

**REPORT ON DISCUSSIONS  
DURING UL MEETINGS  
WITH ELECTRICAL INSPECTORS  
AT THE  
2004 IAEI SECTION MEETINGS**



August 30, 2005

TO: Attendees of Underwriters Laboratories Inc. Meetings with Electrical Inspectors at 2004 IAEI Section Meetings

SUBJECT: Report of Meetings

Underwriters Laboratories held meetings with Electrical Inspectors during the 2004 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 2004**

**ANNUAL IAEI SECTION MEETINGS**

This report contains questions and answers from the 2004 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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**For the AHJ Portion of The Web Site, The Address is**

**<http://www.ul.com/Regulators>**

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## 1.0 UL SERVICES AND INFORMATION

- 1.1 Q. How fast can I expect turnaround to be with a Field Evaluation?  
(W)
- A. UL's Field Evaluation program has been totally revamped commencing in the Western United States in 2004 and implemented for all the US at the beginning of 2005. The program now has dedicated staff doing only field evaluations so that we can respond quickly. With the revamped customer service call center setup, UL can have and has provided on many occasions next day turnaround when necessary. Our goal is to provide whatever turnaround is necessary to meet the client's and AHJ's needs. If you are interested in a Field Evaluation, please call Customer Service at 1-(877)-UL-Helps (1-877-854-3577) or see us on-line at <http://www.ul.com/field/index.html>. If you have concerns about response turnaround or any other aspect of the Field Evaluation program, please contact Chuck Mello at (360) 817-5578 or [chuck.mello@us.ul.com](mailto:chuck.mello@us.ul.com)
- 1.2 Q. Can UL make their standards viewable online as well as manufacturer's installation instructions?  
(W)
- A. Presently, there are over 900 UL standards for safety for the United States. Developing and maintaining these standards is a huge and expensive task. In order to recoup some of the funds necessary to develop and maintain these standards, UL must charge for these standards. Therefore UL cannot offer free access to the standards online. If you do have a question about a standard or requirements in a standard, you can contact your Regulatory Services representative and they can provide assistance in getting an answer for you. You can also purchase UL standards if you wish at [www.commm-2000.com](http://www.commm-2000.com). The scopes of the standards are viewable online at <http://ulstandardsinfont.ul.com/scopes/>
- UL requires Listed products to be provided with installation instructions when necessary so that the product can be properly installed in accordance with the manufacturer's recommendations as well as the applicable Code. Last year over 19 billion UL Marks appeared on products for over 71,000 manufacturers. Providing each product's installation instructions on UL's website is not feasible. Manufacturers typically provide access to installation instructions on their web sites and offer easy access to those instructions. While it is difficult inspect an installation when no instructions are present, it is the responsibility of the installer to hang on to a product's installation instructions and provide those instructions in order to determine compliance with NEC Section 110.3(b).

- 1.3 Q. Can I get a Field Evaluation report next day instead of an email when someone gets around to it?  
(W)
- A. Yes, if UL is aware of the need for next day report delivery it can be provided. There are several standard communications with the AHJ including an email notification to the Chief Electrical Inspector in your jurisdiction notifying them that we will be doing a Field Evaluation in the jurisdiction. The Field Evaluation staff who will be performing the Field Evaluation will also contact the AHJ to let them know when they will be onsite so that the AHJ can be there if they wish. For technical reports, preliminary findings reports and final reports, they are automatically provided in Adobe Acrobat pdf format via e-mail to the client and the AHJ and our goal is to have them issued within 5 business days after the last day on site. If that isn't happening, please contact Chuck Mello at (360) 817-5578 or [chuck.mello@us.ul.com](mailto:chuck.mello@us.ul.com)
- 1.4 Q. What is UL's policy for manufacturers changing markings and labels in the field? Are the manufacturers made aware of these requirements?  
(W)
- A. When manufacturers' representatives change labels in the field, it is considered a Field Modification. Unless UL evaluates the changes, UL does not know if the product continues to comply with UL's requirements. If you require verification that the changes comply with UL's requirements, UL can perform the appropriate Field Engineering Service to verify compliance, either through a Field Evaluation or Field Inspection where appropriate. To initiate a UL Field Evaluation or Field Inspection, please call 1 (877) UL-HELPS, (1-877-854-3577). For UL's Field Modification Policy see [www.ul.com/regulators/modification.cfm](http://www.ul.com/regulators/modification.cfm)
- 1.5 Q. How can an AHJ find out what the UL Listing Mark on a product applies to?  
(SW)
- A. The UL Listing Mark consists of four elements; the UL symbol, the word "Listed", a control or issue number, and the product identity. The product identity is used to determine the UL product category. You can look up the product identity in the index in the White Book (UL General Information for Electrical Equipment Directory) to locate the Guide Information for the product category. The Guide Information for the product category provides information on the scope and limitations of the products bearing the particular product identity, as well as explanations of product markings and identification of the basic standard used to evaluate the product. The Guide Information is readily accessible in both UL's Online Certification Directory, and UL's White Book. UL's Regulatory Services staff is always available, by calling 800-595-9844, to help locate and interpret the product Guide Information. Regulatory Services is also available to provide free seminars on how to use both the Online Certification Directory and the White Book.

- 1.6 Q What does UL provide to the AHJ after evaluating a product in the field?  
(SW)
- A. There are two distinct types of field services - Field Inspections and Field Evaluations.

Field Inspections are performed on products that may be eligible to bear the Listing Mark, but, for whatever reason, were not labeled in the factory. If the product is found to comply with the Listing requirements for the product, the UL field representative witnesses the application of the UL Listing Mark to the product by a representative of the manufacturer. The AHJ will receive written confirmation that the product at an identified location was inspected and the Listing Mark was permitted to be applied in the field.

Field Evaluations are performed on products that were never Listed, or were significantly modified such that the original Listing does not apply. Upon completion of the Field Evaluation, UL provides the AHJ with a copy of a report, which provides detail on what was done, including identification of what was evaluated and where, what requirements were applied, and what deviations or discrepancies from the standard were found, if any, along with detail of corrective actions used to resolve them.

For more information on UL's Field Evaluations and Field Inspections, go to <http://www.ul.com/regulators/field.cfm>

- 1.7 Q. Why won't a manufacturer apply a UL Mark on their product, if the product has Listing?  
(SW)  
(S)

- A. Manufacturers are not obligated to apply the UL Mark on their products. If the product bears the UL Mark, though, the manufacturer is obligated to comply with all of the applicable requirements. The appearance of catalog or model numbers or other specific product designations in the UL Online Certification Directory ([www.ul.com/database](http://www.ul.com/database)) signifies that (1) representative samples of these products have been submitted to UL and found to comply with applicable requirements, and that (2) the manufacturer has been authorized to use the appropriate UL Mark on production that continues to comply with UL's requirements and is subject to UL's Follow-Up Service. Since manufacturers are not obligated to apply the UL Mark on all of their production, products which do not bear the UL Mark are not required by UL to comply with UL's requirements. Accordingly, the appearance of a company's name or a specific product designation in UL's Online Certification Directory does not in itself assure that products so specified or identified are subject to UL's Follow-Up Service. The manufacturer's products are not subject to UL's Follow-Up Service unless they bear the UL Mark. Only those products bearing the appropriate UL Mark and the company's name, trade name, trademark, or other authorized identification should be considered as being covered by UL's Listing and Classification and Follow-Up Service. The UL Mark provides evidence of listing or labeling which may be required by installation codes or standards.



- 1.8 (SW) Q. Why does the manufacturer's name on the product sometimes not match the UL file number on the product?
- A. The UL file number may not be required to be marked on the product. The UL file number can be used to identify a particular company and the associated product category in lieu of the manufacturer's name. If the file number is used as the identifier, the manufacturer may use different names on the product for marketing purposes.
- 1.9 (SW) Q. Why do some products have the UL Listing Mark on the smallest shipping container, but not on the product itself? Some products don't have even the UL symbol on the product. Many times when the AHJ comes to the jobsite to do an inspection, the packaging has been thrown away, and there is no method to determine that the product is UL Listed.
- A. The UL Listing Mark will always appear on the product unless the product is of such a size, shape, material or surface texture that, in UL's opinion, is impossible to apply legibly that complete marking to the product. In these cases the complete UL Listing Mark will then appear on the smallest unit container in which the product is packaged. UL may authorize the use of the UL symbol on the product in addition to the complete UL Mark on the package, but size, shape, material, and other physical characteristics may not permit even the application of the UL symbol to some types of products.

It is important therefore to always check any packaging, boxes, that the product came in.

- 1.10 (S) Q. Can Listing Marks be placed on the product by the installer/manufacturer after installation?
- A. The application of a UL Mark in the field is only permitted when an inspection is conducted under one of UL's [Field Engineering Services](#) in the presence of a UL representative. Either a Field Inspection or a Field Evaluation. Per Q1.6, a Field Inspection is the only option here. This question is about "Listing" Marks.

For products installed in the field eligible to bear a UL Listing Mark or Classification Mark at the time of manufacture lacking a UL Mark, UL's [Field Inspection Service](#) is appropriate.

For products installed in the field that can be completely evaluated in the field, a [Field Evaluated Product \(FEP\) Service](#) is appropriate. UL Field Evaluated Product Service covers on-site safety evaluations of installed products or systems, conducted by UL technical staff to the applicable safety requirements, and the application of the FEP Mark on the product.

With either service the AHJ will be notified ahead of time so that the AHJ can be present when the UL representative is on site and a written report would be provided after the completion of the evaluation.

For more information on field labeling see <http://www.ul.com/regulators/modification.cfm#field>

- 1.11 Q. Does UL want the AHJs to report the manufacturers that are installing Listing labels in the field?  
(S)
- A. Yes, by all means. We encourage inspectors to report field labeling to UL by opening a Field Report online at <https://www.ul.com/regulators/ahjprod.cfm> . Once a Field Report is open, UL's Field Report Department will work with the manufacturer to assure that the action is not repeated. Products that are labeled in the field without a UL representative present should not be considered as a Listed product. A Field Inspection would need to be performed to determine if the product is eligible to bear the Listing Mark, and to permit the Listing Mark to remain on the product.
- 1.12 Q. Sometimes, manufacturers' installation instructions use the word "Recommend". Does the installer need to specifically follow the "Recommendations" in order to comply with Section 110.3(B) of the NEC?  
(E)
- A. Yes. Installation instructions provided with Listed products are reviewed as part of the Listing investigation. Manufacturer's 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.
- 1.13 Q. Is there a limit to the number of similar or identical products produced by a single manufacturer before UL requires Listing of all products rather than an occasional Field Evaluation  
(E)
- 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.

## 2.0 SERVICE EQUIPMENT, POWER DISTRIBUTION EQUIPMENT, AND SWITCHBOARDS

- 2.1 (W) Q. Prior to the 2003 White Book, the guide information for the Listing of fan forced air cooled dry-type distribution transformers required that remote annunciation be provided to an attended site and provision for load shedding be provided. Has the Listing requirements changed for these transformers?
- A. Transformers of this type are Listed under the category Transformers, Distribution, Dry Type, Over 600 V (XPFS) located in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database) and on page 135 in the 2005 the White Book. The Guide Information now states: "Transformers provided with forced-air (fan cooled) ratings are provided with alarm contacts for remote indication of over temperature."

The Guide Information for XPFS was revised in the 2003 White Book because the previous wording required remote annunciator circuits and load shedding, yet the NEC and the ANSI/IEEE standard used as the basis for the evaluation of these transformers did not require those provisions. Since the Code and the standard used to evaluate the transformers did not require those provisions, the Guide Information was changed to accurately reflect Listing requirements.

- 2.2 (W) Q. Are there any Listings of emergency generators?
- A. Underwriters Laboratories Inc. Lists stationary generators under the product category "Engine Generators (FTSR)." Guide Information for this category can be found in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database) and on page 38 in UL's 2005 White Book. This category covers electrical generating equipment driven by gasoline, LP-gas, natural gas or diesel-fueled internal combustion engines.

Listed stationary engine generator assemblies are rated 600 V or less and are intended for installation and use in accordance with the National Electrical Code® (NEC ®); NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines; NFPA 99, Standard for Health Care Facilities; and NFPA 110, Standard for Emergency and Standby Power Systems. Listed stationary engine generator assemblies are suitable for use in emergency, legally required standby or optional standby systems, provided the system has the necessary capacity to supply the loads being served and that the installation complies with the applicable codes and standards.

UL 2200, Standard for Safety for Stationary Engine Generator Assemblies, is the basic Standard used to investigate these products. The NEC does not address the specific requirements for the initial acceptance testing, periodic operational testing and written records that must be maintained. Procedures for the testing and maintenance of emergency and standby power systems may be found in NFPA 110, NFPA 99 and other NFPA documents.

For more information on UL Listed stationary engine generator

assemblies, contact Timothy Zgonena in Northbrook, Ill., by phone at +1-847-664-3051; or by e-mail at Timothy.P.Zgonena@us.ul.com.

2.3 Q What are the standards used for evaluating medium voltage equipment?  
(NW)

A. The set of standards for medium voltage equipment depends on the equipment. UL 347, Standard for High Voltage Industrial Control Equipment is used for medium voltage industrial control equipment. For medium voltage transformers, both the UL 1562 Standard for Transformers, Distribution, Dry Type as well as the ANSI/IEEE C57 series of standards are appropriate. Medium voltage enclosed switchgear will be evaluated using the ANSI/NEMA C37 series of conformance test documents as well as the ANSI/IEEE C37 series of design standards. And again, based upon the specifics of the equipment where there will be different standards used for an evaluation.

UL publishes a list of Medium Voltage product categories in the front of the White Book on page xxix under the heading "Over 600 Volts Rated Equipment and Devices Category List". This information can also be found online at <http://www.ul.com/regulators/600volts.cfm>

2.4 Q What standard is used for medium-voltage cables?  
(NW)

A. The cables themselves are Listed under the category of Medium Voltage Cables (PITY), located on page 78 in the White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). The standard that is used for Listing is UL 1072, Standard for Medium-Voltage Power Cables. This standard does not include requirements for cables with concentric neutral conductors. However, it is possible to have a single-conductor cable with a concentric neutral conductor manufactured in accordance with the requirements of others, which meets the requirements for jacketed single-conductor shielded cable in this standard. The entire scopes of UL Standards are available at <http://ulstandardsinfont.ul.com/scopes/>

### 3.0 CIRCUIT BREAKERS AND AFCIs

- 3.1 Q. Does UL have any information available on Federal Pacific Stab Lock  
(W) breakers?
- A. At one time, circuit breakers manufactured by Federal Pacific were eligible for UL Listing. Whether any one particular circuit breaker was Listed at the time of manufacture would be determined by whether or not the circuit breaker has the UL Mark on it.

Federal Pacific has not been in business for a number of years and therefore has not been producing circuit breakers eligible for Listing. You may want to contact the company that ultimately acquired the Federal Pacific line of circuit breakers, American Circuit Breaker Corp. at 704-463-7361.

In addition, it is our understanding that in the early 1980's Federal Pacific circuit breakers were the subject of a recall instituted by the Consumer Product Safety Commission (CPSC). Due to the passage of time, we no longer have information regarding the models involved or the reason(s) for the recall. You may want to contact the CPSC at 301-504-0508 in Washington, DC to obtain further information. CPSC has a website: [www.cpsc.gov](http://www.cpsc.gov) where this or other information is available.

You can also send questions by E-mail to CPSC at: [clearinghouse@cpsc.gov](mailto:clearinghouse@cpsc.gov)

- 3.2 Q. Are there any circuit breakers specifically Listed for 12 V?  
(E)
- A. NO. UL 489 The standard for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures states that circuit breakers can only be rated and marked with one or more of the following voltage ratings:  
60, 125, 125/250, 160, 250, 500, and 600 V for dc; and 120, 127, 120/240, 240, 277, 347, 480Y/277, 480, 600Y/347, and 600 V for ac.

As such, a 12 v rating is not permitted. However, all circuit breakers are suitable for use on 12V circuits, except those requiring a higher voltage to operate an internal system such as a GFCI circuit breaker. It is understood that a voltage rating is a maximum value and a circuit breaker can be used at a voltage less than the marked rating.

- 3.3 Q. What should we do if we get a nuisance trip on a UL Listed  
(E) Arc-Fault Circuit-Interrupter (AFCI)?
- A. 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. Single pole

AFCI circuit breakers 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.

Circuit breaker type AFCI's are Listed under the category Arc Fault Circuit Interrupters, Branch/Feeder Type (AVZQ) located on page 5 of the 2005 White Book. Additional information on AFCI's is located online at <http://www.ul.com/regulators/afci/index.html>

- 3.4 Q. Can AFCIs clear a series fault? Who established the current criteria?  
(E)
- A. The guide information for the Arc-Fault Circuit Interrupters Branch/Feeder Type (AVZQ) located on page 5 of the 2005 White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database), now includes 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 AFCIs is located online at <http://www.ul.com/regulators/afci/index.html>

- 3.5 Q. I have heard of some purported problems of excessive heat coming from stacked AFCI type circuit breakers. Has this been reported as an ongoing problem?  
(E)
- A. We are not aware of any reports of excessive heating of stacked AFCI circuit breakers. Branch/Feeder Type AFCI circuit breakers 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. If you encounter AFCIs that seem to be overheating, please open a Field Report online at <https://www.ul.com/regulators/ahjprod.cfm>

3.6 Q. What does the integral test button on AFCIs test?  
(E)

A. 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.

Depressing the Test button is the only way to test the operation of an AFCI in the field.

## 4.0 INDUSTRIAL CONTROL EQUIPMENT

- 4.1 Q. A 30 ampere-rated fused disconnect is supplied by a feeder circuit  
(NW) greater than 30 amps. Would this type of installation comply with the UL Listing for the fused disconnect?
- A. UL Lists fused disconnects under the category Enclosed Switches (WIAX) located on page 126 in the White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). Overcurrent protection for feeders is covered in NEC Section 215.3 and is based on non-continuous load plus 125 percent of the continuous load. This would correspond to the Listing on fused disconnects, which includes as part of the (WIAX) Guide Information the following statement: "Continuous load current not to exceed 80 percent of the rating of fuses employed in other than motor circuits". Fused disconnects marked for use with 30 A fuses would be suitable for continuous load currents of 80 percent of the rating, which is 24 A. Conversely, a continuous load of 24 A is provided with overcurrent protection sized at 125 percent of the load rating, which is 30 A. Sizing of the disconnect switch is based on the rating marked on the equipment, and the sizing of that equipment is based on 80% of the continuous load rating.

Acceptability of a 30 amp fused disconnect in a feeder circuit rated greater than 30 amperes is dependent on the installation. If the feeder circuit uses conductors larger than those marked for termination within the disconnect switch, connection of these conductors to the switch would be in violation of NEC Section 110.3(B). If the feeder is rated higher than the disconnect (for example 50 A) but has conductors that are suitable for use on the switch (for example 10 AWG) then feeder tap requirements in NEC Section 240.21 would apply. In this example, a feeder protected upstream at 50A and having 10 AWG tap conductors, could terminate at the line terminals of a 30A fused disconnect switch.



## 5.0 LIGHTING PRODUCTS AND SIGNS

- 5.1 Q. Are Listed sign manufacturers required to place the Listing labels where the Listing Mark is visible after installation?  
(S) (E)
- A. UL Lists electric signs under the category of Signs, (UXYT) located on page 114 in the 2005 White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). The issue of visibility is difficult because it is relative to position of the sign before and after installation. Specifically, labels placed on top of signs are not visible without the use of ladders or other means to access the label location. The authority having jurisdiction can require the installer to prove the listing label is installed on the sign in any particular location or provide the AHJ a means of access to see the label.

UL is concerned only that the mark is externally visible after installation. In other words, the Listing Mark cannot be located on the back of a sign intended to be wall mounted. However, UL has stayed out of the fray with respect to "visible from the ground" which is an issue with some AHJs. UL requires the mark to be located where it can be seen, even if by a ladder, after installation. However, the AHJ has the final say so if they want it in a particular location perhaps visible without resorting to ladders, hoists, or other gear, the sign manufacturer may want to consider a more prominent marking location on the sign. Manufacturers are not permitted to field label the sign, except in the presence of a UL field representative.

- 5.2 Q. What happens when a section (multi-section) sign is Listed but the installation is not code compliant? Are installation instructions required to be provided with each part of the sign?  
(SW)
- A. UL Lists electric signs under the category of Signs, (UXYT) located on page 114 in the 2005 White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). Listed signs are evaluated for compliance with the Standard for Electric Signs, UL 48. UL 48 requires installation instructions be provided for SECTION SIGNS. The UL 48 STP (Standards Technical Panel) has put together a more extensive set of installation instruction requirements for the new draft of UL 48. Installation instructions should be made available by the installer so that the AHJ can verify that the installation is in accordance with manufacturer's instructions and NEC Section 110.3(B). If the installation instructions are considered to be in violation of the NEC, or if no instructions were provided by the manufacturer, the AHJ should file a Field Report online at <https://www.ul.com/regulators/ahjprod.cfm>.

If the installation is not NEC compliant, it is up to the AHJ to take appropriate action to not accept the installation based on Section 110.2 of the Code and to require compliance with the code.. The typical installation concern is when the field wiring connecting the sections is not code compliant, but again the answer is to turn down the installation and require Code compliance.

## 6.0 WIRING SYSTEMS

- 6.1 Q. Are Ground Clamps available for rebar? Also, are any of them  
(E) of the "Acorn" type?
- A. Yes there are ground clamps specifically Listed for use with rebar, and yes some are of the Acorn type. 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 64 in the 2005 White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). The ground clamps are marked with the size of the rebar, the size range of the grounding electrode conductor, and DB or Dir Bur to indicate suitable for direct burial in earth or encased in concrete.
- 6.2 Q. Could UL simplify the marking for ground clamps used on sweated  
(E) copper (copper water tubing)?
- A. Ground clamps are Listed under the category Grounding and Bonding Equipment (KDER) located on page 64 in the 2005 the White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). The Guide Information for KDER indicates "Clamps are intended for use with rod and/or pipe electrodes in accordance with the NEC and are marked with the size of electrode and electrode grounding conductor with which the clamp is intended to be used. Clamps suitable for use on copper water tubing are marked for such use."  
Since the "Copper water tubing" marking is large and difficult to get onto the clamps, UL will look into the possibility of permitting an abbreviation (such as "CWT"). If an abbreviation is determined acceptable, it would need to be clearly indentified as such in the UL Standard for Grounding and Bonding Equipment, UL 467, as well as the Guide Information for KDER.
- 6.3 Q. I have seen various cables with metallic armor and colored coatings  
(E) on the armor. Can these coatings affect the grounding/bonding abilities of the cable?
- A. UL evaluates the cables with regard to the effect which any coatings will have upon the cable. Typically, the coatings presently in use are of an ink type or consist of electrically conductive paint that does not affect the grounding/bonding abilities of the cable.

6.4  
(E)

- Q. Reportedly, one manufacture of Rain tight EMT fittings includes a Torque requirement for the installed fitting. How can the torque be verified and enforced in the field?
- A. EMT Fittings are Listed under the product category Electrical Metallic Tubing Fittings (FKAV), located on page 33 in the White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). Each of the manufacturers of EMT fittings Listed for rain tight or wet locations achieves their rain tightness by a different method. Therefore it is important to follow the assembly/installation instructions located on the shipping container of the fitting. A "crows foot" attachment is one method available as a torque wrench attachment for verifying compliance with torque specifications in the field.

## 7.0 WIRING DEVICES

- 7.1 (NW) Q. The installation instructions for a GFCI receptacle say, "For the installation in wet locations, protect the GFCI receptacle with a weatherproof cover that will keep both the receptacle and any other parts dry." What do we do for damp locations?
- A. GFCIs are Listed under the category Ground Fault Circuit Interrupters (KCXS), located on page 63 in the 2005 White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). The UL Guide information for (KCXS) states, "A receptacle type GFCI installed in wet locations is intended to be installed with an enclosure that is weatherproof, whether or not the attachment plug cap is inserted." This conforms to NEC 406.8. An installation suitable for wet locations shall also be considered suitable for damp locations. Sometimes referred to as "bubble covers", receptacle-type GFCI enclosures used to keep the receptacle and plugs dry are known as cover plates and outlet box hoods which are covered by the Standard for Cover Plates for Flush-Mounted Wiring Devices, UL 514D. Bubble covers/cover plates are Listed under the category Metallic Outlet Boxes (QCIT) located on page 89 in the White Book and if nonmetallic, Nonmetallic Outlet Boxes (QCMZ) located on page 90 in the White Book.
- 7.2 (E) Q. When did UL change the requirements for ground-fault circuit-interrupters (GFCIs) and what was changed? Also, how long will the older GFCIs be permitted to be sold?
- A. New UL requirements for GFCIs became effective on January 1, 2003. They were changed in response to a Field Survey conducted jointly by NEMA and UL. GFCIs 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, did not continue to work when evaluated in the field several years after installation. GFCIs 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 GFCIs 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.

The requirements in question only apply to GFCIs manufactured after January 1, 2003. GFCI's manufactured prior to January 1, 2003 continue to be Listed and may continue to be sold until stock is depleted.

## 8.0 OUTLET BOXES

- 8.1 (NW)
- Q. Contractors are resistant to using the wet location receptacle cover that is compliant with NEC 406.8 because they purportedly break easily or fall apart. What is UL planning on doing to correct this problem?
- A. Reasonable care needs to be exercised with any product. Samples of the hooded covers that comply with NEC 406.8 have been evaluated for compliance with the Standard for Cover Plates for Flush-Mounted Wiring Devices, UL 514D. This standard includes tests for cycling, UV exposure, compression, and cold impact. If you are seeing problems in the field that the standard is not adequately addressing, you should submit a field report so that UL can evaluate the means of failure. As data is collected, corrective measures can be addressed either with a particular manufacturer, or through a revision to the standard.

Field Reports can be filed online at  
<https://www.ul.com/regulators/ahjprod.cfm>

## 9.0 APPLIANCES AND UTILIZATION EQUIPMENT

- 9.1 (W) Q. How come hydromassage bathtubs have small access panels when they are shipped with a skirt around the tub, however, when they are intended to be framed in, in the field they are required to be provided with very large access openings per the installation instructions?
- A. UL Lists hydromassage bathtubs under the category Hydromassage Bathtubs (NCHX), located on page 239 in the White Book and in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database). Products in this category are evaluated for compliance with the Standard for Hydromassage Bathtubs, UL 1795. UL 1795 requires that access be provided to make connections to the branch circuit. When a hydromassage bathtub is shipped from the factory with a skirt, the location of connection to the branch circuit is known and factory controlled.

When a product is shipped from the factory without a skirt, the installation instructions are required to specify the size and location of an access panel so access can be assured. If the dimensions and location of the access opening are made in accordance with the instructions, the proper access should be provided.

- 9.2 (NW) Q. For hydromassage bathtubs, why isn't the UL label easy to find?
- A. The Listing Mark for hydromassage bathtubs is required to appear on the product where readily visible after installation. A location adjacent to the manufacturer's name, model number and electrical ratings is generally considered "readily visible".

- 9.3 (S) Q. Can you explain why X-ray and medical equipment ha a Listing label only on one piece of the equipment, when there are many options that can be added and the equipment is still considered to be listed?
- A. The instructions are required to identify all the combinations or accessory parts, that are Listed with the unit, however, it may be confusing with only one label if the label covers the base product and all these various accessories. Some manufacturers will label the product as "1 of 5", "2 of 5", etc. and this does provide more clarity on the issue making it easier for the inspector to identify the various parts of the listed equipment. If there is confusion on the installation of a Listed product, please contact Regulatory Services at 800-595-9844 for clarification.

## 10.0 OTHER TOPICS

- 10.1 Q. How can we tell if a UL Listing Mark is counterfeit? Is there  
(SW)
- 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 end, counterfeiters go to work to profit at the expense of the public's well being and a company's reputation. Each year, over 17 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 Listing Mark always includes, as one element, the familiar UL symbol (the UL in a circle) or other specific formats authorized by UL. A legitimate Listing Mark also contains three additional elements: 1) the word "LISTED"; 2) the product identity; and 3) a unique alphanumeric control or issue number assigned by UL.

The following warning signs may be indicative of a product that does not have UL Listing:

- A product whose label does not contain the four elements outlined above.
- Any product that references UL on the carton or on the product itself but has no company name or address.
- Any product that references UL on the carton, but not on the product itself.
- Cheap, low quality workmanship and/or packaging.
- 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"

The product identity as indicated in the Guide Information (this information can be found in UL's General Information for Electrical Equipment Directory, " the White Book" 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.

The complete four element UL Mark will always appear on the product unless the product is of such a size, shape, material or surface texture that, in UL's opinion, is impossible to apply legibly that complete marking to the product. In these cases the complete UL Listing will then appear on the smallest unit container in which the product is packaged. It is important therefore to also check any packaging, boxes, that the product came in. UL may authorize the use



of the UL symbol on the product in addition to the complete UL Mark on the package.

UL has taken many rigorous steps, including introduction of holographic labels, color schemes specific to each product category, and overt/covert security coding, to maintain the integrity of our Marks. UL has an anti-counterfeiting operation team specifically dedicated to protection of UL's Marks. For nearly ten years, UL and U.S. Customs have partnered in extensive and unprecedented nationwide anti-counterfeiting efforts that have resulted in the seizure of millions of products bearing counterfeit UL Marks. If you come across a suspicious product referencing UL, or have any questions on UL's anti-counterfeiting and U.S. Customs programs, contact Mr. Brian Monks in Melville, NY, by phone at 631-271-6200, ext. 22856, or by e-mail at Brian.H.Monks@us.ul.com.

- 10.2 Q. Unused knockouts are being closed in metal enclosures by plastic knockout seals in UL listed equipment. Is UL allowing this method of closing an unused opening in the Listing of enclosures?  
(S)
- A. The answer is yes, when the hole seal complies with the requirements of the end-product standard. While UL has permitted such constructions, it is more common for enclosure manufacturers to either provide knockouts where all of the knockouts are in place when the enclosure leaves the factory, or avoid open conduit openings in their enclosures to minimize or eliminate the need for hole seals for unused openings..
- Knock out closures are Listed under the category Outlet Bushings and Fittings (QCRV) located on page 91 in the White Book.
- 10.3 Q. The Field report web based system does not accept digital images. Can the AHJs send a digital image other than through email?  
(S)
- A. An AHJ can send a digital image through email to the UL Regulatory Services person or directly to the Field Report Department at field.reports.nbk@us.ul.com with a reference to the field report and the specific product. Or, the digital images can be provided on a CD to the Field Report Department.
- 10.4 Q. Factory-wiring in equipment have bends that do not comply with the wire bending radius requirements in the code. How is this permissible?  
(E)
- 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

