standards for installation using the Canadian Electrical Code®. UL developed a Listing Mark that included a “C” in the 7 o’clock position. If a product was evaluated to both US and Canadian standards then initially that product had two listing marks.

UL then consolidated the two marks into one that had a “C” in the 7 o’clock position and a “US” in the 5 o’clock position. This marking convention was later adopted by most all of the NRTLs.

10.2 (W) Q. **The role of the AHJ in fighting counterfeiting.** UL has been providing a lot of information regarding counterfeit products. What is the AHJs role in fighting counterfeiting? What type of information is provided in a public notice? Does UL inspect product at companies outside of the U.S.?

A. The AHJ plays an important part in the fight against counterfeiting. The National Electric Code® (NEC®), as well as local building and fire codes, often require that certain products being installed bear a third party certification, such as an Underwriters Laboratories Listing or Classification Mark. The presence of this Mark is reassurance for the code official that the product meets the requirements for the installed application. The AHJ can play a pivotal role in determining if a product or Certification Mark is authentic or counterfeit at the time of inspection. If there is suspicion that a product or Mark may not be genuine, the AHJ may elect to withhold approval of the project until verification is obtained as to its authenticity.

A public notice is intended to provide end users (i.e. consumers, retailers, distributors, AHJs, etc.) with information that will help them determine if a

product that they have is counterfeit. Pictures of the product, along with a description of the counterfeit aspect of the product, and mention of where the products could have been purchased are provided along with any recommended actions that should be taken.

UL conducts Follow-Up Service Inspections at manufacturers of UL-certified products all over the world. Each year, over 500,000 product inspections are conducted to ensure the integrity of the UL Mark and the products that they are applied to. It is just one of several ways UL controls the use of its Marks.

Additional information on UL's Anti-Counterfeiting Operations can be found on the UL web site at: www.ul.com/ace/index.html.

10.3 (W) Q. **Requiring third-party product certification.** Is there some way to get the government, testing labs, and other organizations together to start an effort to have our government officials require that all electrical products that enter this country be required to bear a label from an NRTL?

A. The federal government has traditionally been reluctant to enact regulations regarding certification of electrical products, and typically relies on the states and local governments. However, OSHA does control the accreditation of Nationally Recognized Testing Laboratories, such as UL.

A quick search of the National Electrical Code for the words "Listed," "Labeled," and "Identified" yields hundreds of requirements to use such equipment in electrical installations. States or local jurisdictions that have adopted the NEC by law already have such requirements in place. In addition, some states have gone beyond that required in the NEC, and require evidence of evaluation by a qualified independent third party on all installed electrical equipment.

In addition, most major retailers will not stock and sell electrical products that are not certified by a Nationally Recognized Testing Laboratory.

10.4 (E) Q. **Acceptance of the CE Mark.** Can a CE Mark be accepted as an NRTL mark?

A. A CE Marking is a European marking of conformity that indicates that a product complies with the essential requirements of the applicable European Laws or Directives with respect to safety, health, environmental and consumer protection. Generally, this conformity to the applicable Directives is done through self-declaration. The CE Marking is required on products in the countries of the European Economic Area (EEA) to facilitate trade between the member countries. The manufacturer or their authorized representative established in the EEA is responsible for affixing the CE Marking to their product. The CE Marking provides a means for a manufacturer to demonstrate that their product complies with a common set of laws required

by all of the countries in the EEA to allow free movement of trade within the EEA countries.

Unlike the UL Mark, the CE Marking:

- Is not a safety certification mark,
- Is generally based on self-declaration rather than third party certification, and
- Does not demonstrate compliance to North American safety standards or installation Codes.

Please keep in mind that a product that bears a CE Marking may also bear a certification mark such as UL's Listing Mark, however, the CE Marking and the UL Mark have no association. The UL Mark indicates compliance with the applicable safety requirements in effect in North America and is evidence of UL certification, which is accepted by Model North American Installation Codes such as the *National Electrical Code* and the *Canadian Electrical Code*.

The CE Marking on products is not a certification mark. AHJs should continue to look for the UL Mark on products in order to determine if a product complies with applicable safety requirements for North America.

For more information on the CE Mark and what it represents, please refer to the CE Marking Information section of the 2006 UL White Book on page xxxvii, or online at UL's Regulators web site at:

<http://www.ul.com/regulators/CEmarkinfo.cfm>.

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Q. Counterfeiting questions. How do AHJs determine if a product has a counterfeit UL Mark? What do we look for? How big a problem is counterfeiting for UL? What is UL doing to try and combat these offshore manufacturers that are producing counterfeit products and what is UL doing to prevent these products from entering the United States?

A. For over a century, the UL Mark, has been considered the American Symbol of Safety. Each day, employees at UL go to work for a safer world. On the other hand, counterfeiters go to work to profit at the expense of the public's well being and a company's reputation. Each year, over 20 billion authentic UL Marks appear on products that have been evaluated by UL for safety from fire, electric shock, and physical hazards. While incidents of counterfeiting represent only a fraction of a percentage point of all the legitimate UL labels used annually, UL is totally committed to aggressive anti-counterfeiting activities.

UL continues to work tirelessly to combat counterfeiting of the UL Mark. Examples of our anti-counterfeiting initiatives include the introduction of holographic labels, color schemes specific to each product category, and overt or covert security coding, to maintain the integrity of our Marks. Additionally,

UL and the U.S. Customs Service have partnered in extensive and unprecedented nationwide anti-counterfeiting efforts. UL has a “zero-tolerance” policy concerning anti-counterfeiting and our anti-counterfeiting program has increased in its effectiveness resulting in increased seizures of products with counterfeit labels and destruction of these items. As a direct result of UL’s increased emphasis on anti-counterfeiting, many individuals have been tried, convicted and are now serving time in prison for their actions.

A legitimate UL Listing Mark is composed of four elements:

1. The familiar UL symbol in a circle;
2. The word “LISTED” in capital letters;
3. The product identity; and
4. An Issue Number or Control Number (An Issue Number is a serialized multi-digit alphanumeric code. A Control Number is a unique four-digit alphanumeric code assigned by UL).

For information on identifying the four elements that comprise a legitimate UL Mark refer to the introductory portion of the 2006 UL White Book under the section, *“Practical Application of the White Book in the Field”*, beginning on page xxxv. Additional information on UL’s Anti-Counterfeiting Operations can be found on the UL web site at: www.ul.com/ace/index.html.

Some of the common indications that a product may be counterfeit include:

- A product whose label does not contain the four elements outlined above;
- A product that references UL on the carton or product but has no company name or address;
- A product that references UL on the packaging, but not on the product itself;
- Cheap, shoddy workmanship and/or packaging; or
- Marks with the letters “UL” side by side instead of staggered, the lack of a control or issue number, or the words “Approved” or “Pending” instead of “LISTED” or “CLASSIFIED”

If you come across a suspicious product referencing UL, or would like more information on UL’s anti-counterfeiting or U.S. Customs programs, contact Brian Monks in Melville, NY, by phone at **+1-631-271-6200, ext. 22856**; or by e-mail at Brian.H.Monks@us.ul.com.



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