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SUBJECT 1588

**OUTLINE OF INVESTIGATION
FOR
ROOF AND GUTTER DE-ICING CABLE UNITS**

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FOREWORD

A. This Outline of Investigation contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Outline of Investigation. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of these requirements by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Outline of Investigation will not necessarily be judged to comply with the Outline of Investigation if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

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

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgement given with due consideration to the necessary limitations of practical operation and state of the art at the time the Outline of Investigation is processed. UL shall not be responsible to anyone for the use of or reliance upon this Outline of Investigation by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Outline of Investigation.

F. Many tests required by the Outline of Investigations of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 This outline covers roof and gutter de-icing cable units intended for permanent connection. These cable units are intended for use in accordance with Article 426 of the National Electrical Code, NFPA 70.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this outline shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

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

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

2.4 Specific components are 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.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Undated References

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

CONSTRUCTION

5 Heating Conductors

5.1 The heating conductors of other than a metallic-sheathed roof and gutter de-icing cable shall be insulated with a compound acceptable for use at 75°C (167°F) or higher in dry locations and 60°C (140°F) or higher in wet locations. The average thickness of the insulation shall not be less than 0.762 mm (0.030 inch) with a minimum of 0.686 mm (0.027 inch) at any one point. Magnesium oxide suitable for the purpose is acceptable as an insulating compound for use with metallic sheathed cables.

6 Grounding Component

6.1 The heating section of a roof and gutter de-icing cable shall be provided with a grounding component which consists of a metallic sheath or a metallic braid. In the case of a metallic braid, provision shall be made for connecting the braid to the branch-circuit grounding means by a means such as:

- a) A grounding lead 14 AWG minimum bare or green insulated copper wire;
- b) A fitting that surrounds the cable and mechanically secures the braid; or
- c) A lug to be crimped onto the pigtailed braid and then secured to a grounding screw in the supply junction box.

If the heating section consists of more than one conductor, the grounding component may be incorporated on each conductor or all conductors may be enclosed within a common sheath or braid. The grounding component shall have an ampacity not less than that of 18 AWG copper conductor.

6.2 If the grounding component consists of a braid, it shall provide at least 50 percent coverage as determined according to the following formula:

$$\text{Percent coverage} = 100 (2F - F^2)$$

in which:

$$F = \frac{NPd}{\sin a}; (0 \leq F \leq 1)$$

a – Angle of braid with axis of cable