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Subjects 2279 (674, 698, 844,
 886, 913, 1010, 1604)
 (In reply refer to Subject 2279)

333 Pfingsten Road
 Northbrook, IL 60062-2096
 May 17, 1996

TO: See Appendix A for the List of Addressees

SUBJECT: Request for Comments on Proposed Requirements for the Proposed First Edition of the Standard for Electrical Equipment for Use In Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations, UL 2279; PROPOSED EFFECTIVE DATE

SUMMARY OF TOPICS

This bulletin contains the proposed draft of the first edition of the Standard for Electrical Equipment for Use In Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations, UL 2279

COMMENTS ON THIS PROPOSAL DUE: JUNE 17, 1996

Attached as Appendix B is the draft of UL 2279. Questions regarding interpretation of requirements should be directed to the responsible UL Staff. Please see Appendices C through I of this bulletin regarding designated responsibility for the subject product categories.

PROPOSED EFFECTIVE DATE

This proposed new standard will not necessitate a review or additional testing of currently Listed products. Therefore, UL proposes that the new standard UL 2279 become effective upon publication.

RATIONALE

UL is proposing to adopt the first edition of the Standard for Electrical Equipment for Use In Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations, UL 2279. This standard will contain requirements for all protection methods for use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations. This Standard identifies applicable IEC requirements by reference and then details any specific deviations. The IEC requirements referenced are contained in the following IEC Standards:

IEC 79-0, Electrical Apparatus for Explosive Gas Atmospheres, Part 0: General Requirements,
 IEC 79-1, Electrical Apparatus for Explosive Gas Atmospheres, Part 1:
 Construction and Verification Test of Flameproof Enclosures of Electrical Apparatus,

A not-for-profit organization
 dedicated to public safety and
 committed to quality service

IEC 79-2, Electrical Apparatus for Explosive Gas Atmospheres, Part 2: Electrical Apparatus - Type of Protection "p",
 IEC 79-7, Electrical Apparatus for Explosive Gas Atmospheres, Part 7: Increased Safety "e",
 IEC 79-11, Electrical Apparatus for Explosive Gas Atmospheres, Part 11: Intrinsic Safety "i",
 IEC 79-15, Electrical Apparatus for Explosive Gas Atmospheres, Part 15: Electrical Apparatus with Type of Protection "n",
 IEC 79-18, Electrical Apparatus for Explosive Gas Atmospheres, Part 18: Encapsulation "m".

This Standard is a result of the newly adopted Zone classification scheme in Article 505 of the National Electrical Code, NFPA 70-1996, and the subsequent need for documenting these protection method requirements. It also represents existing UL internal practice with regard to Listing equipment for use in Zones. The Standard is a natural culmination of UL's efforts to harmonize North American hazardous location requirements with those of the international community, as detailed in UL's Subject 35 bulletin dated October 31, 1995. Additionally, manufacturers indicated a need for a UL Standard to address Zones during a May 14, 1996 Ad Hoc meeting (detailed Meeting Report to follow).

UL's participation in the international standards writing activities for the IEC Publication 79 Series of Standards, and our Memorandum of Understanding and other test data exchange programs with European test houses, has been in place for years, is ongoing and provides a forum for continued harmonization efforts regarding deviations to the IEC 79 Standards.

The current deviations documented by this Standard are based on superseding requirements set forth by the NEC, and on the need to protect against electrical shock and fire hazards that are normally associated with ordinary location requirements. Additionally, requirements for bi-pin fluorescent fixtures were added to this Standard to address the lack of requirements for this common type of design. These requirements are based on existing practice by the European test houses and upcoming revisions to the CENELEC EN50019 Standard.

IMPACT

If this standard is adopted it will not require a review or retest of presently Listed or Recognized products.

UL is willing to consider agreements with other agencies to facilitate test data exchange whereby UL generated test data may be used in foreign certification submittals.

Request for Comments on Proposals

Please provide the following:

1. Your comments concerning the proposed new edition; and
2. Your comments concerning the proposed effective date, should the proposals be adopted.

Comments should be sent to the attention of Alan McGrath at the Northbrook office of UL, 333 Pfingsten Road, Northbrook, Illinois 60062-2096. Please reference all correspondence to Subject 2279.

All comments should be sent by June 17, 1996.

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Unless specifically requested to do otherwise, UL will not acknowledge comments indicating concurrence with these proposals.

UNDERWRITERS LABORATORIES INC.

Alan McGrath

ALAN McGRATH (Ext. 43038)
Project Engineer
Standards Department

REVIEWED BY:

Kerry McManama/am

KERRY MCMANAMA (Ext. 42469)
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SR:JTM

2279.ULS

Subjects 2279

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A P P E N D I X A

TO: Casualty Council of Underwriters Laboratories Inc.,
 Electrical Council of Underwriters Laboratories Inc.,
 Fire Council of Underwriters Laboratories Inc.,
 Subscribers to UL's Listing, Classification, and Recognition Services for Equipment for
 Use in and Relating to Hazardous (Classified) Locations
 Subscribers to UL's Standards Service for:
 Electric Motors and Generators for Use in Hazardous (Classified) Locations,
 UL 674
 Industrial Control Equipment for Use in Hazardous (Classified) Locations, UL 698
 Electric Lighting Fixtures for Use in Hazardous (Classified) Locations, UL 844
 Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886
 Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II,
 and III, Division 1, Hazardous (Classified) Locations, UL 913
 Receptacles Plug Combinations for Use in Hazardous (Classified) Locations,
 UL 1010
 Electrical Equipment for Use in Class I and II, Division 2, and Class III
 Hazardous (Classified) Locations, UL 1604

PROPOSED REQUIREMENTS ARE OF A TENTATIVE AND EARLY NATURE AND ARE FOR REVIEW AND COMMENT ONLY. CURRENT REQUIREMENTS ARE TO BE USED TO JUDGE A PRODUCT UNTIL THESE REQUIREMENTS ARE PUBLISHED IN FINAL FORM.

APPENDIX B

PROPOSED REQUIREMENTS AND PROPOSED EFFECTIVE DATE
FOR THE PROPOSED FIRST EDITION OF THE STANDARD FOR
ELECTRICAL EQUIPMENT FOR USE IN CLASS I, ZONE 0, 1, AND 2 HAZARDOUS (CLASSIFIED)
LOCATIONS, UL 2279

PROPOSED EFFECTIVE DATE: EFFECTIVE UPON PUBLICATION

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1 Scope

1.1 These requirements cover equipment for use and installation in Class I, Zones 0, 1, and 2, Gas Groups IIA, IIB, and IIC, hazardous (classified) locations, in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements do not cover equipment for use in Gas Group I.

1.3 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

2 General

2.1 Except as modified by Parts 0 through 18 of this Standard, equipment shall comply with International Electrotechnical Commission (IEC) Publication 79-0, Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements, and one or more of the following specific protection method Standards:

IEC 79-1, Electrical Apparatus for Explosive Gas Atmospheres, Part 1: Construction and Verification Test of Flameproof Enclosures of Electrical Apparatus
 IEC 79-2, Electrical Apparatus for Explosive Gas Atmospheres, Part 2: Electrical Apparatus - Type of Protection "p",
 IEC 79-7, Electrical Apparatus for Explosive Gas Atmospheres, Part 7: Increased Safety "e",
 IEC 79-11, Electrical Apparatus for Explosive Gas Atmospheres, Part 11: Intrinsic Safety "i",
 IEC 79-15, Electrical Apparatus for Explosive Gas Atmospheres, Part 15: Electrical Apparatus with Type of Protection "n",
 IEC 79-18, Electrical Apparatus for Explosive Gas Atmospheres, Part 18: Encapsulation "m".

Exception: Equipment for use only in Zone 2, and that complies with the requirements of IEC 79-15 as modified by Part 15 of this Standard, need not comply with IEC 79-0, General Requirements, or Part 0 of this Standard.

2.2 Equipment complying with the requirements of one or more of the protection methods specified in 2.1 is suitable for use and installation in a Zone classified hazardous location as specified in Table 2.1

Table 2.1

Area classification	IEC Standard	Protection method identification
Zone 0	IEC 79-11, Electrical Apparatus for Explosive Gas Atmospheres, Part 11: Intrinsic Safety "i"	Ex ia
Zone 1	IEC 79-1, Electrical Apparatus for Explosive Gas Atmospheres, Part 1: Construction and Verification Test of Flameproof Enclosures of Electrical Apparatus	Ex d
	IEC 79-2, Electrical Apparatus for Explosive Gas Atmospheres, Part 2: Electrical Apparatus - Type of Protection "p"	Ex p
	IEC 79-7, Electrical Apparatus for Explosive Gas Atmospheres, Part 7: Increased Safety "e"	Ex e
	IEC 79-11, Electrical Apparatus for Explosive Gas Atmospheres, Part 11: Intrinsic Safety "i"	Ex ib
	IEC 79-18, Electrical Apparatus for Explosive Gas Atmospheres, Part 18: Encapsulation "m"	Ex m
Zone 2	IEC 79-15, Electrical Apparatus for Explosive Gas Atmospheres, Part 15: Electrical Apparatus with Type of Protection "n"	Ex nA, nC, & nR

2.3 The numbering scheme used to number the various parts of this standard is based on the standard number of the IEC document that the particular part of this standard covers. For example, the modifications to IEC 79-18 are contained in Part 18 of this standard.

2.4 Equipment covered by this Standard shall also comply with the applicable requirements for similar equipment for use in ordinary locations.

Part 0 -- General Requirements

3 Preface

3.1 Except as modified by 4.1 through 10, equipment for use in Zone classified hazardous locations shall comply with the requirements that appear in clause 1 through clause 25, Annexes A through E, and Amendments 1 and 2 of the second edition of IEC Publication 79-0, Electrical Apparatus for Explosive Gas Atmospheres, Part 0: General Requirements. The equipment shall also comply with one or more of the protection methods identified in Parts 1 through 18 of this Standard, as applicable.

Exception: Equipment for use only in Zone 2, and that complies with the requirements of IEC 79-15 as modified by Part 15 of this Standard, need not comply with IEC 79-0, General Requirements, or Part 0 of this Standard.

4 Scope

4.1 Clause 1.1 -- Add "Encapsulation (Publication 79-18)" to the specific types of protection that supplement or modify 79-0, and delete "Sand-filled Apparatus(Publication 79-5) and Oil Immersed Apparatus(Publication 79-6)".

5 Connection Facilities for Earthing or Equipotential Bonding Conductors

5.1 Clause 13.1 -- Add the following text, "The requirements of Section 13 shall be superseded by Section 505-25 of the NEC, as applicable."

6 Cable and Conduit Entries

6.1 Clause 15.1 -- Add the following text, "The requirements of Section 15 shall be superseded by Section 505-15 of the NEC, as applicable."

7 Marking

7.1 Clause 25.2.(12) -- Add the sub-clause and text, "Class I, Zone 0, 1, or 2, as applicable."

8 Appendix A -- This is "Informative."

9 Appendix B -- This is "Informative."

10 Appendix C -- Delete.

Part 1 -- Construction and Verification Test of Flameproof Enclosures of Electrical Apparatus

11 Scope

11.1 Except as modified by 12.1, equipment for use in Zone classified hazardous locations shall comply with the requirements that appear in Clause 1 through Clause 15, Annexes A and B, and Amendment 1 of the third edition of IEC Publication 79-1, Electrical Apparatus for Explosive Gas Atmospheres, Part 1: Construction and Verification Test of Flameproof Enclosures of Electrical Apparatus. The equipment shall also comply with Part 0 of this Standard.

12 Connection of Conductors and Cables

12.1 Clause 11.1 -- Add the following text, "The requirements of Section 11 shall be superseded by Section 505-15 of the NEC, for field connections, as applicable."

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Part 2 – Electrical Apparatus - Type of Protection “p” (purged/pressurized)

13 Scope

13.1 Except as modified by 13.2, equipment for use in Zone classified hazardous locations shall comply with the requirements that appear in Clause 1 through Clause 19, Annexes A , B, and C, of the third edition of IEC Publication 79-2, Electrical Apparatus for Explosive Gas Atmospheres, Part 2: Electrical Apparatus- Type of Protection “p”. The equipment shall also comply with Part 0 of this Standard.

13.2 There are presently no modifications to IEC Publication 79-2, Electrical Apparatus for Explosive Gas Atmospheres, Part 2: Electrical Apparatus- Type of Protection “p”.

Part 7 – Increased Safety “e”

14 Scope

14.1 Except as modified by 15.1 through 17.1, equipment for use in Zone classified hazardous locations shall comply with the requirements that appear in Clause 1 through Clause 8, Annexes A through E, and Amendment 1 and 2 of the second edition of IEC Publication 79-7, Electrical Apparatus for Explosive Gas Atmospheres, Part 7: Increased Safety “e”. The equipment shall also comply with Part 0 of this Standard.

15 Normative References

15.1 Add the following “Normative references” resulting from the addition of fluorescent bi-pin lamp requirements:

- a) IEC 68-2-42, Basic environmental testing procedures; part 2: Tests Kc: Sulphur dioxide test for contacts and connections
- b) IEC 68-2-6, Basic environmental testing procedures; part 2: Tests Fc and guidance: Vibration (sinusoidal)
- c) IEC 947-1, low voltage switchgear and control gear. Part 1: General requirements
- d) IEC 400, Lampholders for tubular fluorescent lamps and starter holders
- e) IEC 664, Insulation coordination for equipment within low voltage systems. Part 1: Principles, requirements and tests.
- f) IEC 1195, Double-capped fluorescent lamps - Safety specifications

16 Luminaires Designed for Mains Supply

16.1 Insert the following after a) in clause 5.2.1:

- b) Tubular fluorescent bi-pin lamps with G13 or G5 lamp caps according to IEC 1195. Lampholder and lamp socket shall comply with 5.2.7.

16.2 Add the following clauses after clause 5.2.6:

5.2.7 Luminaires for tubular fluorescent bi-pin lamps shall comply with the following requirements (Annex A.1 through A.4 do not apply while Annex A.5 does apply).

5.2.7.1 The mechanical dimensions and the mounting conditions in the luminaire shall take into account the mechanical values and the tolerances specified for the lamp in IEC 400 and IEC 1195.

5.2.7.2 The lampholder shall comply with the requirements for G 13 or G5 in IEC 400.

5.2.7.3 The two poles on each side of the lamp shall be connected in parallel inside each lampholder. Therefor the filament of the lamp is not heated and the lamp is of the cold starting type using an electronic ballast. The current carrying capacity of each pole (one pin) shall be rated for the whole current of the lamp to achieve redundancy.

5.2.7.4 The creepage distances and clearances shall be based upon the maximum igniting (striking) voltage of the lamp/ballast. The metal ring of the lamp tube shall be assumed to be on the electrical potential of the pins.

5.2.7.5 The maximum values for torque and/or force occurring when fitting or removing the lamp in the luminaire shall be not more than 50% of the limit values that may be applied to the pins of the lamp specified in IEC 1195.

5.2.7.6 The electrical contact between each pin of the lamp and the lampholder must be evaluated under corrosion and vibration conditions. The type tests are given in 6.3.3 and 6.3.4.

5.2.7.7 An isolation switch shall be provided. It shall deenergize each lampholder when the protective cover of the luminaire is removed. The switch shall comply with the following:

- The switch must be an isolator (IEC 664, IEC 947-1 Category III) or the contact clearance of each pole shall be at least 1.25 mm for a maximum supply voltage of 300 V (DC or R.M.S.)
- The operation of the contacts shall be compulsory or the switch must fail to the safe condition (open contact)
- The switch and its operation shall not be capable of manual defeating. one solution may be IP 2X protection according to IEC 529 of the operating part of the switch. Another solution may be that the switch can only be closed (after operating) by means of a tool.

5.2.7.8 For the insulating material of the lampholder, IEC 79-0 applies.

16.3 Add clause 6.3.3 and 6.3.4 after clause 6.3.2:

6.3.3 Sulfur dioxide test for bi-pin lamp caps/lampholders

the contacts shall be tested according to IEC 68-2-42, Sulfur dioxide test for contacts and connections, with the following conditions applying:

- State of the contacts during the test: fully assembled
- Duration of the test: 21 days
- After the test the contact resistance shall not have increased by more than 50% of the initial value.

6.3.4 Vibration test for luminaires with bi-pin lamp caps/lampholders.

The luminaires shall be submitted to a vibration endurance test according to IEC 68-2-6.

A complete sample of the luminaire is mounted by its normal fixings to a rigid test fixture, and exposed to frequencies between 1 Hz and 100 Hz.

Between 1 and 9 Hz the amplitude shall be 1.5 mm; between 9 and 100 Hz the test unit shall be subjected to an acceleration of 0.5 g.

The frequency sweep rate shall be 1 octave per minute with an endurance exposure of 20 cycles in each of the orthogonal planes.

After the exposure, there shall be no visible mechanical damage on all parts of the luminaire. Furthermore, during the test the luminaire shall be operated and the current from the lampholder to the lamp shall be monitored. Only one pin shall be connected electrically at each side of the lamp. The test is satisfactory, if during the exposure to vibration no significant change in the current flow occurs. In the case that it is difficult to detect interruptions of the lamp current at the rated frequency, a test with a direct current of similar value than the rated lamp current (r.m.s. value) may be conducted. In this case the test arrangement in Fig. 1 shall be used.

Alternatively, the test may be conducted with hydrogen/air mixture of $(21 \pm 2\%$ hydrogen in air) inside the luminaire. The test is passed if no ignition occurs during the exposure.

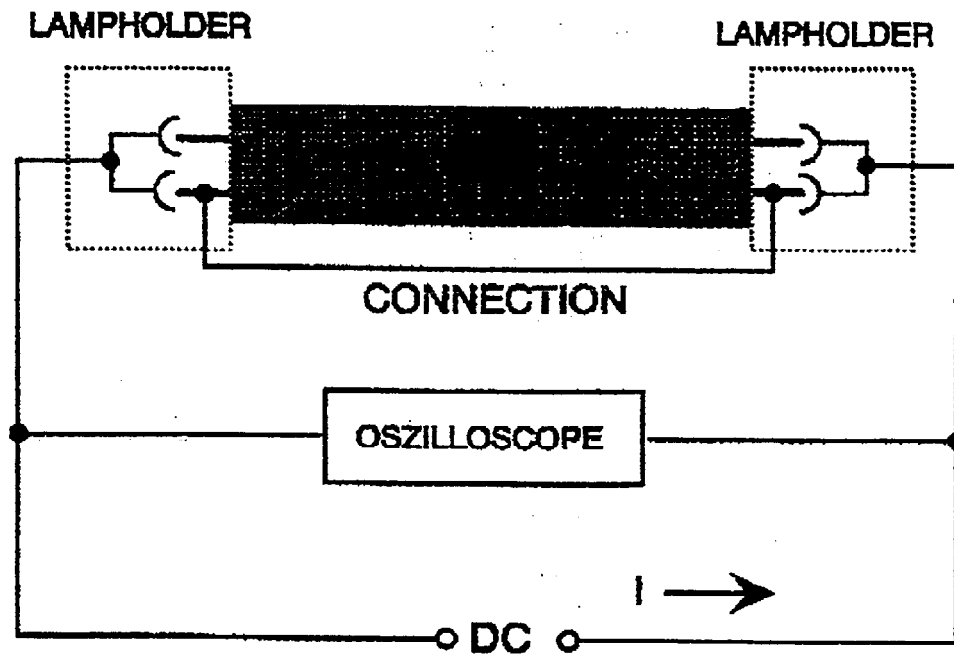


Fig. 1: Test arrangement for vibration test with direct current

17 Appendix A

17.1 Add the following after A.4:

A.5 Requirements for Current Transfer

A.5.1 The current transfer to the lamp cap shall be effected:

a) in the case of screw caps

- to the bottom contact of the caps through resilient or spring contact elements with a force of at least 15N, and

- to the lamp cap through at least two threads or through one or more spring elements with a total contact force of at least 30N;

b) in the case of cylindrical pin caps through spring elements having a contact force of at least 10N;

c) in the case of cylindrical plug-in caps, where the design shall not allow electrical sparking in or external to the joint between the cap and holder, through spring elements having a contact force of at least 10N;

d) in the case of caps where, on removal from the respective lamp holder, the circuit is interrupted in a separate flameproof enclosure (complying with IEC 79-1) in such a way that the contact force exerted by the spring elements on the caps is not less than 7.5N at the moment of circuit interruption.

A.5.2 The above minimum values prescribed for the contact force apply with the lamp fitted to the holder and ready for use. The pressure of the contact elements shall not be affected significantly by heating and other effects to be expected during operation.

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Part 11 -- Intrinsic Safety "i"

18 Scope

18.1 Except as modified by 18.2, equipment for use in Zone classified hazardous locations shall comply with the requirements that appear in Clause 1 through Clause 10, Annexes A , B, and C, of the third edition of IEC Publication 79-11, Electrical Apparatus for Explosive Gas Atmospheres, Part 11: Intrinsic Safety "i". The equipment shall also comply with Part 0 of this Standard.

18.2 There are presently no modifications to IEC Publication 79-11, Electrical Apparatus for Explosive Gas Atmospheres, Part 11: Intrinsic Safety "i".

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Part 15 -- Electrical Apparatus with Type of Protection 'n' (nonincendive)

19 Scope

19.1 Except as modified by 19.2, equipment for use in Zone classified hazardous locations shall comply with the requirements that appear in Clause 1 through Clause 23 and Appendix A of the first edition IEC Publication 79-15, Electrical Apparatus for Explosive Gas Atmospheres, Part 15: Electrical Apparatus with Type of Protection "n".

19.2 There are presently no modifications to IEC Publication 79-15, Electrical Apparatus for Explosive Gas Atmospheres, Part 15: Electrical Apparatus with Type of Protection "n".

Part 18 – Encapsulation "m"

20 Scope

20.1 Except as modified by 20.2, equipment for use in Zone classified hazardous locations shall comply with the requirements that appear in Clause 1 through Clause 10, Annexes A, B, and C, of the first edition of IEC Publication 79-18, Electrical Apparatus for Explosive Gas Atmospheres, Part 18: Encapsulation "m". The equipment shall also comply with Part 0 of this Standard.

20.2 There are presently no modifications to IEC Publication 79-18, Electrical Apparatus for Explosive Gas Atmospheres, Part 18: Encapsulation "m".

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APPENDIX C

Designated Responsibility for UL 674 Product Categories

PSPT, Generators for Use in Hazardous Locations
PTDR and PTDR2, Motors for Use in Hazardous Locations
PTKQ, Motors and Generators, Rebuilt, for Use in Hazardous Locations
PUCJ, Motors, Specialty, for Use in Hazardous Locations

The following individual is involved with the investigation of products covered under the subject categories. As the Primary Designated Engineer, he coordinates the establishment and uniform interpretation of UL requirements applicable to the product categories.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or any adopted requirements that affect your product, you are encouraged to contact:

CCN	Office/Subsidiary	Responsible Engineer	Extension
PSPT, PTDR, PTKQ, PTDR2, PUCJ	Northbrook	RUSS FILIP	42841

The Industry Advisory Conference (IAC) Chairman for the subject categories is Lee Hewitt at UL's Northbrook Office. The IAC Chairman oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

A P P E N D I X D

Designated Responsibility for UL 698 Product Categories for Use in Hazardous Locations, except as noted

NNNY, Control Panels and Assemblies
 NNRL, Control Assembly Covers
 NOIV, Motor Controllers, Auxiliary Devices
 NOPU2, Motor Controllers, Auxiliary Devices
 NOTH, Combination Motor Controllers
 NOWT, NOWT2, Motor Controllers Float- and Pressure-Operated
 NPKR, NPKR2, Magnetic Motor Controllers
 NPXZ, NPXZ2, Manual Motor Controllers
 NQLX, Miscellaneous Motor Controllers
 NQMJ2, Controllers, Switches
 NRBX, Industrial Control Panels Relating to Hazardous Locations
 NRDZ, Auxiliary Devices Relating to Hazardous Locations
 NRFQ, Magnetic Motor Controllers

The following individuals are involved with the investigation of products covered under the subject categories. The Primary Designated Engineer (shown in UPPERCASE letters) coordinates the establishment and uniform interpretation of UL requirements applicable to the product categories.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or any adopted requirements that affect your product, you are encouraged to contact:

CCN	Office/Subsidiary	Responsible Engineer	Extension
NNNY, NNRL, NOIV, NOPU2, NOTH, NOWT, NOWT2, NPKR, NPKR2, NPXZ, NPXZ2, NQLX, NRDZ, NRFQ	Northbrook	ED BRIESCH	43174

CCN	Office/Subsidiary	Responsible Engineer	Extension
NQMJ2	Northbrook	DON ANKELE	42965

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CCN	Office/Subsidiary	Responsible Engineer	Extension
NRBX	Northbrook	ED BRIESCH	43174
	Camas	D. Kumandan	55604

The Industry Advisory Conference (IAC) Chairman for the subject categories is Lee Hewitt at UL's Northbrook Office. The IAC Chairman oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

APPENDIX E

Designated Responsibility for UL 844 Product Categories for Use in Hazardous Locations

FTEV, Emergency Lighting Equipment
FTGT, Emergency Lighting Equipment Fittings
IFUX, Fixtures
IFYJ, Paint Spray Booth Fixtures
IGBW, Fixtures, Recessed Type
IGIV, Fixture Fittings
IGMX, Fixture Fittings for Use with Specified Fittings

The following individual is involved with the investigation of products covered under the subject categories. As Primary Designated Engineer, he coordinates the establishment and uniform interpretation of UL requirements applicable to the product categories.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or any adopted requirements that affect your product, you are encouraged to contact:

CCN	Office/Subsidiary	Responsible Engineer	Extension
FTEV, IFUX, IFYJ, IGBW, IGIV, IGMX, FTGT	Northbrook	FRANCIS MAH	43217

The Industry Advisory Conference (IAC) Chairman for the subject categories is Lee Hewitt at UL's Northbrook Office. He oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

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APPENDIX E

Designated Responsibility for UL 886 Product Categories for Use in Hazardous Locations

CYMX , Cable Sealing Fittings
EBNV,EBNV2, Conduit-Fittings
FTRQ , Enclosures
POWX , Mineral Insulated Cable Fittings
QAZV, Outlet Box Accessories
QBCR, QBCR2, Outlet Boxes and Fittings
UBVX, Shielded Nonmetallic Sheathed Cable Fittings

The following individuals are involved with the investigation of products covered under the subject categories. The Primary Designated Engineer (shown in UPPERCASE letters) coordinates the establishment and uniform interpretation of UL requirements applicable to the product categories.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or any adopted requirements that affect your product, you are encouraged to contact:

CCN	Office/Subsidiary	Responsible Engineer	Extension
EBNV, EBNV2, QAZV, QBCR, QBCR2, POWX	Northbrook	TOM DIGANCI	42844
UBVX, FTRQ, CYMX	Northbrook	DON ANKELE	42965

The Industry Advisory Conference (IAC) Chairman for the subject categories is Lee Hewitt at UL's Northbrook Office. He oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

A P P E N D I X G

DESIGNATED RESPONSIBILITY FOR UL 913 PRODUCT CATEGORIES FOR USE IN HAZARDOUS (CLASSIFIED) LOCATIONS

ARCX, INTRUSION DETECTION UNITS
OERX, OERX2, INTRINSICALLY SAFE EQUIPMENT AND SYSTEMS
QGXT, OCCUPATIONAL HEAD PROTECTION
QQPX2, POWER SUPPLIES
QUZW, PROCESS CONTROL EQUIPMENT
RMGR, RADIO DEVICES

The individual shown is involved with the investigation of products covered under the subject categories. As Primary Designated Engineer he coordinates the establishment and uniform interpretation of UL requirements applicable to the product categories.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or any adopted requirements that affect your product, you are encouraged to contact:

CCN	Office/Subsidiary	Responsible Engineer	Extension
ARCX, OERX, QGXT, QQPX2, QUZW, RMGR	Northbrook	DAVE STYRCULA	43213

The Industry Advisory Conference (IAC) Chairman for the subject categories is Lee Hewitt at UL's Northbrook office. The IAC Chairman oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

APPENDIX H

Designated Responsibility for UL1010 Product Categories for Use in Hazardous Locations

RRHS, Receptacle-Plug Combinations, Accessories
RROR, RROR2, Receptacles with Plugs
RSBZ, Receptacles with Plugs Interlocked with Circuit Breakers
RSPX, Receptacles with Plugs Interlocked with Switches

The following individual is involved with the investigation of products covered under the subject categories. As Primary Designated Engineer, he coordinates the establishment and uniform interpretation of UL requirements applicable to the product categories.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or ant adopted requirements that affect your product, you are encouraged to contact:

CCN	Office/Subsidiary	Responsible Engineer	Extension
RRHS, RROR, RSBZ, RSPX	Northbrook	RON BEAUCHAMP	43243

The Industry Advisory Conference (IAC) Chairman for the subject categories is Lee Hewitt at UL's Northbrook Office. He oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

Subject 2279

-1-

May 1996

A P P E N D I X I

DESIGNATED RESPONSIBILITY FOR UL 1604 PRODUCT CATEGORY NRAG, INDUSTRIAL CONTROL EQUIPMENT, PROGRAMMABLE CONTROLLERS

The following individual is involved with the investigation of products covered under the subject category. As Primary Designated Engineer he coordinates the establishment and uniform interpretation of UL requirements applicable to the product category.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or any adopted requirements that affect your product, you are encouraged to contact:

CCN	Office/Subsidiary	Responsible Engineer	Extension
NRAG	Northbrook	R. BAIRD	42132

The Responsible Department Manager for the subject category is Lee Hewitt at UL's Northbrook office. The Responsible Department Manager oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

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DATA	DATE	NO. OF PAGES
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REVISION	7-14-95	19
~~BULLETIN~~	~~10-28-94~~	~~94~~
REVISION	4-29-94	13
~~BULLETIN~~	~~3-24-94~~	~~88~~
~~BULLETIN~~	~~3-10-94~~	~~6~~
~~REDACTED~~		
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Subjects 2225 (698, 886, 1203, 1569, 1813)
 (In reply, refer to Subject 2225)

333 Pfingsten Road
 Northbrook, IL 60062
 June 25, 1996

TO: Casualty Council of Underwriters Laboratories Inc.,
 Electrical Council of Underwriters Laboratories Inc.,
 Subscribers to UL's Standards Service and Listees for
 Metal-Clad Cable and Cable Sealing Fittings for Hazardous (Classified)
 Locations;
 Explosion - Proof and Dust - Ignition - Proof Electrical Equipment for Use in
 Hazardous (Classified) Locations;
 Industrial Control Equipment for Use in Hazardous (Classified) Locations;
 Metal - Clad Cables; and
 Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations

SUBJECT: Extension of the Comment Due Date for the Proposed First Edition of the Standard for
 Metal-Clad Cables and Cable Sealing Fittings for Use in Hazardous (Classified)
 Locations, UL 2225;

SUMMARY OF TOPICS

This bulletin extends the comment due date for the Subject 2225 Bulletin dated May 10, 1996
 from June 7, 1996 to July 12, 1996.

The original comment due date for UL's Subject 2225 Bulletin dated May 10, 1996, was June 7, 1996.
 Due to requests from industry, the comment due date has been extended to July 12, 1996.

Please provide the following concerning the Subject 2225 Bulletin dated May 10, 1996:

1. Your comments concerning the proposed revisions; and
2. Your comments concerning the proposed effective date, should the proposals be adopted.

Comments should be sent to the attention of Alan McGrath at the Northbrook office of UL, 333 Pfingsten
 Road, Northbrook, Illinois 60062-2096. Please reference all correspondence to Subject 2225.

UNDERWRITERS LABORATORIES INC.

Alan McGrath

ALAN McGRATH (Ext. 43038)
 Project Engineer
 Standards Department

REVIEWED BY:

Don Ankele

DON ANKELE (Ext. 42965)
 Staff Engineer
 Hazardous Locations
 Engineering Services - 418B

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Subjects 2225 (698, 886, 1203, 1569, 1813)
 (In reply, refer to Subject 2225)

333 Pfingsten Road
 Northbrook, IL 60062
 June 14, 1996

TO: Casualty Council of Underwriters Laboratories Inc.,
 Electrical Council of Underwriters Laboratories Inc.,
 Subscribers to UL's Standards Service and Listees for
 Metal-Clad Cable and Cable Sealing Fittings for Hazardous (Classified)
 Locations;
 Explosion - Proof and Dust - Ignition - Proof Electrical Equipment for Use in
 Hazardous (Classified) Locations;
 Industrial Control Equipment for Use in Hazardous (Classified) Locations;
 Metal - Clad Cables; and
 Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations

SUBJECT: Announcement of UL's Acceptance of Submittals for Metal-Clad Cables and Cable
 Sealing Fittings for Division 1 Hazardous (Classified) Locations, and Announcement of
 the First Listing of Metal-Clad Cable Sealing Fittings for Division 1 Hazardous (Classified)
 Locations

SUMMARY OF TOPICS

UL announces that it is now accepting submittals for metal-clad cables and cable sealing fittings for hazardous (classified) locations.

UL announces it is now accepting submittals for metal-clad cables and cable sealing fittings for use in hazardous (classified) locations. These products will be investigated in accordance with the first edition of the Standard for Metal - Clad Cable and Cable Sealing Fittings for Use in Hazardous (Classified) Locations, UL 2225 expected to be published on July 31, 1996. The first Listing of metal-clad cable sealing fittings for Division 1 Hazardous (Classified) Locations has recently been issued.

UL 2225 covers metal-clad cable for use in hazardous (classified) locations, Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F and G and Class III; Class I, Zone 1, Groups IIA, IIB, IIB plus Hydrogen, and IIC in accordance with the National Electrical Code, NFPA 70.

UL 2225 also covers explosion-proof and dust-ignition-proof cable sealing fittings for use in Hazardous (Classified) Locations, Class I, Division 1 and 2, Groups A, B, C, and D; Class II, Division 1 and 2, Groups E, F, and G; Class III, and Class I, Zones 1 and 2, Groups IIA, IIB, IIB plus Hydrogen, and IIC in accordance with the National Electrical Code, NFPA 70.

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UL 2225 also covers explosion-proof and dust-ignition-proof cable sealing fittings intended for use on mobile offshore oil rigs and drilling platforms. Investigations of these fittings include an evaluation for conformity to the installation and use provisions of Title 46 Code of Federal Regulations Sub-part 111.105 and Subpart 111.60 of the United States Coast Guard Electrical Engineering Regulations, Subchapter J (Parts 110 to 113 inclusive) as applied by the authority having jurisdiction.

UL 2225 also applies to metal-clad cables and cable sealing fittings for hazardous locations under the following atmospheric conditions:

- a) A minimum ambient temperature of minus 50°C (minus 58°F),
- b) An oxygen concentration of not greater than 21 percent by volume, and
- c) A nominal barometric pressure of one atmosphere.

UL 2225 was developed because metal-clad cable can now be installed in Division 1 hazardous (classified) locations in accordance with the 1996 National Electrical Code (NEC). Sections 501-4(a) Exception No. 2, 502-4(a) Exception, and 505-15(3)(b) and (c) of the 1996 NEC requires that the metal-clad cable be investigated to, and comply with, a nationally recognized testing laboratory standard before the product can be installed.

The proposed requirements in UL 2225 were developed from UL's engineering experience, previous investigations of metal-clad cables and Division 2 cable sealing fittings, and from the following UL standards:

The Standard for Fittings for Conduit and Outlet Boxes, UL 514B;
The Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886;
The Standard for Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations, UL 1203; and
The Standard for Metal-Clad Cables, UL 1569.

Manufacturers who wish to submit products for investigation should contact one of the following individuals.

NORTHBROOK OFFICE:

Mr. Don Ankele
847-272-8800 (Ext. 42965)
Engineering Services 418B
333 Pfingsten Road
Northbrook IL, 60062

MELVILLE OFFICE:

Mr. Tom Guida
516-271-6200 (Ext. 22228)
Engineering Services 216S
1285 Walt Whitman Road
Melville, NY 11747

UNDERWRITERS LABORATORIES INC.

Alan McGrath

ALAN McGRATH (Ext. 43038)
Project Engineer
Standards Department

SR:JTM

REVIEWED BY:

Don Ankele/am

DON ANKELE (Ext. 42965)
Staff Engineer
Engineering Services 418B

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Subjects 2225 (698, 886, 1203, 1569, 1813)
 (In reply, refer to Subject 2225)

333 Pfingsten Road
 Northbrook, IL 60062
 May 10, 1996

TO: Casualty Council of Underwriters Laboratories Inc.,
 Electrical Council of Underwriters Laboratories Inc.,
 Subscribers to UL's Standards Service and Listees for
 Metal-Clad Cable and Cable Sealing Fittings for Hazardous (Classified)
 Locations;
 Explosion - Proof and Dust - Ignition - Proof Electrical Equipment for Use in
 Hazardous (Classified) Locations;
 Industrial Control Equipment for Use in Hazardous (Classified) Locations;
 Metal - Clad Cables; and
 Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations

SUBJECT: Request for Comments on Proposed Requirements for the Proposed First Edition of the
 Standard for Metal-Clad Cables and Cable Sealing Fittings for Hazardous (Classified)
 Locations, UL 2225; PROPOSED EFFECTIVE DATE

SUMMARY OF TOPICS

This bulletin proposes the following:

The minimum time requirement for the accelerated aging test contained in the proposed first edition of UL 2225 would be deleted.

COMMENTS DUE: JUNE 7, 1996

This bulletin supplements the Subject 2225 bulletin dated April 19, 1996.

Attached for your review and comment are proposed requirements for UL 2225. Questions regarding interpretation of requirements should be directed to the responsible UL Staff. Please see Appendix A of this bulletin regarding designated responsibility for the subject product categories.

Please note that proposed requirements are of a tentative and early nature and are for review and comment only. Current requirements are to be used to judge a product until these requirements are published in final form.

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PROPOSED EFFECTIVE DATE

The proposed requirement will not necessitate a review or additional testing of currently Listed products. Therefore, UL proposes that the new requirement becomes effective upon publication.

RATIONALE

In UL's Subject 2225 Bulletin dated April 19, 1996, UL proposed that the accelerated aging test be conducted for a length of time of at least 30 days as determined by the equation contained in 28.3.3.1. However, after further review, UL has determined that there could be instances where the accelerated aging could be conducted in less than 30 days. Therefore, as shown below, UL is proposing to delete the 30 day minimum requirement.

IMPACT

The proposed revision, if adopted, would not require a review, retest, or modifications to currently Listed products.

PROPOSAL

28.3.3 Accelerated aging tests

28.3.3.1 Three separate enclosure samples are to be conditioned in an oven at a temperature (T_2) and for a length of time (D) determined in accordance with the following ~~but not less than 30 days:~~

$$D = \frac{18262.5}{2^{\Delta T/10}}$$

$$T_2 = T_1 \frac{\Delta T}{10} \left(\frac{\ln \frac{18262.5}{D}}{\ln 2} \right)$$

in which:

D is the test time in days ~~(30 days minimum)~~.

T_1 is the maximum temperature in °C obtained on the enclosure in a temperature test under normal operating conditions.

T_2 is the test oven temperature in °C.

ΔT is T_2 minus T_1 .

Either the test time in days (D) or the test temperature (T_2) is to be selected by the manufacturer.

28.3.3.1 revised (date of publication)

REQUEST FOR COMMENTS ON PROPOSALS

Please provide the following:

1. Your comments concerning the proposed requirement; and
2. Your comments concerning the proposed effective date, should the proposals be adopted.

Written comments should be sent to the attention of Alan McGrath at UL's Northbrook office, 333 Pfingsten Road, Northbrook, IL 60062-2096. Please reference all correspondence to Subject 2225.

All comments should be sent by June 7, 1996.

Unless specifically requested to do so, UL will not acknowledge comments indicating concurrence with these proposals.

UNDERWRITERS LABORATORIES INC.

Alan McGrath

ALAN McGRATH (Ext. 43038)
Project Engineer
Standards Department

SR:JTM

REVIEWED BY:

Don Ankele

DON ANKELE (Ext. 42965)
Staff Engineer
Engineering Services 418B

APPENDIX A

DESIGNATED RESPONSIBILITY FOR UL PRODUCT CATEGORIES

CYMX, CABLE SEALING FITTINGS FOR USE IN HAZARDOUS LOCATIONS
 EBNV, CONDUIT FITTINGS FOR USE IN HAZARDOUS LOCATIONS
 EBNV2, CONDUIT FITTINGS FOR USE IN HAZARDOUS LOCATIONS
 FTRQ, HAZARDOUS LOCATIONS EQUIPMENT – ENCLOSURES
 POWX, MINERAL INSULATED CABLE FITTINGS
 QAZV, OUTLET BOX ACCESSORIES
 QBCR, HAZARDOUS LOCATIONS EQUIPMENT – OUTLET BOXES
 QBCR2, HAZARDOUS LOCATIONS EQUIPMENT – OUTLET BOXES
 PJAX, METAL-CLAD CABLES
 FDLW, DRILLING EQUIPMENT – MARINE SHIPBOARD CABLE SEALING
 FITTINGS
 DAZV, HAZARDOUS LOCATIONS EQUIPMENT – CENTRIFUGES
 DMRR, HAZARDOUS LOCATIONS EQUIPMENT – CLEANING MACHINES
 FTRV, ENCLOSURES FOR USE IN HAZARDOUS LOCATIONS
 FDKX, DRILLING EQUIPMENT, DRILLING INSTRUMENTATION FOR USE IN
 HAZARDOUS LOCATIONS
 FTRX, ENCLOSURE ACCESSORIES
 QDIY, HAZARDOUS LOCATIONS EQUIPMENT – PAINTING EQUIPMENT
 QFIW, HAZARDOUS LOCATIONS EQUIPMENT – PANELBOARDS
 QNHV, HAZARDOUS LOCATIONS EQUIPMENT – PLUMBING ACCESSORIES
 SAOX, HAZARDOUS LOCATIONS EQUIPMENT – REELS – CORDS
 TVLE2, SEALING COMPOUNDS FOR USE IN HAZARDOUS LOCATIONS
 VCSV, HAZARDOUS LOCATIONS EQUIPMENT – SOUND RECORDING AND
 REPRODUCING EQUIPMENT
 VXDY, HAZARDOUS LOCATIONS EQUIPMENT – STATIC NEUTRALIZING
 EQUIPMENT
 WYMV, HAZARDOUS LOCATIONS EQUIPMENT – TELEMETERING EQUIPMENT
 WZAT, HAZARDOUS LOCATIONS EQUIPMENT – TELEPHONES
 XIAZ, HAZARDOUS LOCATIONS EQUIPMENT – TIME INDICATING AND
 RECORDING EQUIPMENT
 ZBRX, HAZARDOUS LOCATIONS EQUIPMENT – VIBRATORS
 ZCFV, HAZARDOUS LOCATIONS EQUIPMENT – VISCOMETERS
 ZRBZ, HAZARDOUS LOCATIONS EQUIPMENT – X-RAY EQUIPMENT
 ZRBZ2, HAZARDOUS LOCATIONS EQUIPMENT – X-RAY EQUIPMENT
 ACCESSORIES
 NNNY, INDUSTRIAL CONTROL EQUIPMENT – CONTROL PANEL AND
 ASSEMBLIES
 NNRL, INDUSTRIAL CONTROL EQUIPMENT – CONTROL ASSEMBLY COVERS
 NOIV, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 AUXILIARY DEVICES
 NOPU2, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 AUXILIARY DEVICES
 NOTH, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 COMBINATION MOTOR

NOWT, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 FLOAT-AND PRESSURE
 NOWT2, INDUSTRIAL CONTROL EQUIPMENT – CONTROLLERS –
 COMPONENT
 NPKR, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 MAGNETIC MOTOR
 NPKR2, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 MAGNETIC MOTOR
 NPXZ, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 MANUAL MOTOR
 NPXZ2, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 MANUAL MOTOR
 NQLZ, INDUSTRIAL CONTROL EQUIPMENT – MOTOR CONTROLLERS –
 MISCELLANEOUS MOTOR
 NRBX, INDUSTRIAL CONTROL EQUIPMENT RELATING TO HAZARDOUS
 LOCATIONS
 NRDZ, INDUSTRIAL CONTROL EQUIPMENT RELATING TO HAZARDOUS
 LOCATIONS – AUXILIARY DEVICES
 NRFQ, INDUSTRIAL CONTROL EQUIPMENT RELATING TO HAZARDOUS
 LOCATIONS – MAGNETIC MOTOR CONTROLLERS

The individuals shown in the following tables are involved with the investigation of products covered under the subject categories. The Primary Designated Engineer (**shown in UPPERCASE letters**) coordinates the establishment and uniform interpretation of UL requirements applicable to the product categories. The Designated Engineers (**shown in lowercase letters**) work with the Primary Designated Engineer to interpret requirements and maintain standards.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or any adopted requirements that affect your product, you are encouraged to contact the individual at the office to which you normally submit your products.

The Industry Advisory Conference Chairman for the subject categories is Lee Hewitt at UL's Northbrook office. The IAC Chairman oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

CCN	Office/Subsidiary	Responsible Engineer	Extension
CYMX, TVLE2, FTRV, FTRQ, FDLW, FTRX	Northbrook	D. ANKELE	42965

CCN	Office/Subsidiary	Responsible Engineer	Extension
POWX, EBNV, EBNV2 QAZV, QBCR, QBCR2	Northbrook	T. DIGANCI	42844

CCN	Office/Subsidiary	Responsible Engineer	Extension
PJAZ	Melville	T. GUIDA	22228
	Northbrook	K. Conner	42330
	Santa Clara	A. Flandez	32816

CCN	Office/Subsidiary	Responsible Engineer	Extension
NNNY, NNRL, NOIV, NOPU2, NOTH, NOWT, NOWT2, NPKR, NPKR2, NPXZ, NPXZ2, NQLX, NRBX, NRDZ, NRFQ, QNHV	Northbrook	E. BRIESCH	43174

CCN	Office/Subsidiary	Responsible Engineer	Extension
DAZV, DMRR, QDIY, QFIW, ZRBZ, VXDY, ZRBZ2,	Northbrook	P. KELLY	42326

CCN	Office/Subsidiary	Responsible Engineer	Extension
DMRR	Northbrook	J. WODZINSKI	42840

CCN	Office/Subsidiary	Responsible Engineer	Extension
SAOX, VCSV	Northbrook	J. ZIMMER	42969

CCN	Office/Subsidiary	Responsible Engineer	Extension
WYMV, FDKX	Northbrook	D. MAHER	42930

CCN	Office/Subsidiary	Responsible Engineer	Extension
WZAT	Northbrook	S. RIRIE	43623

CCN	Office/Subsidiary	Responsible Engineer	Extension
ZCFV, ZBRX	Northbrook	R. FILIP	42841

CCN	Office/Subsidiary	Responsible Engineer	Extension
XIAZ	Northbrook	K. MCMANAMA	42469

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Subjects 2225 (698, 886, 1203, 1569, 1813)
 (In reply, refer to Subject 2225)

333 Pfingsten Road
 Northbrook, IL 60062
 April 19, 1996

TO: Casualty Council of Underwriters Laboratories Inc.,
 Electrical Council of Underwriters Laboratories Inc.,
 Subscribers to UL's Standards Service and Listees for
 Metal-Clad Cable and Cable Sealing Fittings for Hazardous (Classified)
 Locations;
 Explosion - Proof and Dust - Ignition - Proof Electrical Equipment for Use in
 Hazardous (Classified) Locations;
 Industrial Control Equipment for Use in Hazardous (Classified) Locations;
 Metal - Clad Cables; and
 Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations

SUBJECT: Request for Comments on Proposed Requirements for the Proposed First Edition of the
 Standard for Metal-Clad Cables and Cable Sealing Fittings for Hazardous (Classified)
 Locations, UL 2225, PROPOSED EFFECTIVE DATE

SUMMARY OF TOPICS

This bulletin proposes the following:

The First Edition of the Standard for Metal-Clad Cables and Cable-Sealing Fittings for Hazardous (Classified) Locations, UL 2225, would be published.

COMMENTS DUE: MAY 17, 1996

This bulletin supersedes the Subject 2225 bulletin dated November 10, 1995.

Attached as Appendix A for your review and comment are proposed requirements for UL 2225. Questions regarding interpretation of requirements should be directed to the responsible UL Staff. Please see Appendix B of this bulletin regarding designated responsibility for the subject product categories.

Please note that proposed requirements are of a tentative and early nature and are for review and comment only. Current requirements are to be used to judge a product until these requirements are published in final form.

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PROPOSED EFFECTIVE DATE

These proposed requirements will not necessitate a review or additional testing of currently Listed products. Therefore, UL proposes that the new requirements become effective upon publication.

RATIONALE

On November 10, 1995 UL issued a Subject 2225 bulletin which contained the first draft of the proposed Standard for Metal-Clad Cables and Cable-Sealing Fittings for Hazardous (Classified) Locations, UL 2225. The rationale for proposing the standard was essentially as follows:

Metal - Clad Cable can now be installed in Division 1 hazardous (classified) locations in accordance with the 1996 National Electrical Code. Articles 501-4(a) Exception No. 2, 502-4(a) Exception, and 505-15(3)(b) and (c) of the 1996 NEC requires that the metal-clad cable be investigated to, and comply with, a nationally recognized testing laboratory standard before the product can be installed. Therefore, UL has developed the proposed first edition of the Standard for Metal - Clad Cable and Cable Sealing Fittings for Hazardous (Classified) Locations, UL 2225.

The proposed requirements in UL 2225 were developed from UL's engineering experience, previous investigations of Division 2 cable sealing fittings, and from the following UL standards:

The Standard for Fittings for Conduit and Outlet Boxes, UL 514B;
 The Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886;
 The Standard for Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations, UL 1203; and
 The Standard for Metal-Clad Cables, UL 1569.

UL has now responded to all comments received on the first draft. The second draft of the proposed first edition of UL 2225 is contained in Appendix A. For your convenience in review, proposed additions to the first draft are shown underlined, proposed deletions are shown ~~lined out~~, and extensively revised paragraphs are also shown underlined.

IMPACT

A new category will be established to cover Metal - Clad Cables that comply with this new standard. Cable sealing fittings complying with this new standard will be covered under the existing product categories of CYMX, cable sealing fittings for hazardous locations, and FDLW, marine shipboard cable sealing fittings for hazardous locations.

UL proposes that this new standard become effective upon publication.

REQUEST FOR COMMENTS ON PROPOSALS

Please provide the following:

1. Your comments concerning the proposed requirements; and
2. Your comments concerning the proposed effective date, should the proposals be adopted.

Written comments should be sent to the attention of Alan McGrath at UL's Northbrook office, 333 Pfingsten Road, Northbrook, IL 60062-2096. Please reference all correspondence to Subject 2225.

Subjects 2225 (698, 886, 1203, 1569, 1813)

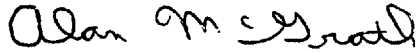
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April 1996

All comments should be sent by May 17, 1996.

Unless specifically requested to do so, UL will not acknowledge comments indicating concurrence with these proposals.

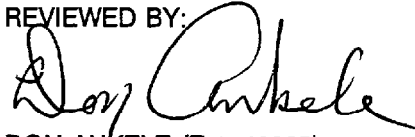
UNDERWRITERS LABORATORIES INC.



ALAN McGRATH (Ext. 43038)
Project Engineer
Standards Department

SR:JTM

REVIEWED BY:



DON ANKELE (Ext. 42965)
Staff Engineer
Engineering Services 418B

PROPOSED REQUIREMENTS ARE OF A TENTATIVE AND EARLY NATURE AND ARE FOR REVIEW AND COMMENT ONLY. CURRENT REQUIREMENTS ARE TO BE USED TO JUDGE A PRODUCT UNTIL THESE REQUIREMENTS ARE PUBLISHED IN FINAL FORM.

A P P E N D I X A

PROPOSED FIRST EDITION OF THE STANDARD FOR METAL - CLAD CABLE AND CABLE SEALING FITTINGS FOR HAZARDOUS (CLASSIFIED) LOCATIONS, UL 2225

For your convenience in review, proposed additions to the first draft contained in UL's Subject 2225 Bulletin dated November 10, 1995 are shown underlined, proposed deletions are shown ~~lined out~~, and extensively revised paragraphs are also shown underlined.

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1 Scope

1.1 These requirements cover metal-clad cable for Use in hazardous (classified) locations, Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F and G and Class III; Class I, Zones 1 and 2, Groups IIA, IIB, IIB plus Hydrogen, and IIC in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements also cover explosion-proof and dust ignition-proof cable sealing fittings for use in hazardous (classified) locations, Class I, Division 1 and 2, Groups A, B, C, and D; Class II, Division 1 and 2, Groups E, F, and G; Class III, and Class I, Zones 1 and 2, Groups IIA, IIB, IIB plus Hydrogen, and IIC in accordance with the National Electrical Code, NFPA 70.

1.3 These requirements also cover explosion-proof and dust ignition-proof cable sealing fittings intended for use on mobile offshore oil rigs and drilling platforms. Investigations of these fittings include an evaluation for conformity to the installation and use provisions of Title 46 Code of Federal Regulations Sub-part 111.105 and Subpart 111.60 of the United States Coast Guard Electrical Engineering Regulations, Subchapter J (Title 46 Code of Federal Regulations, Parts 110 to 113 inclusive) as applied by the authority having jurisdiction.

~~1.4 Metal-clad cable shall also comply with all of the requirements in the Standard for Metal-Clad Cables, UL 1569.~~

~~1.5 Explosion-proof and dust ignition-proof cable sealing fittings shall also comply with the requirements in the Standard for Fittings for Conduit and Outlet Boxes, UL 514B.~~

1.6 These requirements apply to metal-clad cables and cable sealing fittings for hazardous locations under the following atmospheric conditions:

- a) A minimum ambient temperature of minus 50°C (minus 58°F),
- b) An oxygen concentration of not greater than 21 percent by volume, and
- c) A nominal barometric pressure of one atmosphere.

1.7 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of explosion, fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

2 General

2.1 If a value for measurement is followed by a value in other units in parentheses, the second value may be only approximate. The first stated value is the requirement.

2.2 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

3 Definitions

3.1 The following definitions apply in this Standard.

3.1.1 EXPLOSION-PROOF CABLE SEALING FITTING – A device or combination of devices intended to provide a means of entry of a cable into a hazardous location explosion-proof enclosure and which also provides strain relief and provides required sealing characteristics, either by an integral means or when combined with a separate sealing fitting.

3.1.2 DUST-IGNITION-PROOF CABLE SEALING FITTING – A cable sealing fitting capable of meeting the requirements for dust-ignition-proof construction and performance as given in the Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886.

3.1.3 SEALING CHARACTERISTICS – Those characteristics necessary to minimize the migration of gases through the seal and to prevent the propagation of flame from enclosures required to be explosion-proof, and/or exclude hazardous dusts or readily ignitable fibers from an enclosure required to be dust ignition-proof.

PART I – METAL-CLAD CABLES

CONSTRUCTION

4 General

4.1 Metal-clad cables for use in Division 1, and Zones 1 and 2 hazardous locations shall comply with all applicable construction requirements for metal-clad cables in the Standard for Metal-Clad Cables, UL 1569.

4.2 Metal-clad cables for use in Division 1 and Zone 1 hazardous locations shall also have the following constructional features:

- a) A gas/vapor tight continuous corrugated aluminum sheath,
- b) An overall jacket of polymeric material, and
- c) Separate grounding conductors in accordance with Section 250-95 of the 1996 NEC.

4.3 The sheath, jacket and grounding conductors required by 4.2 shall also comply with all applicable construction requirements in the Standard for Metal-Clad Cables, UL 1569.

4.4 Metal-clad cables with optical-fiber members shall be subjected to special investigation.

PERFORMANCE

5 General

5.1 ~~Except as indicated otherwise in Sections 6 – 8,~~ Metal-clad cables for use in Division 1, and Zones 1 and 2 hazardous locations shall comply with the all applicable performance requirements for metal-clad cables in the Standard for Metal-Clad Cables, UL 1569 and also in Sections 6 - 8A of this standard.

5.2 The sheath, jacket and grounding conductors required by 4.2 shall also comply with any applicable performance requirements in the Standard for Metal-Clad Cables, UL 1569, and also in Sections 6 - 8A of this standard.

6 Impact Test – Low Temperature

6.1 The non-metallic components of at least eight specimens of finished cable shall not crack when the non-metallic components of ten specimens of finished cable are tested. The test is to consist of an impact of a 3 lb (1.36 kg) mass falling through a distance of 3 ft (0.91 m) at a temperature of $-25 \pm 1^{\circ}\text{C}$ ($-13 \pm 1.8^{\circ}\text{F}$), or at the minimum ambient rated and marked on the cable, if rated lower than -25°C (-13°F).

6.2 The 10 specimens are to be placed in an environmental chamber and maintained at the required temperature for a period of 4 hours. Immediately following this conditioning, each of the 10 specimens are to be placed on a solid supporting surface and then subjected to the impact specified in 6.1 by means of a steel head. This steel head is to have an overall diameter of 28.5 mm (1.1 in.) and is to have a flat striking surface that is 25 mm (1 in) in diameter with slightly rounded edges. Flat cable is to be placed such that the major cross-sectional axis is parallel with the supporting surface.

7 Mechanical Damage – Impact

7.1 An impact test shall be conducted using the requirements, including sample selection, specified for the Impact Test, Section 21, in the Standard for Metal-Clad Cables, UL 1569. However, the weight of the falling mass shall be 25 lbs (11.34 kg) through a distance of 1 ft (0.31 m) instead of 10 lbs (4.54 kg) through a distance of 1.5 ft. (0.46 m) for the tests with the No. 14 AWG conductors.

8 Crushing Test

8.1 A crushing test shall be conducted using the requirements, including sample selection, specified for the Crushing Test - All Cable, Section 22, in the Standard for Metal-Clad Cables, UL 1569. However, the crushing force is to be 1500 lbf (6670 N) instead of 1000 lbf (4448 N) for the test with the No. 14 AWG conductors.

8A Flame Test

8A.1 The flame test shall be performed in accordance with the FT4/IEEE 1202 Type of Flame Exposure test found in the Standard for Fire-Propagation and Smoke-Release Test for Cables, UL 1685.

9 Explosion Test

~~9.1 These requirements are applicable only to metal-clad cables for Class I Hazardous Locations with one or more subassemblies, where the integrity of each subassembly is to be maintained in passage through the cable sealing fitting used with the cable, for example shielded signal cables.~~

~~9.2 Explosion flame propagation tests shall be performed on samples of the cable under consideration using the gas mixtures and test method specified in the appropriate group in the Explosion Tests, Section 23. The cable shall be fitted to a 1 cubic foot (0.028 cubic meter) test enclosure using a suitable explosion-proof cable sealing fitting, installed in accordance with the manufacturer's instructions. No attempt shall be made during the fitting installation to seal individual conductors within a subassembly. The length of the cable protruding from the cable sealing fitting shall be 5.5 ft (1.8 m). No attempt shall be made to seal the outer end of the cable, or the ends of each subassembly protruding into the test enclosure. Each subassembly shall protrude through the gland into the test enclosure with the shield, jacket or other covering intact for a length of $5.9 \pm .4$ inch (150 ± 10 mm). For each test the test gas mixture shall be introduced into the test chamber and the pressure shall be increased to 3 psi (20.7 kPa) for a period of 10 min, or until the concentration of the gas exiting the cable reaches the test gas concentration. An envelope surrounding the outer end of the cable under test shall be filled with the same test gas mixture. The gas mixture in the 1 cubic foot test~~

~~enclosure shall then be ignited by means of a spark plug. There shall be no ignition of the gas in the envelope surrounding the outer end of the cable as a result of these tests.~~

MARKING

10 General

10.1 Metal-clad cables for use in Division 1 and Zone 1 hazardous locations shall comply with all applicable marking requirements for metal-clad cables in the Standard for Metal-Clad Cables, UL 1569.

10.2 Cables complying with the requirements of this standard shall also be surface marked "HL". The marking "HL" indicates the suitability of the cable for use in Division 1 and Zone 1 hazardous locations. The manner in which this marking is applied shall comply with the applicable requirements in UL 1569.

~~10.3 The size of the marking specified in 10.2 shall be in accordance with the Marking Section of the Standard for Metal-Clad Cables, UL 1569.~~

PART II – CABLE SEALING FITTINGS

CONSTRUCTION

11 General

11.1 Cable sealing fittings shall comply with the construction requirements in all the Standard for Fittings for Conduit and Outlet Boxes, UL 514B, and with all the construction requirements in the Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886.

11.2 Design tolerances of the cable sealing fitting shall be considered in determining compliance with 11.1 of this standard checked for compliance with the manufacturing drawings supplied by the manufacturer.

11.3 The width of all joint surfaces or the length of path through or across any joint surface or opening in the cable sealing fitting, including threadless joints and threaded joints, shall be dimensionally measured for compliance with the appropriate requirements contained in 15.1 or in Section 6 and 15.4 in the Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886, for the specific hazardous locations for which the sealing fitting is intended.

11.4 All joint surfaces shall have the gap between joint surfaces examined by means of a appropriate measuring tools. The gap between the joint surfaces shall not exceed the dimensions specified in 15.1 or in Section 6 in the Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886 for the specific hazardous locations for which the cable sealing fitting is intended.

11.5 Cable sealing fittings intended to seal metal-clad cables with optical-fiber members shall be subjected to special investigation.

12 Enclosure Types

12.1 A cable sealing fitting that complies with the applicable requirements of this standard: ~~may be marked Type 7 and 9.~~

a) For use in Class I, Groups A, B, C, or D locations may be marked with the enclosure designation Type 7, or

b) For use in Class II, Groups E, F, or G locations may be marked with the enclosure designation Type 9.

Exception: A cable sealing fitting marked for use only in Zone 1 or Zone 2.

12.2 A cable sealing fitting that is intended for use in environmental conditions that has a marked enclosure type designation, shall also comply with the applicable requirements for each enclosure type, as specified in the Standard for Enclosures For Electrical Equipment, UL 50; for example, Type 3, 4X, or 6.

12.3 A cable sealing fitting marked Type 3, 3R, 3S, 4, 4X, 6, or 6P enclosure may also be marked "Raintight" if no water enters the enclosure. Compliance with these requirements shall be determined by the applicable tests in the Standard for Enclosures for Electrical Equipment, UL 50.

13 Material

13.1 A cable sealing fitting shall be made of ferrous materials, copper, brass, bronze, or aluminum or its alloys containing not less than 80 percent aluminum. A metal such as zinc or magnesium, or their alloys, is not acceptable.

13.2 Copper shall not be used for a cable sealing fitting for use in Class I, Group A or IIC locations.

13.3 Nonmetallic material shall be subjected to the ~~Solvent Vapor~~ Non-metallic Enclosure Materials Test in Section 28.

14 Bonding Continuity

14.1 Cable sealing fitting intended for use with multiconductor metal-clad cables shall be constructed in a manner such that connection between the metallic covering of the cable and the cable connector will comply with the requirements of the Standard for Fittings for Conduit and Outlet Boxes, UL 514B.

15 Joints

15.1 ~~15.4~~ For Groups A, B, C and D; IIA, IIB, and IIC, a flamepath having a cylindrical cross-section shall have a length of not less than 1 inch (25.4 mm). The diametrical clearance (difference in diameters) shall not be greater than 0.0033 inch (0.083 mm). The diametrical clearance of a path longer than 1-1/4 inch (31.8 mm) shall not be more than 0.0045 inch (0.114 mm). For flamepath lengths greater than 1 inch (25.4 mm) but less than 1-1/4 inch (38.1 mm) the clearance shall be as given in UL 886, Table 6.1.

15.2 ~~15.3~~ Non-threaded metal-to-metal joints are permitted for Class I, Group A or IIC Cable sealing fitting, provided

a) The joint complies with Class I, Group B requirements for joint dimensions as stated in UL 886; Section 6; and

b) The assembly complies with the Class I, Group A or IIC explosion flame propagation test requirements in 23.9 - 23.13.

15.3 ~~15.4~~ All other explosion-proof joints in cable sealing fittings shall comply with the requirements in Joints, Section 6, in the Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886.

15.4 ~~15.2~~ A cable sealing fitting shall be so constructed that positive mechanical retention is provided, independent of any ground clamp or strain relief, to prevent movement of any part that could then result in a reduction of any internal flame path or an increase of any internal gap ~~prevents external movement of the cable shall not affect the joint and gap requirements. Non-metallic parts shall not be relied upon to secure parts forming a flame path.~~

15.5 In determining compliance with 15.4, non-metallic parts shall not be relied upon to secure parts forming a flame path.

16 Supply Connections

16.1 A cable sealing fitting shall be provided with at least five full threads. ~~A cable sealing fitting shall be provided with male threads conforming to the requirements for conduit threads or other wiring methods in accordance with Article 501 in the National Electrical Code, NFPA 70-1993, and shall gauge ± 1 turn. A shoulder on the cable sealing fitting shall not bottom before 5 full threads are engaged when installed in a test plate having a female thread form of the same type thread tapped to ± 5 turns on the thread form gauge.~~

17 Seal

17.1 A seal shall be provided between the end of the connector intended for the connection of the cable and the end of the connector intended for connection to the explosion-proof equipment as indicated in 17.2 and 17.3.

17.2 A sealing compound or a cement used for the seal shall:

- a) Not be less than 5/8 inch (16.9 mm) deep,
- b) Neither soften nor crack under the service conditions,
- c) Ensure a tight seal and to retain the compound in place, and
- d) Not be affected adversely by the hazardous vapors in which it is intended to be used.
- e) Seal each individual conductor or subassembly and the metal jacket of the cable.

17.3 The sealing compound shall neither flow nor creep at the operating temperature of the device. A sealing compound of the softening type shall have a softening point of not less than 93°C (200°F) as determined by the Standard Test Method for Softening Point by Ring-and-Ball Apparatus, ASTM E28-92. Polymeric sealing compounds shall be subjected to the Solvent Vapor Tests found in Tests on Sealing Compounds, Section 29.

18 Protection Against Corrosion

18.1 All ferrous-metal parts other than stainless steel shall be protected against corrosion, except at joint surfaces and conduit threads, for example, by zinc or cadmium coating, plating, enameling, painting, varnishing, or lacquering. Joint surfaces and conduit threads may be electroplated.

Exception: As an alternative for a cable sealing fitting of ferrous metal other than stainless steel, the Rust-Resistance Test, Section 33, in the Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886, may be conducted.