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**REPORT ON DISCUSSIONS
DURING UL MEETINGS
WITH ELECTRICAL INSPECTORS
AT THE
2008 IAEI SECTION MEETINGS**



February 9, 2009

TO: Attendees of Underwriters Laboratories Inc. Meetings with Electrical Inspectors at the 2008 IAEI Section Meetings

SUBJECT: Report of Meetings

Underwriters Laboratories held meetings with Electrical Inspectors during the 2008 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.

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FROM

UL MEETINGS WITH ELECTRICAL INSPECTORS

AT THE 2008

ANNUAL IAEI SECTION MEETINGS

This report contains questions and answers from the 2008 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



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**Specific Information for AHJs and
Regulators on the UL Web Site**

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IAEI Section Identifier Legend

- (E)** Eastern Section
- (NW)** Northwestern Section
- (S)** Southern Section
- (SW)** Southwestern Section
- (W)** Western Section

1.0 UL LISTING, CLASSIFICATION AND FIELD EVALUATION INFORMATION

1.1 (SW) Q. **Notifying AHJs of Field Evaluations.** UL has stated in the past that the AHJ is supposed to be notified in advance of a UL Field Evaluation in my jurisdiction. I do not receive such notification in all instances.

A. It is UL's practice to always involve the local inspection authority when conducting Field Evaluations.

Prior to conducting a Field Evaluation, a jurisdictional notification letter is sent to the Chief or Senior Inspector informing them that UL has been contracted to conduct the evaluation work. This letter includes information on the scope of the evaluation, identification of the product to be evaluated, it provides who the customer is, and gives the address of the installation.

The AHJ is then called to provide specific dates and times that the UL Engineer plans to be at the installation site so they can be present if they desire. This call is also used to get input on any specific concerns that the AHJ may have. (Our goal is to always provide this information to the applicable inspection authority. However, at times when project schedules have very short lead times this notice may get missed or the AHJ may not be available when the UL Engineer calls.)

If deficiencies are found, a Preliminary Findings Report is prepared and issued to both the client and the AHJ.

If the deficiencies remain unresolved after 90 days, both the client and the AHJ are notified that the Field Evaluation did not result in a favorable conclusion and the project is then closed. If the evaluation did find a compliant product, the UL Engineer will apply a UL Field Evaluated Product (FEP) label and a final full engineering report is created and provided to both the client and the AHJ.

In the event that you learn about a UL Field Evaluation or Field Inspection after the fact, please contact a UL Regulatory Services staff member at **1-800-595-9844** or by email at ULRegulatoryServices@us.ul.com. You may also contact UL's Field Evaluation Services Management at **1-877-UL-HELPS** (1-877-854-3577) and select prompt "2", to get resolution.

1.2 (SW) Q. **Clarifying information in the Field Evaluation Deficiency Statistics report.** In the Field Evaluation Deficiency Statistics that were provided, I noted that the percentage of Field Evaluated products not labeled went from 4.9 percent in 2006, to 0.3 percent in 2007 and to 0.0 percent in 2008. Can you explain?

- A. This particular measure should not have been included in the Field Evaluation Deficiency Statistics report, due to inconsistencies in data collection. Upon further review of the reporting form and statistics, it was noted that the process for staff reporting whether products were labeled or not required checking a box on the form. The check box was apparently not being used properly.

UL is taking corrective action to improve the report form. The percentage of products not labeled was in fact higher than noted in the report, but accurate numbers are not available at this time.

- 1.3 (NW)** Q. **Field Evaluation pricing.** How much does UL charge to perform a Field Evaluation? Some AHJs have been informed that UL charges way too much for Field Evaluation services.

- A. UL is constantly reviewing the pricing level for providing Field Evaluations. Many different factors are considered when determining the appropriate pricing level for Field Evaluations. It should be noted that some contractors or building owners have been known to exaggerate the cost associated with having unlisted products evaluated in order to avoid having Field Evaluations requested by AHJs.

If UL is requested to provide a quote for Field Evaluation work, we would be happy to provide the details of the quote to the appropriate AHJ upon request.

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" or visit UL's online Field Evaluation Services homepage at: www.ul.com/field/index.html.

2.0 UL FIELD REPORTS SYSTEM

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

(NW)

A. UL's Field Reports 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. At the conclusion of the investigation the AHJ will receive a close out letter with generic information on the findings and outcome.

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 for assistance at **1-800-595-9844** or by email at **ULRegulatoryServices@us.ul.com**.

3.0 SERVICE EQUIPMENT, SWITCHBOARDS, PANELBOARDS AND POWER DISTRIBUTION EQUIPMENT

3.1 (S) Q. **Evaluation of UL Classified prefabricated commercial buildings.** Are modular buildings (typically used as electrical distribution or main service unit enclosures) evaluated to all of the current Model Codes as part of the evaluation process by UL such as the NEC[®], UPC[®], UMC[®], IMC[®], and IBC[®] etc.?

A. Not necessarily. The manufacturer determines which Model Codes are used by UL to investigate these prefabricated commercial buildings.

Prefabricated commercial and industrial buildings are factory-built buildings or structures incorporating pre-installed materials and equipment that, after installation, are usually concealed and may not be accessible for inspection at the installation site. They are intended for installation subject to approval by the authority having jurisdiction.

UL Classifies these buildings under the product category “Commercial and Industrial Buildings, (QRNZ).” Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 283 in the 2008 UL White Book.

The UL Classification Mark on these prefabricated commercial buildings will specifically identify all of the Model Codes used as part of the evaluation. Additionally, the UL Classification Mark will reference the required Data Plate (See Question 3.2 for an explanation of a Data Plate), which is to be located adjacent to the electrical distribution panel. It should be noted that most prefabricated commercial buildings Classified under this product category were investigated only to NEC[®] requirements.

3.2 (S) Q. **Determining the scope of the evaluation of a UL Classified prefabricated building.** How does the local AHJ know what is covered by the UL Classification Mark on a prefabricated building? Does the UL Mark only address the prefabricated building or does it include the internal components and equipment being installed or mounted inside the building?

A. Prefabricated commercial and industrial buildings are required to have a Data Plate, which is to be located adjacent to the electrical distribution panel, that provides the following information:

- Manufacturer's name and address.
- Type of concealed wiring method (Rigid conduit, EMT, etc.), if any. Conduit, EMT, etc. which is not installed within walls, ceilings, or floor is not considered to be concealed wiring.

- Maximum voltage rating of equipment located in the building.
- If multiple electrical sources are present, a warning marking shall be provided in such a location that it is visible before entering the building.
- Reference to a drawing (provided with the building), which shows or lists all factory installed equipment.
- List of field-completed electrical construction subject to inspection by the local authorities.
- Unevaluated equipment subject to approval by local inspection authorities.

Please refer to the previous Q&A on prefabricated commercial and industrial buildings for Guide Information and information on the UL Classification Mark.

3.3 (S) Q. Questions on Modular IT units. What are the adopted National Codes used for the evaluation of either Modular IT units or units built on semi-trailers? Are they evaluated to only the NEC[®]? What about HVAC and Plumbing and HVAC for equipment and environmental cooling or heating?

A. UL Classifies these Modular IT buildings under the product category “Commercial and Industrial Buildings, (QRNZ).” To date UL has only evaluated these Modular IT buildings to NEC[®] requirements. In general, no manufacturers have requested that UL investigate their Modular IT products to the requirements found in the mechanical or plumbing codes.

UL has not evaluated any Modular IT units that are constructed on semi-trailers, because they are not intended to be permanently installed.

Please refer to the two previous Q&As on prefabricated commercial and industrial buildings for additional information.

3.4 (S) Q. Factory provided main bonding jumpers. Is the green bonding screw and its attachment point in the enclosure evaluated for the fault current in a UL Listed panelboard?

A. UL Lists panelboards under the product category “Panelboards, (QEUY).” Guide Information for this category can be found in UL’s Online Certifications Directory at www.ul.com/database and on page 262 in the 2008 UL White Book. UL Listed panelboards are evaluated to the Standard for Safety for Panelboards, ANSI/UL 67.

ANSI/UL 67 requires that a panelboard is to be provided with a main bonding jumper if the panelboard is either marked as being suitable for use as service equipment, or is provided with an insulated neutral. The Questions and Answers from UL Meetings with Electrical Inspectors at the 2008 Annual IAEI Section Meetings

main bonding jumper shall consist of a separate screw, strap, or other means to bond "the box or the interior pan" (if a box is provided) or "the interior pan" (if no box is provided) to the insulated grounded circuit conductor.

The size of the main bonding jumper is detailed in the Standard, and is determined based on the maximum ampere rating of the panelboard and the anticipated size of the largest main service conductors. If the main bonding jumper is a screw, the screw shall have a green colored head that is hexagonal, slotted, or both. The screw shall be visible without disassembly or removal of any devices inside the panelboard.

Panelboards are marked with short circuit current ratings that are based on construction and performance requirements. This rating applies to the overall assembly, including the bonding means.

3.5 **Q.** **Use of field installed products in Listed panelboards.** Are there Listed third party manufactured products that are investigated for the purpose of bonding the grounded conductor to the enclosure of a Listed panelboard and would their use violate the panelboard Listing?
(S)

A. Bonding and grounding devices are Listed by UL under the product category "Grounding and Bonding Equipment, (KDER)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 180 in the 2008 UL White Book. UL Listed bonding and grounding equipment is evaluated to the Standard for Safety for Grounding and Bonding Equipment, ANSI/UL 467.

UL Lists panelboards under the product category "Panelboards, (QEUY)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 262 in the 2008 UL White Book. UL Listed panelboards are evaluated to the Standard for Safety for Panelboards, ANSI/UL 67.

Grounding and bonding equipment must be installed in accordance with any installation instructions that are included with the product. The suitability of field installed grounding and bonding equipment within a panelboard have not been specifically investigated by UL unless the installed grounding and bonding device is identified in the specific markings of the panelboard. Without evaluation as a n assembly of the Listed grounding and bonding equipment along with the Listed panelboard, UL cannot indicate whether the panelboard does or does not continue to comply with ANSI/UL 67, the Standard for Safety for Panelboards.

4.0 CIRCUIT BREAKERS AND AFCIs

4.1 Q. **UL Listed Combination AFCIs.** Are there any UL Listed combination
(E) AFCI devices?

A. Yes, UL Lists Combination Type AFCI devices under the product category “Arc-Fault Circuit Interrupters, Combination Type (AWAH).” Guide Information for this category can be found in UL’s Online Certifications Directory at www.ul.com/database and on page 62 in the 2008 UL White Book. UL Listed Combination Type AFCI devices are evaluated to the Standard for Safety for Arc-Fault Circuit Interrupters, ANSI/UL 1699.

Combination Type AFCI devices comply with the requirements for both Branch/Feeder Type AFCIs (see AVZQ on page 61) and Outlet-Circuit-Type AFCIs (see AWCG on page 62), hence the “Combination” name. They are intended to provide protection of the branch-circuit wiring, feeder wiring, or both, and cord sets and power-supply cords connected to receptacles against the unwanted effects of arcing.

These devices may be self-contained with an enclosure, separate devices intended to be mounted in an enclosure or outlet box, or integrated as part of another device, such as a circuit breaker or outlet receptacle.

According to NEC[®] Article 100, a device is considered a unit of an electrical system that carries or controls electric energy as its principal function. Circuit breakers and Receptacles are both considered devices by this definition.

Currently, there are four manufacturers that have UL Listings for Combination Type AFCI devices; all four are using circuit breaker designs. There are currently no manufacturers that produce a UL Listed Combination Type AFCI receptacle.

4.2 Q. **Use of 3-pole circuit breakers on 1-phase circuits.** Under the UL
(E) product category DIVQ, it specifies that 3-pole molded-case circuit breakers are suitable for use only on 3-phase systems unless marked otherwise. Is it allowed to use a 3-pole breaker and only connect conductors to 2 of the 3 poles?

A. Yes, provided the 3-pole molded-case circuit breaker is either:

- Marked to indicate use on 1-phase systems, such as, “For 1–phase connections, use two outside poles,” or an equivalent statement; or
- The 3-pole molded-case circuit breaker is used in place of a 2-pole breaker on a 3-phase system, such as a 2-pole breaker used in a branch circuit that is actually two legs of a 3-phase system, is acceptable without the 3-pole breaker being specifically marked.

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This information is specified in the Molded-Case Circuit Breaker Marking Guide, located in Appendix A at the back of the 2008 UL White Book, in Item #34, found on page 12.

UL Lists molded-case circuit breakers under the product category “Circuit Breakers, Molded-Case & Circuit Breaker Enclosures, (DIVQ).” Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 90 in the 2008 UL White Book. UL Listed molded-case circuit breakers are evaluated to the Standard for Safety for Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures, ANSI/UL 489.

4.3 Q. UL Classified vs. UL Listed molded-case circuit breakers. What is the difference between a UL Listed molded-case circuit breaker and a UL Classified molded-case circuit breaker?

(E)

A. UL Classified molded-case circuit breakers have been investigated and found suitable for use in place of other Listed circuit breakers in specific Listed panelboards. These circuit breakers are Classified for use in specified panelboards in accordance with the details described on the circuit breaker or in the publication provided with the Classified circuit breaker.

Additionally, UL Classified molded-case circuit breakers have specific maximum ratings. These circuit breakers are restricted to a rating of 15 to 50 amperes at 120/240 volts. Classified circuit breakers are intended to be installed in specific Listed panelboards, with ratings not exceeding 225 amperes, at 120/240 volts ac, and a maximum short-circuit current of 10 kA. These circuit breakers are Classified for use in specified panelboards in accordance with the details described on the circuit breaker or in the publication provided with the Classified circuit breaker.

UL Classifies molded-case circuit breakers under the product category “Circuit Breakers, Molded-Case, Classified for Use in Specified Equipment, (DIXF).” Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 91 in the 2008 UL White Book. UL Classified molded-case circuit breakers are evaluated to the Standard for Safety for Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures, ANSI/UL 489 and the Standard for Safety for Panelboards, ANSI/UL 67.

A circuit breaker that is Classified only is marked on the side with the statement: *“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,*

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contact [Classified circuit breaker manufacturer's name].”

A circuit breaker that is both Classified and Listed is marked on the side with the statement: “This circuit breaker is Listed for use in circuit breaker enclosures and panelboards intended and marked for its use. This circuit breaker is Classified for use, where the available short-circuit current is 10 kA, 120/240 V ac or less, in the compatible panelboards shown in Publication No. _____ provided with this circuit breaker. When used as a Classified circuit breaker, do not use in equipment connected to circuits having an available system short-circuit current in excess of 10 kA, 120/240 V ac. If additional information is necessary, contact [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 Classified circuit breaker, in addition to the company name and catalog number of the applicable UL Listed panelboards, and corresponding UL Listed circuit breakers in place of which the 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 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 following mark:  appears on the front, visible surface of UL Classified molded-case circuit breakers.

UL Lists molded-case circuit breakers under the product category “Circuit Breakers, Molded-Case and Circuit Breaker Enclosures, (DIVQ).” Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 90 in the 2008 UL White Book.

Listed circuit breakers are rated 600 V or less. A circuit breaker is marked ac or dc, or both ac and dc. A symbol (~), where used, represents ac. The frequency is included if other than 60 Hz. Circuit breakers that have an interrupting rating higher than 5,000 amperes are marked to indicate the higher rating.

An interrupting rating on a molded-case circuit breaker included in a piece of equipment does not automatically qualify the equipment in which the circuit breaker is installed for use on circuits with higher available fault currents than the rating of the equipment itself.

For additional information on markings of molded-case circuit breakers,

please refer to the Molded-Case Circuit Breaker Marking Guide, located in Appendix A at the back of the 2008 UL White Book.

The Listed panelboard, switchboard or other end-use equipment is marked for use with the intended Listed molded-case circuit breakers.

5.0 DISTRIBUTED ENERGY SYSTEMS

5.1 (SW) Q. **Field modifications of UL Listed panelboards.** For PV installations, we are having an issue where you tie into an “all-in-one” panelboard, and need some guidance as to what modifications are permitted by UL.

A. In the electrical industry, an “all-in-one” panelboard commonly refers to a service panel that includes a metering section, main breaker, and branch circuit breaker panelboard section in a single enclosure. The panel would typically be constructed with the metering section having terminals for the supply service conductors (service lateral or service entrance conductors). The load side of the meter socket would have factory installed insulated conductors that route to the supply terminals of the main breaker in the circuit breaker section of the equipment. The assembly would be UL Listed to the requirements of ANSI/UL 67, the Standard for Safety for Panelboards.

What is happening now is that modifications to the panelboard are needed in order to add a solar photovoltaic system to supply part of the energy demand for the building. The question is how would UL view any modifications to the original Listed “all-in-one” panelboard?

UL’s position is that a UL Listing Mark on a product or equipment signifies that when the product or equipment left the point of manufacture, it was compliant with the UL requirements in effect at that time. UL has a documented policy on field modifications being made to Listed products.

When a UL Listed product is modified after it leaves the factory, UL has no way to determine if the product continues to comply with the safety requirements used to certify the product without investigating the modified product. UL can neither indicate that such modifications “void” the UL Mark, nor that the product continues to meet UL’s safety requirements, unless the field modifications have been specifically evaluated by UL. This can be done through a UL Field Evaluation by qualified UL staff that can assess the extent of the modifications and make a determination on whether or not the product continues to comply with the applicable UL requirements.

For additional information on field modifications please refer to page 39 in the 2008 UL White Book or go online to UL’s Regulators, Field Related Certification Services web page at:
www.ul.com/regulators/index_field.cfm.

For additional information on UL’s Field Evaluation Services please visit UL’s online Field Evaluation Services homepage at:
www.ul.com/field/index.html.

6.0 LUMINAIRES AND SIGNS

6.1 (SW) Q. **Concerns with ungrounded portable luminaires.** Why does UL permit ungrounded portable luminaires to be permanently mounted? These products often have quite a bit of exposed metal.

A. Actually, there is a requirement for permanently mounted portable luminaires to be grounded. The requirement for grounding permanently mounted portable luminaires became effective on February 18, 2006, so it may have taken some time for stock to clear on products manufactured to the previous requirements.

UL Lists portable luminaires under the product category "Luminaires, Portable, (QOWZ)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 273 in the 2008 UL White Book. UL Listed portable luminaires are evaluated to the Standard for Safety for Portable Electric Luminaires, ANSI/UL 153.

The specific grounding requirement for permanently mounted portable luminaires in ANSI/UL 153 is as follows:

68.3.3 A wall-mounted unit that has accessible metal parts shall be provided with a grounding attachment plug and comply with the requirements in Grounding and Bonding, Section 36.

Exception: Units are not required to be provided with a grounding attachment plug or comply with the requirements of Section 36 if they cannot be readily adapted for permanent mounting by:

- a) A separable bracket for mounting that does not contain wiring and does not require tools for attachment to the luminaire; or*
- b) Ring hanger, keyhole slots, or notches in the luminaire that permit removal from the mounting hardware without the use of tool.*

An exception is made for products that employ non-permanent means (removal without the use of tools) to mount them to the surface, these are not required to be grounded.

6.2 (W) Q. **Can UL List custom luminaires?** With NEC[®] Section 410.6 requiring all luminaires to be listed, can UL List a custom Elk Antler chandelier?

A. Yes, UL does List these types of custom luminaires under the product category "Incandescent Surface-Mounted Luminaires, (IEZR)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 149 in the 2008 UL

White Book. UL Listed incandescent surface-mounted luminaires are evaluated to the Standard for Safety for Luminaires, ANSI/UL 1598.

This category covers surface-mounted luminaires, including floor-, wall-, ceiling-, and pole-mounted luminaires. Ceiling-mounted luminaires include cord-, stem-, chain- and cable-suspended luminaires, in addition to outlet box-mounted luminaires.

If you discover an unlisted custom luminaire of this type, UL can conduct a Field Evaluation to ensure its safety. For more information, contact UL's Field Evaluation customer service at **1-877-UL-HELPS** (1-877-854-3577) and select prompt "2" or visit UL's online Field Evaluation Services homepage at: www.ul.com/field/index.html.

6.3 (W) Q. **Location of markings on signs.** Is there a requirement for sign labels to be visible after installation?

A. Yes, the general requirement in UL Standard 48 is that a sign shall be marked, in a location where the marking is plainly visible after the sign has been installed. This means that for most signs the marking should be somewhere on the outside of the sign (other than the sign face) but it is not required to be visible from the ground.

UL Lists signs under the product category "Signs, (UXYT)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 329 in the 2008 UL White Book. UL Listed signs are evaluated to the Standard for Safety for Electric Signs, UL 48.

There are also some exceptions to the visible marking requirements that permit the marking to be inside the sign visible only after the sign face is removed. This would include all recessed signs and other signs where after installation only the sign face is accessible. In general marking should not be installed on a sign face since they commonly require replacement during the life of a sign.

6.4 (W) Q. **Unreadable sign labels.** I have noticed that sometimes sign labels are faded and unreadable, are these labels required to be permanent? Would the unreadable faded label warrant a field evaluation?

A. UL Standard 48 and NEC[®] Section 600.4 require labeling of a sign. The Standard for Safety for Electric Signs, UL 48, specifically requires in Paragraph 40.1.2 that the marking be capable of use in the application and refers to indelible ink, die stamp, paint or other methods generally considered a permanent marking type. If the marking cannot withstand the elements of its intended location and the information is unreadable at the time of inspection, this would not comply with either the UL Standard or the NEC[®] requirements.

If the AHJ were unable to determine the required code compliance of NEC[®] 600.3 and 600.4, then one option for achieving compliance would be to require the sign to be field 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" or visit UL's online Field Evaluation Services homepage at: www.ul.com/field/index.html.

6.5
(W)

Q. Use of luminaire disconnects on motors. Are the luminaire disconnects required by NEC[®] Section 410.130(G) evaluated for other uses such as a disconnecting means for a motor?

A. No, luminaire disconnects are multi-pole splicing wire connectors and are not intended for use on motor circuits. Additionally, these types of wire connectors do not have a horsepower rating and would not comply with the requirements of NEC[®] Sections 430.109 and 430.110.

UL Lists luminaire disconnects under the product category "Multi-Pole Splicing Wire Connectors, (ZMNA)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 388 in the 2008 UL White Book. UL Listed multi-pole splicing wire connectors are evaluated to the Outline of Investigation for Insulated Multi-Pole Splicing Wire Connectors, UL Subject 2459.

Multi-pole splicing wire connectors are intended for factory wiring and/or field wiring. Multi-pole splicing wire connectors are intended to facilitate the connection of hard-wired utilization equipment (e.g., prefabricated wiring assemblies, ceiling fans, smoke detectors, lighting products) to the branch-circuit conductors of buildings. They are multi-polarity devices used to connect to two or more branch-circuit conductors.

This category also covers luminaire disconnects, which are intended to facilitate replacement of the ballast within a luminaire and may not be directly attached to the branch-circuit conductors.

7.0 WIRING SYSTEMS AND WIRING DEVICES

7.1 (SW) Q. **Is Type SE Cable sunlight resistant?** During an inspection on Type SE cable, I could not find a marking to indicate that the cable was suitable for exposure to sunlight. The manufacturer stated that this cable was tested and suitable for use where exposed to sunlight. Can UL verify whether this use has been evaluated and whether a marking is required?

A. UL Listed Type SE cable has been evaluated and is considered suitable for use where exposed to sunlight. This is confirmed on page 321 of the UL White Book product category Guide Information for Service-Entrance Cable (TYLZ). Also, you can refer to the UL Wire and Cable Marking Guide, located near the back of the UL White Book in Appendix A or online at www.ul.com/regulators. On page 9 of the marking guide, the table shows “yes” under sunlight resistance for Type SE cable, signifying that all UL Listed Type SE cable has been evaluated for this application, and no special marking is needed.

7.2 (W) Q. CEC[®] vs. NEC[®] requirements for MC Cable. Why is type TECK 90 Cable not Listed?

A. Type TECK 90 cable consists of one or more insulated conductors, with or without one or more grounding conductors, an inner jacket of thermoplastic or thermosetting material, and an overall interlocked steel, copper, or aluminum armor. The armor on single-conductor cable is aluminum or copper. TECK 90 cable is rated for use up to 5,000 V, and available in sizes 14 AWG through 2,000 kcmil for copper, and 12 AWG through 2,000 kcmil for aluminum, and employs thermoset- or thermoplastic-insulated conductors. TECK 90 cable rated 5,000 V employs conductors no smaller than 8 AWG.

Type TECK 90 Cable is CUL Listed for Canada and intended for installation in accordance with CAN/CSA-C22.1, “Canadian Electrical Code[®], Part 1.” This cable type is included under the product category “Metal-Clad Cable Certified for Canada, (PJAZ7).” Guide Information for this category can be found in UL’s Online Certifications Directory at www.ul.com/database and on page 391 in the 2008 UL Canadian White Book. Type TECK 90 Cable is evaluated to the Standard, CAN/CSA-C22.2 No. 131, “Type TECK 90 Cable.”

The national standards for Metal-Clad Cable have not been harmonized between the United States and Canada. The use of Type TECK 90 cable is not recognized in the United States under the NEC[®].

Type MC metal-clad cable suitable for use in accordance with the NEC[®] is found under the product category “Metal-Clad Cable, (PJAZ).” Guide

Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 241 in the 2008 UL White Book. Type MC metal-clad cable is evaluated to the Standard for Safety for Metal-Clad Cable, ANSI/UL 1569.

7.3 (W) Q. Self-contained receptacles. Are there receptacle devices Listed by UL for installation without being installed in an outlet box?

A. Yes, UL Lists self-contained 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 295 in the 2008 UL White Book. UL Listed self-contained receptacles are evaluated to the Standard for Safety for Attachment Plugs and Receptacles, UL 498.

Self-contained receptacles include an enclosure and mounting means intended for flush mounting without the use of a separate flush device or other outlet box. They are intended for use with Types NM and NMC cable in accordance with the NEC[®]. They are identified by specific markings on the carton in which they are packed. Devices employing insulation displacement terminals are intended for assembly with specific installation tools only. Reference must be made to the installation instructions regarding the proper tool and the number of cables (per entry) with which the devices are intended to be used.

7.4 (E) Q. Bonding pool water. Does the UL Category KDER include pool water bonding as required by the 2008 NEC[®] 680.26(C)?

A. Yes, but this requirement is met through the grounding and bonding devices used to provide the equipotential bonding. NEC[®] 680.26(C) requires that an intentional bond of a minimum conductive surface area of 5,806 mm² (9 inches²) shall be installed in contact with the pool water. This bond shall be permitted to consist of parts that are required to be bonded in 680.26(B).

UL product category KDER, Grounding and Bonding Equipment, covers bonding devices, ground clamps, grounding and bonding bushings and locknuts, ground rods, armored grounding wire, protector grounding wire, grounding wedges, ground clips for securing the ground wire to an outlet box, water meter shunts, and similar equipment. Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 180 in the 2008 UL White Book.

A number of grounding and bonding devices evaluated under KDER are used to bond the items listed in NEC[®] 680.26(B), those items that are in direct contact with the pool water would meet the requirement of NEC[®]

680.26(C).

Additionally, there is one manufacturer under the product category “Swimming Pool and Spa Equipment, Miscellaneous, (WDUT)” that specifically produces a swimming pool water bonding kit. Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 341 in the 2008 UL White Book. This category covers accessory equipment for swimming pools, hot tubs and spas.

UL Listed miscellaneous swimming pool and spa equipment is evaluated to the Standard for Safety for Electric Spas, Equipment Assemblies, and Associated Equipment, UL 1563 and/or the Standard for Safety for Swimming Pool Pumps, Filters and Chlorinators, UL 1081.

8.0 APPLIANCES AND UTILIZATION EQUIPMENT

8.1 (SW) Q. **HVAC equipment marked “Maximum Fuse Size.”** The nameplate on certain types of HVAC equipment is marked with the “Maximum Fuse Size.” The manufacturer has told the installer and the AHJ that circuit breaker use is acceptable. The AHJs, in following NEC[®] Section 110.3(B), are requiring that the nameplate be followed and fuses (only) be installed. What is UL’s position?

A. If the manufacturer marks the HVAC equipment nameplate with the statement, “Maximum Fuse Size,” then only fuses may be used to provide protection.

UL Lists HVAC equipment under the product category “Heating and Cooling Equipment, (LZFE).” Guide Information for this category can be found in UL’s Online Certifications Directory at www.ul.com/database and on page 199 through 203 in the 2008 UL White Book. UL Listed HVAC equipment is evaluated to the Standard for Safety for Heating and Cooling Equipment, ANSI/UL 1995. Other standards may also be used where specifically indicated in the individual categories.

Guide Information for LZFE specifically states that in permanently connected units employing two or more motors or a motor and other loads operating from a single supply circuit, the motor overload protective devices (including thermal protection for motors) and other factory-installed motor components and wiring are investigated on the basis of compliance with the motor branch-circuit short-circuit and ground-fault protection requirements of the 2008 NEC[®] Section 430.53(C) as referenced in Section 440.22 of the NEC[®]. Such equipment is intended to be connected only to a circuit protected by fuses or a circuit breaker with a rating that does not exceed the value marked in the data plate. This marked protective device rating is the maximum for which the equipment has been investigated and found acceptable. **Where the marking specifies fuses or "HACR Type" circuit breakers, the circuit is intended to be protected only by the type of protective devices specified.**

8.2 (E) Q. **Factory vs. field conductor terminations.** How are Class K conductors in a UL Listed Variable Frequency Drive (VFD) allowed to be terminated in a straight mechanical lug and not required to be terminated using hydraulic crimp terminations?

A. The termination of a conductor in the factory is significantly more controlled than a field installed connection. There are specific construction and test requirements in the applicable Standard, which demonstrate that the factory terminations are suitable for the application.

UL Lists VFDs under the product category “Power Conversion Equipment, (NMMS).” Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 215 in the 2008 UL White Book. UL Listed VFDs are evaluated to the Standard for Safety for Power Conversion Equipment, ANSI/UL508C.

ANSI/UL508C is similar to a large number of other standards and does not specifically require that factory terminated connections comply with the same requirements as field terminated connections. Because of the large number of variables associated with field terminations, the requirements for terminating conductors in the field is generally stricter than those for factory controlled connections.

8.3 (E) Q. Use of commercial appliances in a residence. Why are listed commercial dishwashers and ranges not allowed for residential use?

A. The main reason that commercial cooking appliances are not suitable for residential use is user safety. Let's start with the question of the basic level of user safety knowledge. In a commercial application it is assumed that the user is a trained professional and has had some level of basic cooking appliance safety training. This cannot be assumed in a residential application.

The Standards used to evaluate commercial kitchen products are different than the Standards used to evaluate household use products. Here are two examples of the difference in safety requirements between commercial cooking appliances and household cooking appliances:

- Household cooking appliances have maximum allowable surface temperature requirements that **cannot be exceeded**. Commercial products also have a maximum allowable surface temperature requirement, but these temperatures **can be exceeded** with the addition of warning signage on the appliance.
- Household cook tops and ranges require at least **2 operations to turn on a heating element**, either a push and turn or a pull and turn movement. Commercial ranges **do not require multiple operations**.

The maximum surface temperature and the multiple operations to turn on a heating element are examples of the child safety requirements found in the Standards for household cooking appliances.

UL Lists residential ranges under the product category, “Ranges, Household Electric, (KRMX).” Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 195 in the 2008 UL White Book. UL Listed household

electric ranges are evaluated to the Standard for Safety for Household Electric Ranges, UL 858.

UL Lists commercial ranges under the product category, "Commercial Cooking Appliances, (KNGT)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 188 in the 2008 UL White Book. UL Listed commercial ranges are evaluated to the Standard for Safety for Commercial Electric Cooking Appliances, ANSI/UL 197.

The category KNGT, Commercial Cooking Appliances, covers cooking equipment intended for commercial indoor use, such as coffee machines, espresso coffee makers (single or grouped dispensers), conductive cookers, food warmers including heated food servers, fryers, griddles, nut warmers, ovens, popcorn machines, steam kettles, ranges, and other appliances for use in commercial kitchens, restaurants, or other business establishments where food is dispensed.

Commercial cooking appliances are intended for commercial use in unclassified (ordinary) locations in accordance with ANSI/NFPA[®] 70, "National Electrical Code[®]" (NEC[®]), and are intended to be installed in accordance with ANSI/NFPA[®] 96, "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations."

UL Lists residential dishwashers under the product category, "Dishwashers, Household, (DMIY)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 97 in the 2008 UL White Book. UL Listed household electric ranges are evaluated to the Standard for Safety for Household Dishwashers, ANSI/UL 749.

UL Lists commercial dishwashers under the product category, "Dishwashers, Commercial, (DMGR)." Guide Information for this category can be found in UL's Online Certifications Directory at www.ul.com/database and on page 96 in the 2008 UL White Book. UL Listed commercial dishwashers are evaluated to the Standard for Safety for Commercial Electric Dishwashers, UL 921.

This category covers commercial, freestanding, undercounter, and counter-insert dishwashers using water as the principal cleaning medium. Commercial dishwashers are intended for use in commercial establishments, such as kitchens of restaurants, bars and hospitals, where they are not to be accessible to the public.

9.0 COUNTERFEITING AND OTHER TOPICS

9.1 (NW) Q. **Counterfeiting questions.** How do AHJs determine if a product has a counterfeit UL Mark? What do we look for? 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?

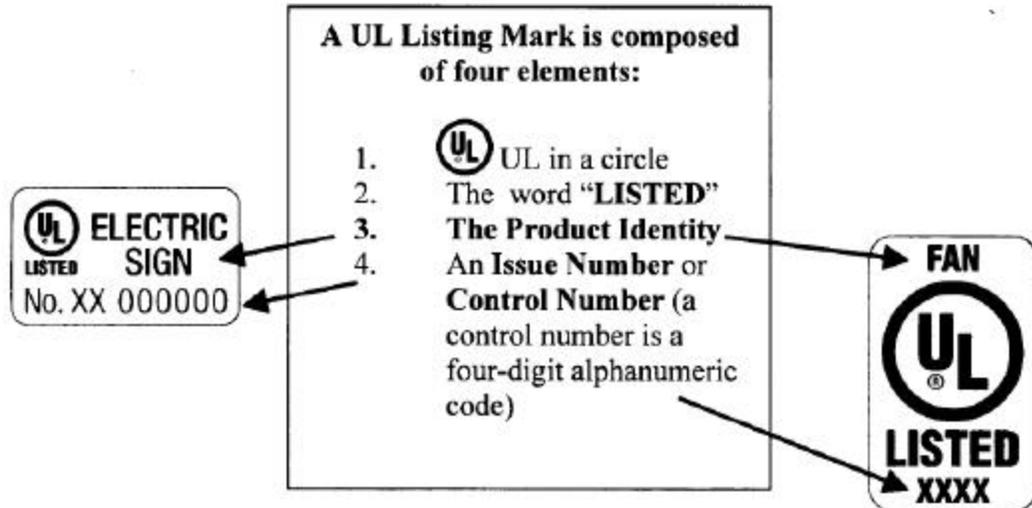
A. For over a century, the UL Mark, has been considered the American Symbol of Safety. Each day, employees at UL go to work for a safer world. On the other hand, counterfeiters go to work to profit at the expense of the public's well being and a company's reputation. Each year, over 21 billion authentic 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).

Below is an example of the four elements that comprise a UL Listing Mark. Additional information on identifying legitimate UL Marks, please refer to the "Practical Application of the White Book in the Field" section of the 2008 UL White Book on page 37. 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, please contact a Regulatory Services staff member at **1-800-595-9844** or by email at ULRegulatoryServices@us.ul.com.



UL introduced a new holographic UL Mark on June 25, 2008. The new holographic UL Mark will be required in 32 common consumer product areas, including power supply cords, nightlights and ceiling fans. The redesigned label incorporates cutting-edge technology, elevated security features and a unique hologram design, making it easy to identify and validate, yet incredibly difficult to replicate.

Distinct features of the new hologram label include:

- Gold background to help U.S. Customs officers and other law enforcement agencies, distributors, retailers and consumers quickly

- identify the new label.
- Color shifting ink similar to that in the new U.S. paper currency.
- Repeating pattern of floating UL symbols, a distinctive burst pattern around one of the floating UL symbols and wavy lines.
- Additional covert security features to assist with the authentication of a UL holographic label.

Additionally, UL has added another level of security via the UL Authenticator, a special credit card-size device that authorities can use to better identify counterfeit products.

9.2 (W) Q. UL Label authenticators. Are the UL Label authenticators available for contractors?

A. Currently authenticators are only available to the AHJ's as complimentary. UL has plans to set up a web site where non-AHJ's would be allowed to purchase authenticators.

9.3 (E) Q. Who regulates the NRTL's? During a field evaluation, UL generated a 50-item list of deficiencies. The contractor then hired a different NRTL who provided a field evaluation marking without addressing all of the issues discovered during the UL evaluation process.

A. This would be up to the AHJ as to whether or not to accept the field evaluation. The AHJ will have to determine if the organization performing the Field Evaluation is competent to evaluate the equipment and that the Field Evaluation addresses all of the electrical safety concerns expressed by the AHJ.

Currently NFPA[®] is working on two new standards that will address Field Evaluations. NFPA[®] 790 and NFPA[®] 791 will address Competency (NFPA[®] 790), Process and Procedures (NFPA 791) with an anticipated publication date to coincide with the 2011 NFPA code cycle. Currently there are two publications that are the basis for NFPA[®] 790 and NFPA[®] 791 standards;

Recommended Competency Guidelines for Third Party Field Evaluation Bodies
www.acil.org/associations/1304/files/RecCompFEOFnl.pdf

Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation
www.acil.org/associations/1304/files/RecomPractUnbleEquipupdate d72005.pdf



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