

**REPORT ON DISCUSSIONS
DURING UL MEETINGS
WITH ELECTRICAL INSPECTORS
AT THE
2002 IAEI SECTION MEETINGS**



August 29, 2003

TO: Attendees of Underwriters Laboratories Inc. Meetings with Electrical Inspectors at 2002 IAEI Section Meetings

SUBJECT: Report of Meetings

Underwriters Laboratories held meetings with Electrical Inspectors during the 2002 Section Meetings. Historically, these meetings have provided for an open exchange between electrical inspectors 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 question 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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QUESTIONS AND ANSWERS
FROM
UL MEETINGS WITH ELECTRICAL INSPECTORS
AT THE 2002
ANNUAL IAEI SECTION MEETINGS

This report contains questions and answers from the 2002 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 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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1.0 UL SERVICES AND INFORMATION

- 1.1 Q. In manufacturers' installation instructions, sometimes they use the word "Recommend". For example, "It is recommended to use on a separate branch circuit..." Does the installer need to specifically follow the "Recommendations" in order to comply with Section 110.3(B) of the NEC?
(W)
- A. Yes, the installation instructions provided with Listed products are reviewed as part of the Listing investigation. Manufacturer recommendations that are part of the instructions should be followed in order to comply with NEC Section 110.3(B). If an AHJ believes the installation instructions conflict with the NEC, please contact a Regulatory Services staff member in your area.
- 1.2 Q. Can UL post manufacturers' installation instruction on-line so that we can obtain and know that they are the proper ones?
(W)
- A. Manufacturers are required to provide the proper installation instructions with the product. Our field representatives perform factory inspections to audit compliance with all the requirements applicable to the product. UL is currently considering the viability of providing installation instructions online.
- 1.3 Q. Are the UL Field Report forms going to be put on-line?
(W)
- A. Yes, September 2002 an electronic version of the Field Report Form was added to UL's Regulator Page, accessed by www.ul.com/regulators.
- 1.4 Q. How can we tell if a UL Listing Mark is counterfeit? Is there something we should be looking for?
(W)
- A. The UL Listing Mark generally includes the UL symbol or it may include other registered forms as authorized by UL. The UL Listing Mark includes: (1) the UL symbol shown below; (2) the word "LISTED"; (3) the product identity; and (4) a control number assigned by UL.



The product identity as indicated in the Guide Information for each product category is generally included as part of the UL Mark, but may be omitted when, in UL's opinion, the use of the name is unnecessary and the UL Mark is directly and

permanently applied to the product by stamping, molding, ink-stamping, silk screening, or similar processes.

This information can also be found on page xv in the front of the 2003 General Information for Electrical Equipment Directory (the White Book).

A separable UL Mark (not part of a nameplate and in the form of decals, stickers or labels) will always include the following four elements: UL's symbol, the word "LISTED" or "CLASSIFIED," the product or category name, and a control number assigned by UL.

The complete UL Mark will appear on the product unless otherwise indicated in the Guide Information for a specific product category.

When a UL Listed product is of such a size, shape, material or surface texture that, in UL's opinion, it is impossible to apply legibly the complete marking to the product, the complete UL Listing Mark will appear on the smallest unit container in which the product is packaged. In these cases, UL may authorize the use of the UL symbol on the product in addition to the complete UL Mark on the package.

There is no magic formula for identifying counterfeit UL Listing Marks. UL has undertaken many rigorous procedures, e.g., holographic labels, color schemes, etc. to maintain the integrity of our Marks.

In addition, UL recognizes that the issue of counterfeiting must be dealt with to protect the integrity of the UL Mark. UL has a Trademark Enforcement Team specifically dedicated to protection of the UL Marks. For nearly eight years, UL and the U.S. Customs Service have partnered in extensive and unprecedented nationwide anti-counterfeiting efforts. If you have any questions on UL's Customs Program, contact Brian Monks in Melville, New York by phone at +1-631-271-6200, extension 22856, or by email at Brian.H.Monks@us.ul.com.

- 1.5 Q. Is there a limit to the number of similar or identical (NW) products produced by a single manufacturer before UL requires Listing of all products rather than an occasional Field Evaluation?
- A. No. The choice to pursue UL Listing for a class or group of products, versus the one-time only approach of Field Evaluations, is made by the manufacturer. UL is ready to assist the manufacturer either way to explain the values of all services offered by UL. There is no limitation on the number of Field Evaluations or "limited production" for

identical pieces of equipment produced by any one manufacturer.

- 1.6 (NW) Q. Is UL currently Listing Medium Voltage (MV) Equipment?
- A. Yes, there are a number of existing MV products already UL Listed and the number of additional Medium Voltage Categories increases continually. To examine the categories presently available, please access the Regulator's Page of the UL Website - www.ul.com -- click on "Equipment over 600 V". This list is also available on page xviii in the front of the 2003 General Information for Electrical Equipment Directory (the White Book).
- 1.7 (NW) Q. Does UL List Dock Cranes?
- A. At this time, there is not a formal Listing program for dock cranes. However, UL can perform a Field Evaluation on an entire dock crane, or any component or subassembly. UL does List cranes and hoists under the product category "Hoists (MSXT)" located on page 161 in the 2003 Building Materials Directory. This category covers hoists that are the smaller, usually stationary type. We also List "Crane and Hoist Electrification Systems (ELPX)" located on page 27 of the 2003 General Information for Electrical Equipment Directory (the White Book).
- These systems are designed to provide electrical power from a fixed source to moving equipment.
- 1.8 (NW) Q. Does UL List Spray Paint Booths?
- A. Yes - UL currently has service available under two product categories, "Paint Spray Booths Without Fire Protection Systems For Use In Hazardous Locations (QEFA)" located on page 86 of the 2003 Hazardous Locations Equipment Directory and "Paint Spray Booths With Fire Protection Systems For Use In Hazardous Locations (QEFY)" located on page 166 in the 2003 General Information for Electrical Equipment Directory (the White Book).
- 1.9 (E) Q. A product is field modified, like a Listed electric fan heater located over a door that because of it being in a limited space, the switch is required to be moved to another location. What type of field inspection would be required and what costs may be involved?
- A. Because of the nature of this field modification, it would require a Field Evaluation, handled from our closest office. To locate the closest office, and whom to contact, please access the Regulator's Page of the UL Website - www.ul.com --

click on "Field Evaluations" or contact your local Regulatory Services Representative identified in the front of this document. Costs are based on the time and travel expenses required to conduct the evaluation.

1.10 Q. Does UL have any guidelines regarding how long of a turnaround (E) there will be for a Field Inspection or Field Evaluation?

A. As quickly as possible to meet the client's and the AHJ's needs is the policy. Many are conducted within 1 or 2 days. Sometimes there are circumstances that are outside of UL's control (e.g. access to the jobsite), so those may take longer. However, every effort is made to provide timely service to all involved.

1.11 Q. A manufacturer has a UL Listing for their product line, and (E) receives an order for a custom made product that is referred to as a "contract special". What steps should the manufacturer go through to have the product labeled?

A. The manufacturer should contact our Customer Service staff, at 1-877-UL-HELPS, who will help the manufacturer choose the appropriate service, either Listing at the factory, or a Field Evaluation at the installation site.

1.12 Q. If equipment is sent into the field without Listing Marks and (E) the manufacturer sends labels to the job site, what is supposed happen?

A. This is a Field Report since this is not a UL authorized practice. Actions are taken by UL to remind the manufacturer of UL's policy, and to ensure the manufacturer has taken appropriate corrective actions. In addition, the manufacturer is required to initiate a Field Inspection by UL.

UL appreciates AHJ's notifying us of these unauthorized situations. It is presumed the product will be "red-tagged", and UL will expedite the necessary Field Inspection.

1.13 Q. Is the CE Mark a safety certification mark? (E)

A. No. 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, environment and consumer protection. Generally, this conformity to the applicable directives is done through self-declaration.

The CE Marking is required on products in the 18 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 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.

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. This information can be accessed at www.ul.com/regulators/CEMarkinfo.html.

1.14 Q. Factory-wiring in equipment have bends that do not comply with (SW) the wire bending radius requirements in the code. This can result in electricians in the field trying to ignore the wire bending requirements because they see it done in Listed equipment.

A. The wire bending space and wire bending radius required by the NEC are for conductors and equipment being installed in the field where conditions cannot be controlled and results verified. Product standards provide suitable requirements for the manufacture of products. Evidence of compliance with the product standards is the UL Listing Mark. Internal factory wiring is permitted to have tighter bends because the bends are made under factory conditions and the suitability of the internal wiring has been evaluated as a part of the product evaluation.

1.15 Q. Assistance is needed on how to read a UL label. For (SW) example, how is the difference between an "enclosed industrial control panel", an "open industrial control panel", and an "industrial control panel enclosure" determined? There are

Marking Guides available for select categories (e.g. Luminaires, Panelboards, and Deadfront Switchboards). Can other marking guides for other types of products be developed? Can another means be developed, such as a glossary of product categories?

- A. Marking requirements for all product categories are located in the UL Guide Information for each product category. The Guide Information for all product categories related to the NEC is published in the UL General Information for Electrical Equipment Directory (the White Book).

This information is also available on the online certifications directory, which can be accessed on the UL website at www.ul.com/database. Using the "keyword search" function, the specific category can be located or if you know the four-digit category code for the product category, enter the code at the "Category Code/Guide Information" search page. UL develops new Marking Guides, as needed, based on feedback from AHJs. UL will consider additional ways to assist AHJs in locating the needed information.

The specific information referenced in the question, can be located in the Guide Information for Industrial Control Equipment (NIMX), located on page 60 of the 2003 General Information for Electrical Equipment Directory (the White Book).

- 1.16 Q. Are there any swimming pool potting compounds that are Listed?
(SW)
- A. Yes, there are UL Listed Potting Compounds found under the product category "Potting Compounds (WCRY)" located on page of the 2003 General Information for Electrical Equipment Directory (the White Book).

2.0 SERVICE EQUIPMENT, POWER DISTRIBUTION EQUIPMENT, AND SWITCHBOARDS

2.1 Q. Has UL Listed any generators?
(NW)

A. Yes - There are many Listings, for different types of generators. They can be found under the following product categories in the 2003 General Information for Electrical Equipment Directory (the White Book) or other UL Directory where specified:

- "Engine Generators (FTSR)" located on page 36. This category covers electric generators used in combination with an internal combustion engine, for use as emergency or standby generators.
- "Generators (JZGZ)" located on page 57. This category covers generators that are also referred to as generator heads.
- "Generators for Use in Hazardous Locations (PSPT)" located on page 164. This category covers electric generators for use in hazardous locations.
- "Motor Generator Sets (PQYW)" located on page 76. This category covers motor generator sets and frequency converters intended for use in ordinary locations.
- "Alternators, Generators and Motors, Electric, Marine (ARDY)" located on page 2 of the 2002 UL Marine Products Directory. This category covers electric generators for use in marine applications.

2.2 Q. Does UL List electric motors?
(NW)

A. UL does have a Listing Service available for ordinary use electric motors under the category Electric Motors (PRGY) located on page 77 in the 2003 General Information for Electrical Equipment Directory (the White Book). This category was created in June 2001 and the requirements were published on November 2, 2001. To date, no motor manufacturer has submitted products to be Listed.

UL has been Listing Fire Pump Motors (QXZF) since 1998. Fire Pump Motors (QXZF) is located on page 195 in the 2003 Fire Protection Equipment Directory.

We also List motors for use in hazardous locations under the

following categories:

Motors For Use In Hazardous Locations (PTDR), located on page 164 in the White Book. Motors, Division 2 For Use In Hazardous Locations (PTHE), Rebuilt Motors and Generators For Use In Hazardous Locations (PTKQ) and Specialty Motors For Use In Hazardous Locations (PUCJ), all located on page 165 in the 2003 White Book.

2.3 Q. I have identified a meter stack problem where the bolts are
(E) burning out. Will UL examine this construction? Does repair/replacement of parts void the Listing?

A. Regarding the first question, yes, UL will investigate the matter as a Field Report, and take appropriate corrective action.

Regarding the second question, an authorized use of the UL Mark is the manufacturer's declaration that the product was originally manufactured in accordance with the applicable requirements when it was shipped from the factory. 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 investigated by UL.

The Authority Having Jurisdiction needs to determine the acceptability of the modification, or require the affected party to have UL evaluate the modified product. UL can assist the AHJ in making this determination.

If the affected party wishes UL to determine if the modifications made to a UL Listed product comply with UL requirements, the appropriate Field Engineering Service can be initiated to investigate the modifications. This evaluation will only be conducted after UL consults with the Authority Having Jurisdiction, in order to assure that UL's evaluation addresses all areas of concern, and meets all of the AHJ's needs. The detailed above can also be accessed online at <http://www.ul.com/regulators/modification.html>.

Information on Field Engineering Services, and contact names, are found at <http://www.ul.com/field.html>.

2.4 Q. If switchgear is comprised of a number of switchboard
(E) sections, shouldn't each section be labeled?

A. Switchboards are Listed under the category Switchboards, Dead-

front (WEVZ), located on page 115 of the 2003 General Information for Electrical Equipment Directory (the White Book). The Guide Information states that Listing Marks for Dead Front Switchboard Sections contain "_____ OF _____". The first space is stamped with a number indicating the position that the section occupies in the series of sections constituting the switchboard. The latter space is stamped with the total number of sections in the switchboard (including sections not bearing a UL Listing Mark).

A Listing Mark covers only the section so marked; it does not cover other sections include in the complete switchboard. It is intended that the switchboard sections are installed in the order identified by the Listing Marks, from left to right.

2.5 Q. Listed equipment that is required to be marked "Suitable For
(E) Use as Service Equipment" is sent to the field without this marking. Would the field inspection involve any testing or would a visual type investigation be sufficient?

A. UL staff performing the Field Evaluation to determine the suitability of the equipment for use as service equipment would make this determination in the field.

2.6 Q. Often, installation instructions get lost for switchboards
(SW) after they are installed. When the instructions for a bottom-feed-only conduit installation get lost after the unit is installed, it is hard for the AHJ to inspect the installation at a later time.

A. According to the information published in UL's "Deadfront Switchboard Marking Guide" (Section 12), all deadfront switchboards are evaluated for bottom feed in compliance with the 2002 NEC Section 408.10. If the conduit entry is some other location than the bottom, the installation must comply with NEC Section 408.3(F). The intended location of the conduit entry, if it is other than the bottom, will be identified in the manufacturer's drawings, or in the installation instructions.

The dead-front switchboard marking guide as well as marking guides for other types of products are available online at <http://www.ul.com/regulators/guides.html>.

2.7 Q. Are there Ground Clamps for rebar?
(SW)

A. Yes, ground clamps that have been specifically evaluated for use on concrete encased rebar are Listed under the category Grounding and Bonding Equipment (KDER) located on page 59 in

the 2003 General Information for Electrical Equipment Directory (the White Book). The ground clamps are marked with the size of the rebar and the size range of the grounding electrode conductor.

- 2.8 (SW) Q. Does UL require arc flash marking, as described in NEC Section 110-16, for panelboards, industrial control panels, motor control centers, and switchboards?
- A. The requirement in NEC Section 110.16 is for marking in the field of the above noted products, and is dependent upon the installation variables.
- 2.9 (SW) Q. What spacing is required between a transformer vent and a wall for dry type transformers above and below 600 V?
- A. Ventilated Transformers above and below 600 volts are typically marked to specify a minimum separation distance to the adjacent walls. Transformers, Distribution, Dry Type, Over 600 V (XPFS) are located on page 126 in the 2003 General Information for Electrical Equipment Directory (the White Book). Transformers below 600 Volts are Listed under the category Power and General Purpose Transformers, Dry Type (XQNX) located on page 128 in the 2003 White Book. The Guide Information for (XQNX) states "Transformers with ventilating openings should be installed so that the ventilating openings are not blocked. Some transformers are marked to specify a minimum distance to a wall."

3.0 CIRCUIT BREAKERS AND AFCIs

3.1 Q. How is it known in which Panelboard a Classified circuit
(W) breaker can be used? A local distributor is providing
Classified circuit breakers without the correlation sheet.

A. According to the Guide information for "Molded-Case Circuit
Breakers Classified For Use In Specified Equipment (DIXF)"
located on page 15 of the 2003 General Information for
Electrical Equipment Directory (the White Book):

"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 V 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 V ac. For catalog numbers (or equivalent) of
specified panelboards, refer to Publication
No. _____ provided with this circuit breaker. 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 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."

If the correlation sheet (referenced publication) is not
provided with each individual Classified breaker, then the AHJ
will not be able to determine compliance in accordance with
NEC Section 110-3(B).

Please supply us with the name of the manufacturer and type or
catalog designation so that we can initiate a Field Report.
Please also provide the name and address of the local
distributor.

3.2 Q. Can we locate information pertaining to Classified circuit

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- (W) breakers on UL's Website? Are the correlation sheets (referenced publications) available on-line?
- A. The on-line certification directory can be searched for companies covered under the product category "Molded-Case Circuit Breakers Classified Use In Specified Equipment (DIXF)". However, this will only provide a list of companies having coverage under this product category. At this time, the correlation sheets (referenced publications) are not on-line. UL will consider providing this information on-line.

3.3 Q. Can a 120 V ac rated circuit breaker be used on a 12 V ac system?
(E)

- A. Circuit breakers are Listed under the category Circuit Breakers, Molded-Case and Circuit Breaker Enclosures (DIVQ), located on page 13 in the 2003 General Information for Electrical Equipment Directory (the White Book). The Guide Information for (DIVQ) states: "Listed circuit breakers are rated 600 V or less. A circuit breaker is marked AC or DC or both AC and DC."

There is nothing in the NEC or UL Listings prohibiting this application.

3.4 Q. Are there any circuit breakers specifically Listed for 12 V ac?
(E)

- A. None that we are aware of.

3.5 Q. What should we do if we get a nuisance trip on a UL Listed Arc-Fault Circuit-Interrupter (AFCI)?
(W)

- A. Circuit breaker type AFCI's are Listed under the category Arc Fault Circuit Interrupters, Branch/Feeder Type (AVZQ) located on page 5 of the 2003 General Information for Electrical Equipment Directory (the White Book).

First, make sure it's a nuisance trip and not an "arc-fault trip" (e.g., shorted or severed conductor from a staple). There are various ways to trouble-shoot this occurrence, and manufacturers provide guidance in this regard.

Also, AFCIs are not designed nor intended for use on circuits in which the grounded (neutral) conductor is shared with other circuits; it will nuisance trip on "shared neutral" circuits.

After the installation has been checked, and it is determined that there is a nuisance trip, please provide the details using the online Field Report Form.

Additional information on AFCI's is located online at <http://www.ul.com/regulators/afci/index.html>.

- 3.6 (W) Q. We came across a situation where the AFCI was tripped and it wouldn't reset, implying a fault downstream. The AFCI was replaced, and the new one did not trip; everything appeared fine. Now what?
- A. While this is not enough information to determine if the original AFCI was at fault or an actual arc-fault exists in the circuit, the original AFCI should have been sent to UL. We would have initiated a Field Report and determined if the AFCI was functioning properly, and if not, what the cause was.
- 3.7 (E) Q. Can AFCIs clear a series fault? Who established the current criteria?
- A. The guide information for the branch/feeder AFCI's (AVZQ) located on page 5 of the 2003 General Information for Electrical Equipment (White Book), now includes a drawing of a typical circuit, and various arc fault scenarios, both series and parallel, and the protection that is provided. The current requirements for AFCIs (UL 1699) were developed by UL in conjunction with NEMA and a UL Standards Technical Panel (STP) involving consumers, AHJs, manufacturers, Consumer Product Safety Commission (CPSC), and general interest experts.

Additional information on AFCI's is located online at www.ul.com/regulators/afci/index.html (UL 1699) were developed by UL in conjunction with NEMA and a UL Standards Technical Panel (STP) involving consumers, AHJs, manufacturers, Consumer Product Safety Commission (CPSC), and general interest experts.

Additional information on AFCI's is located online at <http://www.ul.com/regulators/afci/index.html>.

- 3.8 (E) Q. There are some purported problems such as excessive heat coming from stacked AFCI type circuit breakers. Has this been reported previously?
- A. AFCI circuit breaker types are subjected to the same temperature requirements as ordinary circuit breakers. The installation should be checked to verify compliance with the NEC and the manufacturer's installation instructions. Any UL Listed product where an AHJ has a concern can be submitted as a Field Report.

- 3.9 Q. Is there an integral test button on AFCIs and what does it
(E) test?
- A. Yes, the test button on an AFCI is intended to activate a test circuit that simulates the intended response that causes the AFCI to open when an arc is detected. The instructions provided with the AFCI should be followed for periodic testing.
- 3.10 Q. Has UL developed requirements for separate AFCI
(E) testers/indicators? Are any Listed?
- A. There are presently a number of Listings of AFCI indicators. These devices provide an indication if a selected receptacle is protected by an AFCI. Note that the only accepted method for testing an AFCI is to depress the "test" button provided as an integral part of the AFCI itself. AFCI testers are provided with instructions that state the proper way to "test" an AFCI. AFCI indicators are Listed under the product category Outlet Circuit Testers (QCYU), located on page 86 of the 2003 White Book.
- 3.11 Q. Have there been many AFCI field-related complaints?
(E)
- A. To date, there have been no formal Field Reports regarding AFCIs.

4.0 INDUSTRIAL CONTROL EQUIPMENT

4.1 Q. Does UL currently List Semiconductor Manufacturing Equipment?
(NW)

A. Yes, The product categories are:

- Analysis and Measurement Equipment (TWLR)
- Automation and Wafer Handling Equipment (TWPV)
- Control Panels (TWRP)
- Liquid Chemical Distribution Systems (TWSP)

All located on page 105 in the 2003 General Information for Electrical Equipment Directory (The White Book). And

- Miscellaneous Equipment (TWTZ)
- Power Supplies (TWVJ)
- Process Equipment (TWWT)
- Limited Production Semiconductor Manufacturing Equipment (TWWU)

All located on page 106 in the 2003 White Book.

4.2 Q. On a power distribution box, there are some Listed components
(E) and some Recognized components. How do we differentiate between them and who recommends if the product should be Listed or Recognized?

A. The Listing Mark on the overall product indicates what the product is Listed as and confirms that the compatibility of all of the components inside (whether individually Listed or Component Recognized) have been evaluated and found suitable. The corresponding UL guide information for the overall product will provide further information.

If the overall assembly of Listed and Recognized components does not have a Listing Mark, the AHJ needs to either determine the suitability of the assembly, or require the assembly to be Listed. Recognized components are not intended for separate installation in the field; rather, they are intended for use as components of complete equipment submitted for investigation by Underwriters Laboratories Inc.

4.3 Q. Fire alarm control panels for use in a commercial project are
(SW) being provided with instructions for cord and plug connection (with no delineation about commercial and household) and are provided with instructions to secure the panels to the wall using screws. Is this installation method suitable for commercial applications?

- A. No. Cord and plug connection of fire alarm control panels is only suitable for household applications. Products intended for "Household" use are so marked. Household fire alarm control panels are Listed under the product category Control Units and Accessories, Household System type (UTOU), located on page 253 in the 2003 White Book. "Household" use systems are intended for one and two family dwellings. Fire Alarm Control cabinets installed in all other locations are required by NFPA 72 to have the electrical supply protected from physical damage. UL will take appropriate action to clarify the markings and the installation instructions for the specific fire alarm control panel.

5.0 LIGHTING PRODUCTS AND SIGNS

- 5.1 Q. A luminaire's instructions make reference to UL and that it
(E) may not be UL Listed. How do you know if the luminaire is Listed based on the literature?
- A. The only method provided by UL is an appropriate Listing Mark on the luminaire itself, identifying the type of luminaire. Reference to UL on the Instructions would be optional. If the instructions reference UL, yet there is no Listing Mark on the luminaire, the luminaire is not Listed and a Field Report should be initiated. Please provide the information using the Field Report Form.
- 5.2 Q. There are situations where antique-like luminaires are being
(E) rewired for high-end homes. What can be done to get these products Listed?
- A. The AHJ needs to require whoever is rewiring the luminaires to contact UL's Customer Service (1-877-UL-HELPS) to obtain Listing or assistance with Field Evaluations.
- A UL Field Evaluation would likely be the easiest way to proceed, presuming that the rewiring was done by an electrician or a company that did the job on a one-time basis. A Field Evaluation can be done at the request of the electrician, the company that did the rework, or the homeowner.
- If the company that did the rework already has UL Listing for luminaires, they could do the rework at their factory and put a UL Listing Mark on the unit as authorized by UL.
- 5.3 Q. Can the neutral conductor for a HID luminaire be switched to
(SW) control the light intensity? Switching the neutral is done outside the luminaire.
- A. 2002 NEC Section 404.2(B) sets very rigid requirements to be met before switching the neutral conductor is allowed.
- 5.4 Q. Can low voltage luminaires marked "for recreational vehicle
(SW) use" be used in other locations?
- A. Luminaires intended for RV use are Listed under the category Low Voltage Luminaires for Recreational Vehicle Use (IFDQ) located on page 48 in the 2003 General Information for Electrical Equipment Directory (the White Book). The Guide Information states: This category covers incandescent and fluorescent lamp type luminaires rated 24 V or less, ac or dc,

intended for use in recreational vehicles, supplied by a transformer, battery, converter or similar power supply source and installed in accordance with the National Electrical Code." Luminaires Listed under (IFDQ) have not been Listed for installation in other than recreational vehicles

6.0 WIRING SYSTEMS

6.1 Q. Are straps and staples used to secure cable or conduit
(W) required to be Listed?

A. Not specifically in the NEC. It's up to the AHJ. Please refer to NEC Section 110.2.

Because of the concerns regarding such features as crushing of cables, mechanical strength, resistance to corrosion, flammability (for nonmetallic securement devices), and exposure to elevated or cold temperatures, we evaluate and List these products under "Conduit and Cable Hardware (DWMU) located on page 21 in the 2003 White Book.

6.2 Q. How is a user to know how to install Listed "Manufactured
(NW) Wiring Systems" and how are they labeled?

A. Manufactured Wiring Systems are Listed under (QQVX) located on page 97 of the 2003 White Book. They are intended to be installed in accordance with NEC Article 604 and the manufacturer's installation instructions. Detailed instructions are provided by the manufacturer for the wiring of each assembly in which any wiring is intended for field connection. Detailed instructions are provided for the field assembly into recommended configurations.

Each part of the system (e.g. "distribution box", "tap box", or other appropriate product name) is required to be provided with the Listing Mark, which should be in a location that is visible without disassembly of the product. Each manufactured-wiring-system assembly is also marked with the manufacturer's name, tradename, or trademark and the voltage rating and conductor size. If the unit is not complete and is intended to be assembled or connected with other components in the field, each portion of the system is identified with respect to its intended use.

Each power-feed assembly shall be marked to indicate the type and rating of the intended branch-supply circuit. In addition, the power-feed assembly shall be marked with a diagram specifying methods of connection to the branch circuit or the equivalent of the branch circuit. The markings are required to be visible after installation of the assembly. Each manufactured wiring system is marked to identify the type of cable or conduit employed in the system.

6.3 Q. For Type MC Cable used outdoors, the markings identified in
(NW) the product category Guide Information for Metal-Clad Cable (PJAZ) are different than those stated in the "Wire and Cable Marking Guide". The Guide Information states that the cable must be marked for cable tray, sunlight, or direct burial applications. The Marking Guide notes the word "YES" under those column headings. In the definition of "YES" under the notes to the TABLE, it will lead the reader to believe that marking for these uses is not required.

A. Thank you for your very observant comment. We will make appropriate revisions to the Wire and Cable Marking Guide to correlate properly with the Guide Information.

6.4 Q. Can EMT compression fittings used with larger sizes of EMT be
(SW) evaluated for rain tight applications? If fittings are not Listed for outdoor use and do not comply with the requirements what are my options when they are used in the field?

A. Yes, tests for UL Listing as "Raintight", or for use in wet locations, apply to all sizes, as determined from the 2002 NEC Section 358.20 (A) & (B), for EMT fittings. EMT Fittings are Listed under the product category Electrical Metallic Tubing Fittings, (FKAV), located on page 32 in the 2003 General Information for Electrical Equipment Directory (the White Book).

NEC Section 110.11 restricts the use of materials and equipment from environments that have a deteriorating effect on the product. Until such time as an EMT fitting is Listed as "Raintight", other suitable wiring methods will need to be used.

For additional information, please refer to <http://www.ul.com/regulators/raintight.html>.

6.5 Q. Can EMT be used in medium voltage applications for grounding
(SW) purposes? Are all compression fitting couplings for EMT UL Listed for grounding at all voltages?

A. Yes, EMT is Listed for use in circuits above or below 600 Volts, as noted in the guide information for "Electrical Metallic Tubing (FJMX)" located on page 31 in the 2003 General Information for Electrical Equipment Directory (the White Book). The Guide Information for "Electrical Metallic Tubing Fittings (FKAV)" located on pages 32 in the White Book states that these fittings are suitable for grounding for use in circuits over and under 250 Volts.

6.6 Q. Why wasn't the news that EMT fittings were no longer evaluated as raintight published?
(SW)

A. The news regarding the suitability of EMT fittings for raintight applications was posted on UL's website in April of 2003 at (<http://www.ul.com/regulators/raintight.html>). UL also published the information in a Q&A in the UL Question Corner of the July/August 2003 IAEI News. When the status of these types of connectors change, UL will keep you updated with by posting this information on the Regulators page of UL.com at (<http://www.ul.com/regulators/raintight.html>) as well as disseminating this information at IAEI Meetings.

Regulatory Services recognizes the need to develop new and innovative methods to disseminate information needed by the AHJs. Besides reworking the Regulators Page on the UL website, an email notification system is under development. We welcome your suggestions and comments.

6.7 Q. How will I tell the difference from fittings evaluated for raintight applications?
(SW)

A. The carton will identify the suitability of the fittings for rain tight applications. The Guide Information for Electrical Metallic Tubing Fittings (FKAV), located on page 32 in the 2003 General Information for Electrical Equipment Directory (the White Book), notes that the term "Raintight" or the equivalent on the carton indicates suitability for use where directly exposed to rain.

7.0 WIRING DEVICES

7.1 Q. Did UL change the requirements for ground-fault
(W) circuit-interrupters (GFCIs)?

A. Yes, they were changed in response to a recent Field Survey conducted jointly by NEMA and UL.

GFCI's have made an enormous difference to consumer safety. While pleased with the initial performance of GFCIs, the research indicated that a small but significant percent of GFCIs, particularly older ones, do not continue to work when evaluated in the field several years after installation. GFCI's contain electronics, much like computers. They can be subject to damage from power surges, and other sources that can go unnoticed.

As a result, UL added certification requirements to ensure that GFCIs are more resistant to adverse field conditions.

Six revisions to the UL requirements for GFCI's have been adopted as certification requirements, which became effective January 1, 2003. They include:

- A. A more stringent voltage surge test to ensure the GFCI can handle a higher surge current.
- B. A new corrosion test to demonstrate greater immunity to moist conditions.
- C. An operating test to verify that proper operation of the GFCI cannot be prevented by manipulation of the GFCI conditions.
- D. A reverse line-load miswire test that requires the GFCI to deny power to feed-through receptacles when miswired.
- E. An abnormal overvoltage test that requires the GFCI not become a fire or shock hazard during extreme overvoltage conditions.
- F. Increased requirement for GFCI to operate properly after exposure to conducted radio frequencies.

Existing GFCIs should be tested on a regular basis, as identified in the manufacturer's operating instructions, to ensure proper operation of these devices.

- 7.2 (W) Q. Since the effective date for the revised GFCI requirements was January 1, 2003, how long will GFCIs manufactured to the previous requirements be around?
- A. That's difficult, if not impossible, to predict as they will continue to be on the market until the stock of GFCI's manufactured prior to January 1, 2003 expire.

8.0 OUTLET BOXES

- 8.1 Q. Does UL test putty pads for installation at low temperatures (20 F) or at higher ambient temperatures? Does testing take into account vibration caused by construction? There were antidotal reports of the putty pads falling off after installation. How reliable is the retention of the putty pads?
(SW)
- A. Putty pads are UL Classified under the product category "Wall Opening Protective Materials (QCSN)" located on page 85 in the 2003 General Information for Electrical Equipment Directory (the White Book). UL does not evaluate putty pads for elevated or unusually low temperatures, because the putty pads are intended to be installed inside of buildings, which is not considered to have unusually high or low temperatures. Any restrictions on the use and installation of the product are detailed in installation instructions or as a separate product information sheet, these typically include recommendations on installation temperature and that the boxes should be free from dust, grease and oil in order to assure proper adhesion. UL has not received any formal Field Reports of installation or retention problems. If there are any problems in the field, please provide UL with the information using the Field Report Form.
- 8.2 Q. Do the putty pads cause retention of heat from the conductors in the junction box?
(SW)
- A. UL has not received any formal Field Reports that indicate any increase in temperature inside the junction box due to the use of the putty pads. If there are any problems in the field, please provide UL with the information using the Field Report Form.

9.0 APPLIANCES AND UTILIZATION EQUIPMENT

- 9.1 (NW) Q. Does UL regulate the size and type of cord used to connect restaurant equipment to a source of power?
- A. The Guide Information for Commercial Cooking Appliances (KNGT) can be located on page 219 in the 2003 General Information for Electrical Equipment Directory (the White Book). These appliances are required to be marked with the full load current or wattage of the product. If the product is supplied with a power supply cord, the cord will be sized based upon this full load rating. This full load rating is a result of testing. Some products supplied with cords may not require a full sized cord based upon the results of testing done by UL, due to such factors as cycling loads which may only be in use for short periods of time.
- Products that are not supplied with a cord and plug are intended by be connected to a source of supply in accordance with the NEC.
- 9.2 (SW) Q. Why aren't large commercial and industrial air conditioners evaluated for a short circuit current rating? These air conditioners can be installed on circuits with large available fault currents and it seems like they should have a short circuit current rating.
- A. Large commercial and industrial air conditioner units are Listed under the category Air Conditioning Systems Equipment (ADPZ), located on page 206 in the 2003 General Information for Electrical Equipment Directory (the White Book). Unless specifically tested for higher fault currents, products will be limited to the rating of the product's lowest rated component that is subjected to the fault current. Other methods can be used in the field to reduce the available fault current on the circuit supplying these air conditioners.
- 9.3 (SW) Q. Does UL take into account the chimney effect of gasoline vapors through the beverage vending machine when evaluating these machines for use on a service station island? Also, is there an external marking to indicate that the units are suitable for an island?
- A. UL Lists refrigerated vending machines for use on fuel dispensing islands under the product category, "Control, Monitoring and Auxiliary (EQXX)". The UL Guide information can be found on page 50 of the 2002 Flammable and Combustible Liquids and Gases Equipment Directory. These vending machines have been found suitable for use over or in a Class I, Group D, Division 2 hazardous location that does not extend more

than 18 inches above grade. This is consistent with NEC Article 514 (particularly Figure 514.3) and the Automotive and Marine Service Station Code, NFPA 30A.

UL does consider air flow through the unit. For example, some units are provided with a vapor barrier to prevent vapors from flowing through the unit above the 18 inch level.

These products are marked, "This Product is to be Installed in Accordance with the National Electrical Code, NFPA 70, the Automotive and Marine Service Station Code, NFPA 30A, and Local Authority Having Jurisdiction." and "Minimum Installation Requirement of 18 in. from any Flammable Liquid Dispensing Device.", or equivalent.

9.4 Q. Does UL List Drinking Fountains (bubblers) intended for use in
(SW) hazardous locations?

A. Yes, UL does List drinking fountains for use in hazardous locations under the category, "Water Coolers For Use In Hazardous Locations (SUFT)" located on page 170 in the 2003 General Information for Electrical Equipment Directory (the White Book). These appliances are self-contained units with complete refrigeration systems. The UL Listing Mark will identify these products as "Water Cooler for Use in Hazardous Locations"

10.0 OTHER TOPICS

10.1 Q. Is there a communication panel for use in the "Area of Refuge"
(NW) location as defined in the 1997 edition of the Uniform Building Code, Chapter 11?

A. At this time, we are not aware of a specific communication panel Listed by UL as an "Area of Refuge" communication system. However, we are prepared to investigate these types of communication panels under the category of "Emergency Alarm Equipment (FSVW)", which can be located on the UL Online Certification Directory at www.ul.com/database and enter FSVW at the Category Code/Guide Information search. UL would use the applicable requirements in UL 2017, the Standard for General Purpose Signaling Devices and Systems.

10.2 Q. Are there any Listed ceiling grids?
(E)

A. UL has Classified steel framing members under the product category "Steel Framing Members (VZKS)". They are found on Page 173 of the 2003 Building Materials Directory.

They are intended for use in suspension systems using ceiling membrane materials. The ceiling membrane materials include, but are not limited to, acoustical material, gypsum wallboard, and cementitious backer units.

Additionally, UL Lists luminaire clips for suspended ceilings under the product category "Luminaire Fittings (IFFX)" located on page 50 in the 2003 General Information for Electrical Equipment Directory (the White Book).

10.3 Q. Is UL working with anyone to make sure there is mandatory
(E) Listing in the USA similar to how Canada mandates products to be Listed in Canada?

A. The Canadian Electrical Code Part 1 requires all products to be "Approved" which is defined as Listed/Certified. The U.S. safety system is a voluntary system enforced by AHJ's who verify compliance of the installation with their adopted Electrical Code, which for the majority of the USA is the NEC.

It is up to the inspection community to require products to be Listed. If there is an interest in mandatory Listings, one step is to submit a Code proposal to the NEC to require all products to be Listed.

10.4 Q. Is UL involved in the Listing of photovoltaic systems? Can
(E) Field Evaluations be conducted on a system?

A. Yes, UL has several product categories involving photovoltaic equipment and accessories. They are:

- AC Modules (QHYZ)
- Photovoltaic Charge Controllers (QIBP)
- Photovoltaic Modules and Panels (QIGU)

The above are located on page 87 in the 2003 General Information for Electrical Equipment Directory (White Book).

- Photovoltaic Power Systems Accessory Equipment (QIIO)
- Photovoltaic Power Units (QIJL)
- Static Inverters and Converters For Use In Independent
- Power System (QIKH),

The above are located on page 88 in the 2003 General Information for Electrical Equipment Directory (White Book).

A list of these categories as well as other Distributed Generation Equipment product categories can be located on page xix in the front of the 2003 The above are located on page 87 in the 2003 General Information for Electrical Equipment Directory (White Book) and at www.ul.com/dge/categories.html.

Field Evaluations can be conducted on basically any system; however, there may be some limitations.

