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Subjects 5 (5B)

1655 Scott Blvd.
 Santa Clara, CA 95050
 August 17, 1995

TO: Electrical Council of Underwriters Laboratories Inc.,
 Subscribers to UL's Standards Service for Surface Metal Raceways and Fittings

SUBJECT: Report of the Meeting of the Industry Advisory Conference of UL for Surface Metal Raceways; Request for Comments on Proposed Requirements for the Proposed Twelfth Edition of the Standard for Surface Metal Raceways and Fittings, UL 5, and for the Proposed First Edition of the Standard for Strut-Type Channel Raceway and Fittings, UL 5B; PROPOSED EFFECTIVE DATE

SUMMARY OF TOPICS

The following topics were discussed at the meeting:

1. Inclusion of Requirements for Strut-Type Channel Raceway and Fittings
2. Grounding Requirements
3. Wire Fill
4. Short Circuit Test for Raceway Used With Conductors Larger Than No. 6 AWG
5. Wiring Devices
6. Receptacle Secureness Test
7. Security of Knockout and Break-Away Tab Test
8. Openings
9. Dimensional Limits for Locknut Surfaces
10. Removal of the Thickness of Zinc Coating Test

COMMENTS DUE: November 17, 1995

A meeting of the Industry Advisory Conference of UL for Surface Metal Raceways was held on June 22, 1995 at UL's Melville Office. The purpose of the meeting was to discuss revisions to UL 5 that would result in a new edition of the standard being issued.

Attached as Appendix A are proposed requirements for UL 5. Please note that due to the substantial changes to the organization and content of the standard, the original text has not been provided. Paragraphs pertaining to requirements for nonmetallic parts have been removed and replaced with paragraph 2.5.1 which cross references the Standard for Nonmetallic Surface Raceways and Fittings, UL 5A. Attached as Appendix B are the proposed requirements for UL 5B. Attached as Appendix C is a list of those who attended the meeting. Questions regarding interpretation of requirements should be directed to the responsible UL Staff. Please see Appendix D of this bulletin regarding designated responsibility for the subject product categories.

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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.

PROPOSED EFFECTIVE DATE

The proposed requirements will necessitate a review and possible retest of currently Listed products. Therefore, UL proposes that the new requirements become effective March 31, 1998. This is intended to provide manufacturers with sufficient time to submit modified products for investigation and to implement the necessary changes in production. Please note that this also includes the time that will be needed by UL to conduct a review of the modified product.

* * * * *

The following report is not intended to be a verbatim transcript of the discussions at the meeting, but is intended to record the significant features of those discussions. The particular paragraphs and sections related to each meeting topic are noted immediately below each topic title.

1. INCLUSION OF REQUIREMENTS FOR STRUT-TYPE CHANNEL RACEWAYS AND FITTINGS

DISCUSSION

Currently UL has no written requirements specifically covering strut-type channel raceways in UL 5. UL has received a request from representatives of the Metal Framing Manufacturers Association (MFMA) to develop requirements for strut-type channel raceway. After evaluation of the MFMA request, UL decided to propose such requirements to the Industry Advisory Conference of UL for Surface Metal Raceways and to change the name of UL 5 to "Surface Metal and Strut-Type Channel Raceways and Fittings."

When this item was discussed at the meeting members of industry noted that strut-type raceway was primarily a professionally installed type of product unlike other types of raceway. It was also noted that the National Electric Code addresses strut-type raceway in a section separate from requirements covering other types of raceway. Other differences such as methods of marking, packaging, and installation were discussed as further indications of differences between strut-type raceway and other types of metal raceway. Bearing the above in mind the members of industry requested that strut-type raceway have its own standard. After further evaluation of these comments and the differences between strut-type raceway and other types of raceway, UL has decided that in order to properly address the differences between the types of raceway, development of a separate standard and separate UL categories for strut-type channel raceway and fittings was needed. A copy of the proposed draft of the standard for Strut-Type Channel Raceways and Fittings, UL 5B, is attached as Appendix B.

2. GROUNDING REQUIREMENTS (Sections 7, 14)

DISCUSSION

UL proposed to permit the use of snap and friction fit connections in the grounding path of metal raceways provided that an additional evaluation of the connection has been conducted. The resistance test had traditionally been used to verify grounding of raceways using mechanical securement methods. A raceway using snap or friction fit construction would be subjected to the ground fault test to evaluate its acceptability.

It was noted that the new requirements specified that a fastening means for grounding must be provided if the raceway was not provided with a tapped hole for a grounding screw. Industry members stated that it would be difficult to comply with the requirement. After considering the matter further UL proposed that a grounding fastening means need not be provided if the product instructions described the types of grounding means that would be suitable for the application. Additionally, a member of industry asked if there was a specific reason why the grounding screw requirements specified the use of a No. 10-32 screw as there was a design demand for the use of screws of different thread pitches. In response UL stated that the question would be looked into further. After investigating the requirement for grounding screw specifications UL determined that as long as a manufacturer provides the grounding screw, it can be any thread pitch as long as the screw is No. 10 or larger.

RATIONALE

UL has received comments in response to the Subject 5 meeting report bulletin dated January 24, 1992 regarding the acceptability of snap and friction fit connections for the grounding of a metal raceway system. It is UL's position that it is important to maintain the integrity over time of a metal raceway that is intended for use as an equipment grounding path. Therefore, UL is proposing to evaluate the integrity of these constructions with a new Fault Current Test, Section 14, after pull conditioning.

Additional comments were received during the June 22, 1995 Subject 5 IAC meeting regarding the acceptability of not providing a fastening means for grounding with raceway that has not been provided with a tapped hole for a grounding screw. It is UL's position that referencing the types of grounding means that are suitable for an application instead of providing said means does not lower the level of safety. Therefore, UL proposes to revise the exception to paragraph 7.4 to specify that grounding fastening means need not be provided if the product instructions describe the types of grounding means that would be suitable for the application.

Comments were received regarding the acceptability of the use of grounding screws of different thread pitches than those specified in the paragraph 7.4 grounding screw specifications. It is UL's position that limiting the grounding screw to one specific screw pitch unnecessarily limits manufacturers. Therefore, UL proposes to revise the requirements to indicate that the tapped hole for a grounding screw may be for use with a No. 10-32 or larger screw and if the screw is provided in the raceway it may be No. 10 or larger, with any screw pitch.

IMPACT

A review and retest of all currently Listed metal raceways using snap or friction fit connections will be required to determine compliance with the new fault current test, should the proposals be adopted.

3. WIRE FILL (Paragraphs 4.14, 16.5)

DISCUSSION

During the discussion of this topic at the meeting it was noted by a member of industry that testing conducted indicated that the temperature rating of the conductor insulation could be exceeded in a metal raceway and suggested that the temperature test be put back into the standard. UL indicated that the safety concern associated with the temperature test is that the temperatures would exceed the ability of a plastic raceway to maintain its structural integrity, thereby allowing conductors to be exposed. The risk of exceeding the temperature rating of the conductor insulation is addressed by the wire fill requirements of the National Electric Code, as reflected in the standard. A member of industry pointed out that the means of calculating the interior capacity of raceway is done differently by

different manufacturers and as such wire fill requirements may not sufficiently address the risk of exceeding the temperature rating of conductors. UL indicated that it will maintain, at present, the wire fill requirement and that the matter will be looked into in greater detail.

RATIONALE

At UL's Subject 5 IAC meeting on December 17 and 18, 1992 it was decided that both metal and nonmetallic raceways should be subjected to a temperature test to determine the acceptability of the manufacturer's wire fill recommendation. However, after consideration of comments received in response to the Subject 5 meeting report dated January 24, 1992 and the Subject 5 IAC meeting of June 22, 1995, UL has decided to maintain the use of the manufacturer's recommended wire fill up to the maximum permitted by the National Electrical Code, NFPA 70, without a temperature test for metal raceways.

IMPACT

A review of all currently Listed metal raceway would be required to determine compliance with regard to the installation instructions and markings as they pertain to the National Electrical Code wire fill maximums, should the proposals be adopted.

4. SHORT CIRCUIT TEST RACEWAYS USED WITH CONDUCTORS LARGER THAN NO. 6 AWG (Paragraph 4.12, Section 15)

DISCUSSION

There were no additional comments on the proposed short circuit requirements.

RATIONALE

UL 5 currently specifies that a raceway using conductors larger No. 6 AWG and having a cover secured to the base by other than screws is required to be subjected to a short-circuit test to determine that the cover is secure. However, based on testing performed, UL has determined that screws are often inadequate to secure the cover against the forces generated during a short-circuit. Therefore, UL is proposing to revise the requirement regarding securement of the cover and to add the Short-Circuit Test, Section 15.

IMPACT

A review and retest of all currently Listed metal raceway intended for use with conductors larger than No. 6 AWG will be required to determine compliance with these requirements, should the proposals be adopted.

5. WIRING DEVICES (Paragraphs 3.8, 2.4.2, Section 6)

DISCUSSION

There were no additional comments on the proposed wiring devices requirements.

RATIONALE

UL has recently received requests from manufacturers to evaluate wiring devices, such as receptacles and switches, for use in raceways to the applicable requirements in the corresponding UL Standards for these devices. UL concurs with this request and therefore proposes that all wiring devices used in raceways comply with all applicable UL requirements.

IMPACT

A review and retest of all wiring devices that are currently Listed will be required to determine their compliance with the applicable UL Standard, should the proposals be adopted.

**6. RECEPTACLE SECURENESS TEST
(Section 11)****DISCUSSION**

A member of industry questioned the 25 lbf (111 N) value for the pull test. UL indicated that the force used in the pull test was proposed in previous IAC meetings, and based upon comments received was determined to be appropriate for proposal to industry.

RATIONALE

In some constructions, receptacles are held in position by covers that are fixed to the raceway or fitting base by a snapfit or some other non-positive means. UL is proposing requirements to evaluate the secureness of these constructions.

IMPACT

A review of all Listed raceway and fittings would be required to determine compliance with these requirements, should the proposals be adopted.

**7. SECURITY OF KNOCKOUT AND BREAK-AWAY TAB TEST
(Section 12)****DISCUSSION**

There were no additional comments on the proposed security of knockout and break-away test.

RATIONALE

The security of knockout and break-away tabs is of concern due to the necessity of maintaining the integrity of a raceway with regard to wire containment. UL is proposing requirements to reflect current practice with regard to knockouts and break-away tabs.

IMPACT

A review of all Listed raceways and fittings will be necessary to determine compliance with these requirements, should the proposals be adopted.

8. OPENINGS

[Paragraph 4.4 (c),(d)]

DISCUSSION

Members of industry pointed out that opening requirements for UL 5 were not consistent with similar UL standards (UL 209, Cellular Metal Floor Raceways and Fittings; UL 514A, Metallic Outlet Boxes; and UL 884, Underfloor Raceways and Fittings) and design considerations used in those similar standards could be applicable to UL 5. It was additionally noted that very small gage wires could pass over a partition in a raceway into the other channel as the current requirements allow a 0.080-inch (2.0-mm) gap between the top of the partition and the raceway cover if no wire retainers are used. UL indicated that these concerns would be evaluated and revisions to the standard would be proposed if they were determined to be necessary.

RATIONALE

Based upon evaluation of the comments received at the June 22, 1995 IAC meeting, UL proposes to revise the dimensions of the mounting opening requirements of UL 5 to be consistent with other similar UL standards so as to allow a greater degree of design flexibility to manufacturers without lowering the level of safety. UL additionally proposes to revise the gap requirements for partitions in raceways to address the possibility of the cross over of small gauge wires from one channel of a raceway to another.

IMPACT

A review of all Listed raceways and fittings will be necessary to determine compliance with these requirements, should the proposals be adopted.

9. DIMENSIONAL LIMITS FOR LOCKNUT SURFACES

(Figure 8.1, Paragraphs 8.5, 8.6, 8.7, Tables 8.5 and 8.6)

DISCUSSION

UL noted that there were no requirements given for the provision of concentric flat surfaces around knockouts for the proper installation of locknuts in metallic raceways. The improper installation of a locknut could permit conductors to become exposed. UL has determined that requirements should be proposed that would address the need to evaluate these surfaces.

RATIONALE

There are currently no requirements for the evaluation of the surfaces around knockouts in which locknuts are installed for the connection of conduit to raceways. If the surface around the knockout is not adequate for the proper installation of a locknut the conductors could become exposed thereby increasing the risk of injury.

IMPACT

A review of all Listed raceways and fittings will be necessary to determine compliance with these requirements, should the proposals be adopted.

10. REMOVAL OF THE THICKNESS OF ZINC COATING TEST**RATIONALE**

Paragraph 1.1 of UL 5 states that the requirements cover raceway and fittings for use in accordance with the National Electric Code, NFPA 70. The National Electric Code, NFPA 70, specifies that surface metal raceway shall be permitted for use in dry locations. However, the thickness for zinc coating test was intended to evaluate the corrosion resistance of raceway for use in damp locations. As the purpose of this test is to evaluate a construction contradictory to the intent to paragraph 1.1, UL proposes to remove the thickness for zinc coating test from the standard.

IMPACT

As there are no Listed raceways or fittings for use in damp locations, no review of currently Listed products will be necessary.

REQUESTS FOR COMMENTS ON PROPOSALS

Please provide the following:

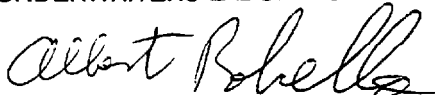
1. Your comments concerning the meeting report and the proposed requirements; and
2. Your comments concerning the proposed effective date, should the proposals be adopted.

Written comments should be sent to the attention of Albert Robello at UL's Santa Clara office, 1655 Scott Blvd., Santa Clara, CA 95050-4169. Please reference all correspondence to Subject 5.

All comments should be sent by November 17, 1995.

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

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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 A

PROPOSED REQUIREMENTS AND PROPOSED EFFECTIVE DATE
FOR THE TWELFTH EDITION OF THE STANDARD FOR
SURFACE METAL RACEWAYS AND FITTINGS,
UL 5

AUGUST 1995 DRAFT

PROPOSED EFFECTIVE DATE: MARCH 31, 1998

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INTRODUCTION

1 Scope

1.1 These requirements cover surface metal raceways and fittings for use in accordance with the National Electrical Code, NFPA 70.

1.2 Raceways of the following thicknesses are intended to enclose circuits operating at potentials not exceeding 600 volts between conductors:

- a) Raceways that are entirely of metal at least 0.040 inch (1.02 mm) thick.
- b) Raceways consisting of nonmetallic covers on metal bases of the thickness indicated in (a).

Thinner all-metal raceways or raceways of thinner metal bases with nonmetallic covers are intended to enclose circuits operating at potentials lower than 300 volts between conductors.

1.3 These requirements do not cover cable trays, wireways or nonmetallic raceways.

1.4 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involve 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 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

2.1.2 A component need not comply with a specific requirement that:

- a) Involves a feature or characteristic not needed in the application of the component in the product covered by this standard or
- b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its recognized rating established for the intended conditions of use.

2.1.4 Specific components are recognized as being incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions for which they have been recognized.

2.2 Units of measurement

2.2.1 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.

2.3 Undated references

2.3.1 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.

2.4 Installation

2.4.1 The method of installation, as outlined in the instructions accompanying the raceway and fittings, shall be practical and feasible under the conditions likely to be met in practice.

2.4.2 The raceway, fittings and any wiring devices or accessories are to be installed as intended and examined with regard to the feasibility of installation, as well as for compliance with the construction, performance, and marking requirements in this standard. Attention is to be given to items that require particular care on the part of the raceway installer.

2.5 Nonmetallic parts

2.5.1 A nonmetallic cover, fitting or other part of a metal raceway shall comply with the applicable requirements in the Standard for Nonmetallic Surface Raceways and Fittings, UL 5A.

3 Glossary

3.1 For the purposes of this standard, the following definitions apply.

3.2 ACCESSORY – A part that may be added to a raceway system for a special purpose (for example, guards, hangers, retainers).

3.3 BOX, FIXTURE – A box that has been evaluated and determined to be acceptable as the support of a lighting fixture, lampholder, or other equipment intended for similar installation.

3.4 FITTING – A part used to connect, change direction, or terminate a raceway (for example, a transition coupler, an end cap, a corner, a tee, an adapter, or a box).

3.5 NONMETALLIC – A polymeric part.

3.6 RACEWAY, SURFACE METAL – A raceway for surface or pendant mounting with a metal base and a metal or nonmetallic cover.

3.7 RACEWAY SYSTEM – A system consisting of a surface metal raceway, associated fittings and that may include wiring devices and accessories.

3.8 WIRING DEVICE – A part of an electrical system that is intended to carry, provide a means of connection to or control of electrical energy within a raceway system (for example, switches or receptacles).

CONSTRUCTION

4 General

4.1 A raceway system shall be constructed to facilitate compliance with the requirements for the installation of insulated wires and cables as given in the National Electrical Code, NFPA 70.

4.2 A component of a raceway system shall comply with the requirements for the construction, performance, and use of that component.

4.3 A raceway shall consist of one or more pieces formed and constructed to make the raceway readily distinguishable from electrical conduit, electrical metallic tubing, electrical nonmetallic tubing, and other raceway systems.

4.4 A raceway system shall provide a complete enclosure that protects the wires installed therein against damage. The complete system, when installed as intended, shall comply with the following:

- a) There shall not be any openings that exceed 1/16 inch (1.59 mm) in width on surfaces that are accessible following installation of the system.
- b) A knockout or break-away tab shall completely cover the opening in which it is located, and the clearance between the knockout or break-away tab and the opening shall not be more than 0.030 inch (0.76 mm).
- c) Mounting holes having a maximum diameter of 17/64 inch (6.7 mm), or slotted openings of one dimension not larger than 5/8 inch (15.9 mm) and the other dimension not larger than 1/8 inch (3.2 mm), may be provided on the raceway base or fitting base surface that is installed flush with the mounting surface.
- d) A partition in a raceway system shall not have any openings through which wires can intentionally or otherwise be passed from one compartment to another.

Exception: A gap of 1/8 inch (3.2 mm) may be used if means is provided to completely contain conductors in their individual compartments, such as wire retaining clips.

4.5 The interior surface of the raceway system shall have a smooth finish that is free from projections, sharp edges, burrs, fins, and other faults likely to damage wires when installed as intended.

4.6 A raceway shall be provided with means for securing it to the mounting surface at intervals of not more than 4 feet (1.2 m).

4.7 If the base is intended to be secured to the mounting surface by screws or bolts extending from the inside, the arrangement shall not result in damage to the conductors.

4.8 Mounting hardware such as screws or bolts shall either be packaged with the raceway, or the installation instructions packaged with the raceway or fittings shall specify the appropriate mounting means. See 16.3.

4.9 An adhesive strip, if provided on the raceway, may serve only as a positioning aid during the installation process. The raceway shall also have provisions for mechanical fastening as required in 4.6 – 4.8.

Exception: An adhesive strip provided on a raceway marked for use with Class 2 circuits only, as defined in Article 725 of the National Electrical Code, NFPA 70, may be used as the sole means of securement.

4.10 Provision shall be made for securing the cover to the base of a two-piece raceway at intervals of not more than 4 feet (1.2 m). A cover may be held in place by continuous grooves, flanges, or the like if it is securely fixed in place. See 4.12.