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Research Triangle Park,
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Subject 1472

333 Pfingsten Road
Northbrook, IL 60062
May 23, 1996

TO: Electrical Council of Underwriters Laboratories Inc.,
Subscribers to UL's Standards Service for Solid-State Dimming Controls

SUBJECT: Report on the Meeting of the Industry Advisory Conference of UL for Dimmer Snap
Switches

SUMMARY OF TOPICS

The following topics were discussed at the meeting:

1. General comments from industry.
2. The need for and use of UL Recognized and CSA Certified Components, Clause 3.1.1;
3. Definitions for "metallic flush plate" and "yoke;"
4. Components that are in parallel to the air-gap switch for some dimmers;
5. Summary of the requirement in Clause 4.7 that an air-gap switch will be provided;
6. The Temperature Test for single-unit dimmers;
7. The Endurance Test for single-unit dimmers;
8. Industry review items, and the use of families of dimmers to minimize the time and cost of a review to the manufacturers;

(continued)

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SUMMARY OF TOPICS (continued)

9. The addition of a Breakdown of Component Test;
10. Clause 4.3.3 that specifies that electrical grade paper with a minimum thickness of 0.013 inches;
11. The possible need for a resistive load for the D-C Offset Test, Clause 5.11; and
12. Present Follow-Up Services programs.

COMMENTS DUE: July 19, 1996

A meeting of the Industry Advisory Conference of UL for Dimmer Snap Switches was held on April 16, 1996 at UL's Northbrook office. The purpose of the meeting was to discuss the present requirements in the Standard for Solid-State Dimming Controls, UL 1472.

Attached as Appendix A 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 B of this bulletin regarding designated responsibility for the subject product categories.

* * * * *

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.

1. GENERAL COMMENTS FROM INDUSTRY**DISCUSSION**

In response to concerns expressed by industry, UL advised:

- a) A complete review of the IAC membership has been initiated per requests from industry in order to maintain diversity;
- b) Editorial corrections suggested by the representatives of industry have been noted and will be reflected in the next revision to UL 1472; and
- c) A UL 1472 Working Group will be formed to develop proposals for revisions to requirements in UL 1472 that address the changing technology for dimmers. The new UL 1472 Working Group will be comprised of the following representatives of UL and industry:

Greg Bezat
Len Kaliski - UL 1472 Working Group Chairman
Frank Pinto
Lester Rivera
Scott Spear
Richard Wagner

Representatives of the Canadian Standards Association (CSA) and Canadian industry will be added. Additional individuals interested in becoming a member of the Working Group should send a request to:

Len Kaliski
Underwriters Laboratories Inc.
333 Pfingsten Road
Northbrook, IL 60062

It is expected that this new Working Group will meet several times before the next UL 1472 IAC Meeting. UL plans on having the next meeting of the IAC for Dimmer Snap Switches in approximately 1 year. This new Working Group is a continuation of the initial Ad Hoc group for UL 1472.

2. UL RECOGNIZED AND CSA CERTIFIED COMPONENTS

BACKGROUND

UL 1472/CSA C22.2 No. 184.1 – 95, Clause 3.1.1 requires that a component comply with both UL and CSA component requirements. Manufacturers have questioned the requirement, indicating that for some products, additional costs are incurred to comply with the product requirements of a country in which the manufacturer does not plan to market his product.

On this basis, manufacturers have asked UL to explore the possibility of a revision to the Preface of UL 1472 for manufacturers who expect their products to be used only in the U.S. or only in Canada to allow those products to comply with the applicable UL component requirements or the applicable CSA component requirements.

UL has been granted status as both a Certification Organization (CO) and as a Testing Organization (TO) for Canada by the Standards Council of Canada. UL has achieved acceptance of its Listing and Component Recognition Marks for Canada in every Canadian Province and Territory. Accordingly, UL is prepared to offer Canadian Certification utilizing UL's Mark for Canada (c-UL) to all dimmer and dimmer component manufacturers.

DISCUSSION

During the meeting, the question was raised regarding the position of the Canadian Standards Association (CSA) with respect to this topic. A CSA representative was invited but was not present to answer this question. Therefore, UL indicated that CSA would be contacted and the industry advised at a later date.

3. DEFINITIONS

DISCUSSION

To further clarify terminology used in UL 1472, manufacturers have requested the addition of definitions for "metallic flush plate" and "yoke."

UL suggested that a definition for a Flush-Device Cover Plate be similar to that provided in the Standard for Nonmetallic Outlet Boxes, Flush Device Boxes, and Covers, UL 514C. Representatives of industry were in favor of this suggestion.

The need for a definition for "yoke" was discussed. The representatives of industry indicated that the term "yoke" is a commonly understood term for the strap which is used to mount a wiring device, such as a dimmer, to a flush-device box. Given this common understanding, the representatives of industry suggested that further definition in UL 1472 is not necessary.

In accordance with established Binational Standards Guidelines, UL and CSA have agreed to coordinate all proposed revisions to UL 1472 prior to making proposals to the industry. Therefore, proposals with respect to this topic will be made after a consensus is reached by UL and CSA.

In the interim, to aid in the development of a proposal, UL requests comments on the definition of Flush-Device Cover Plate and on the need for defining the term "yoke."

4. AIR-GAP SWITCH REQUIREMENT

DISCUSSION

To maintain the perceived level of safety provided by an on/off switch, an air-gap switch is required in a solid-state dimming device used in place of a wallbox mounted snap-switch. For a dimming system with a master and one or more remotes, the master controls the on/off function and is, therefore, to be provided with an air-gap switch. Remote devices are not required to have an air-gap switch. See UL 1472, Clause 4.7, Switches.

A representative of industry raised questions regarding the need for an air-gap switch. The following were among the examples given of features or constructions that might limit the perceived effectiveness of air-gap switch designs:

- a) The actuating means of the air-gap switch is not apparent;
- b) The determination of which unit in a multi-unit system ("master" with one or more "remotes") contains the air-gap switch is not apparent;
- c) There are designs with components in parallel with the air-gap switch; and
- d) There may be other unswitched (electrically live) conductors in the fixture wiring box containing the controlled fixture.

As a result of the discussion, UL is forming a working group to develop proposals for submittal to UL and CSA for processing in accordance with the Binational Standards Guidelines. Please refer to topic 1.

5. PARALLEL COMPONENTS CONNECTED ACROSS AN AIR-GAP SWITCH

DISCUSSION

As mentioned in Topic 4, manufacturers have noted that some solid-state dimmers have components in parallel with the air-gap switch. When the air-gap switch is in the open position, these components allow a small amount of current to flow to maintain logic circuits or illuminate the actuator.

UL requested comments from the representatives of industry regarding the maximum acceptable current which could be conducted through the controlled load with the air-gap switch in the open position. UL asked the representatives of industry to give examples of the currents in parallel across the air-gap switch. The representatives of industry indicated that present designs of illuminated handle switches and dimmers result in the conduction of 1 to 5 mA (depending on the illumination device) through the controlled load. UL noted that, in other situations where such currents are a concern (for example, leakage current in cord and plug connected equipment), 0.5 to 0.75 mA limits have been applied.

As a result of the discussion, UL indicated that the allowable current level and the suitability of the components, serving as the limiting impedance, will be an item to be worked on by the new working group formed to discuss the air-gap issue. To aid the working group, additional information regarding available current limitations is requested from the industry. Please refer to topic 1.

6. TEMPERATURE TEST

DISCUSSION

The suitability of the test box and the temperature limits associated with the Temperature Test is based, in part, on round-robin testing by manufacturers in a working group forum. Based on the round-robin test data, UL does not intend to conduct an industry review of presently Listed or Recognized dimmers for the Temperature Test, Clause 5.5, as UL has determined that the previous test method and the new test method provide equivalent results.

7. ENDURANCE TEST

DISCUSSION

The number of cycles for the Endurance Test in UL 1472 was increased from 6,000 previously required by UL to 10,000 to harmonize with CSA's test methods. As this change is a result of harmonization and is not considered substantive, UL does not intend to conduct an industry review of presently Listed or Recognized dimmers for the Endurance Test, Clause 5.4.

A representative of industry expressed concern with a test method that requires 6 samples and 10,000 cycles. UL suggested that this should not present problems since there won't be an industry review of presently Listed or Recognized dimmers for the Endurance Test.

8. INDUSTRY REVIEW ITEMS

DISCUSSION

The need for a review and possible retest to determine compliance with UL 1472 was discussed with regard to the following requirements in UL 1472:

- a) The Air-Gap Switch Test in Clause 5.7 to be conducted on Types II, III, and IV dimmers to investigate the ability of the contacts to control the maximum rated load of the dimmer with the dimming circuitry shorted out of the circuit;
- b) The Security of Lead Tests in Clause 5.8 to be conducted on each factory-installed field wiring lead;
- c) The Temperature Test; and
- d) The Endurance Test.

For items (a) and (b), the representatives of industry suggested that present construction of previously Listed products would comply with these tests. Furthermore, the original engineering investigation usually included testing which supports this suggestion. However, UL indicated that compliance with these requirements will need to be confirmed during the file review process.

UL proposed to evaluate families of dimmers to minimize the time and cost of a review to the manufacturers. The representatives of industry supported this approach.

UL pointed out that requirements that necessitate construction changes to products will also be included in an industry review.

9. BREAKDOWN OF COMPONENTS TEST

DISCUSSION

Manufacturers have asked for clarification of the requirements for power handling and limiting impedance components. UL presently evaluates these components using a test consistent with the Component Breakdown Test in the Standard for Energy Management Equipment, UL 916.

A representative of industry asked how this test would be performed (i.e. mounting arrangement, type of failure modes considered). UL advised that a proposal is being prepared to address this question.

In accordance with established Binational Standards Guidelines, UL and CSA have agreed to coordinate all proposed revisions to UL 1472 prior to making proposals to the industry. Therefore, proposals with respect to this topic will be made after a consensus is reached by UL and CSA.

10. INSULATION THICKNESS WITH SPACING

DISCUSSION

Manufacturers have indicated that the 0.013 inch thick electrical grade paper that may be used in conjunction with 50 percent of the required spacing in Clause 4.3.3 may not be available in standard stock. UL acknowledged this concern, but also explained that 0.013 inch thickness is consistent with other UL Standards. It was suggested that UL relax the requirement from the 0.013 inch thickness to a 0.010 inch thickness. UL indicated that consideration will be given to this suggestion, but more research is necessary. Only if it is determined that the 0.010 inch thickness will provide an acceptable level of safety with regard to insulative properties, would UL propose a 0.010 inch thickness.

11. D-C OFFSET TEST

DISCUSSION

Manufacturers have noted that to measure the DC component during the D-C Offset Test in Clause 5.11, it may be necessary that the dimmer control a tungsten or other resistive load. UL requested input from the representatives of industry for possible changes to the test method.

A representative of industry indicated that the low DC impedance of an inductive load could significantly attenuate the DC output caused by asymmetrical switching of a dimmer. A more accurate measurement could be obtained by using a non-inductive load. The industry representative indicated that he had test data to support this claim. The representatives of industry supported this method.

In accordance with established Binational Standards Guidelines, UL and CSA have agreed to coordinate all proposed revisions to UL 1472 prior to making proposals to the industry. Therefore, proposals with respect to this topic will be made after a of consensus is reached by UL and CSA.

12. FOLLOW-UP SERVICES PROGRAM

DISCUSSION

Presently, two different Follow-Up Services programs are employed for products covered by UL 1472 as follows:

- a) Dimmers that were investigated under the Standard for Industrial Control Equipment, UL 508, have a Follow-Up Services Procedure that contains a detailed description of the dimmer's construction, and are subjected to regular Follow-Up visits by a UL Field Representative. Any changes to that construction need to be reported to UL engineering for an investigation and, if acceptable, inclusion into the Procedure description.
- b) Dimmers that were investigated under the Standard for General Use Snap Switches, UL 20, have a Follow-Up Services Procedure that has a much less detailed description of the dimmer construction, and an extensive test program both conducted by the manufacturer with records kept of the results, and witnessed by the Follow-Up Services Field Representative on a regular basis.

The representatives of industry suggested that a merge to one Follow-Up program is possible. This program would closely resemble that which is described in (a) above. Accordingly, UL requests comments regarding this issue in order to pursue a desirable combined Follow-Up program.

Subject 1472

-8-

May 23, 1996

REQUESTS FOR COMMENTS

Please provide the following comments concerning the meeting report.

Written comments should be sent to the attention of Christine Skinner at UL's Northbrook office, 333 Pfingsten Road, Northbrook, IL 60062-2096. Please reference all correspondence to Subject 1472.

All comments should be sent by July 19, 1996.

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

UNDERWRITERS LABORATORIES INC.

CHRISTINE A. SKINNER (Ext. 43690)
Engineer
Standards Department
NORTHBROOK OFFICE
(847) 272-8800

REVIEWED BY:

LEN KALISKI (Ext. 42280)
Engineering Group Leader
Engineering Services 415B
NORTHBROOK OFFICE
(847) 272-8800



CLIFFORD S. JONES (Ext. 22492)
Managing Engineer
Engineering Services 216
MELVILLE OFFICE
(516) 271-6200

SR: DES

x:\1472MRPT.C01

APPENDIX AATTENDANCE AT THE APRIL 16, 1996 MEETING OF THE
IAC FOR
DIMMER SNAP SWITCHES**Industry Representatives**

*Thomas Batko	Hubbell Incorporated
*John Longenderfer	Lutron Electronics Co., Inc.
Joseph Louie	General Electric Co.
*Saul Rosenbaum	Leviton Manufacturing Co., Inc.

Invited Guests

Greg Bezat	Hybrinetics Inc.
Steve Carson	Lightolier Controls
*Rich Counts	Prescolite
*David Eckel (substitute for Thomas Batko)	Hubbell Incorporated
*John Mehlretter	Lehigh Electric Products Co.
*Steve Paniri	Canadian Standards Association
Frank Pinto	Lamson & Sessions - Carlon
*Joe Piscitelli	Pass & Seymour, Inc.
Lester Rivera (substitute for Saul Rosenbaum)	Leviton Manufacturing Co., Inc.
Scott Spear	Lightolier Controls
Rich Wagner (substitute for John Longenderfer)	Lutron Electronics Co., Inc.

UL Staff

Gary Hansen	Northbrook Office
Cliff Jones (Chairman)	Melville Office
Len Kaliski	Northbrook Office
Mark Kessler	Northbrook Office
Christine Skinner	Northbrook Office
Jeff Zielke	Northbrook Office

*Not in attendance

A P P E N D I X B

DESIGNATED RESPONSIBILITY FOR UL
PRODUCT CATEGORIES
EOXT, COMMERCIAL DIMMERS
EOXT2, COMPONENT COMMERCIAL DIMMERS
EOYX, DIMMERS, GENERAL USE SWITCH

The individuals shown on the back side of this sheet 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 (IAC) Chairman for the subject categories is Cliff Jones at UL's Melville office. The IAC Chairman oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

Subject 1472

-B2-

May 23, 1996

CCN	Office/Subsidiary	Responsible Engineer	Extension
EOXT	Melville	Charles Kurten	22244
	Northbrook	LEN KALISKI	42280
	RTP	Jeannette Smith	11538
	Santa Clara	Michael Shulman	2770
CCN	Office/Subsidiary	Responsible Engineer	Extension
EOXT2	Melville	Charles Kurten	22244
	Northbrook	LEN KALISKI	42280
	Santa Clara	Nate Caditan	2587
CCN	Office/Subsidiary	Responsible Engineer	Extension
EOYX	Melville	Jon Schuette	22624
	Northbrook	LEN KALISKI	42280
	RTP	Jeannette Smith	11538
	Santa Clara	Michael Shulman	2770

Standard for Safety

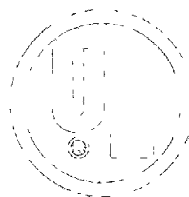
UL 1472

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Solid-State Dimming Controls



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January 2, 1996**Standard for****Solid-State Dimming Controls****UL 1472, First Edition**

Accompanying this transmittal notice is a copy of the First edition of UL 1472.

THIS EDITION OF THE STANDARD BECOMES EFFECTIVE JANUARY 2, 2001.

New product submittals made prior to a specified future effective date will be judged under all of the requirements in this standard unless the applicant specifically requests that the product be judged under the current requirements. However, should the applicant elect this option, it should be noted that compliance with all the requirements in this standard will be required as a condition of continued Listing or Recognition and Follow-Up Services after the effective date and understanding of this should be signified in writing.

The requirements in this standard are substantially in accordance with UL's bulletin on this subject dated March 28, 1995. This bulletin is now obsolete and may be discarded.

Revised and/or additional pages may be issued from time to time.

Canadian Standards Association
CAN/CSA-C22.2 No. 184.1
First Edition

Underwriters Laboratories Inc.
UL 1472
First Edition



Solid-State Dimming Controls

January 2, 1996

Approved
by
Standards Council
of Canada



Commitment for Amendments

This Standard is issued jointly by Underwriters Laboratories Incorporated and Canadian Standards Association. Amendments to this Standard will be made only after processing according to the Standards writing procedures by both Underwriters Laboratories Incorporated and Canadian Standards Association.

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