UL 515

STANDARD FOR SAFETY

Electrical Resistance Trace Heating for Commercial Applications

UL Standard for Safety for Electrical Resistance Trace Heating for Commercial Applications, UL 515

Second Edition, Dated July 17, 2015

Summary of Topics

This new edition of UL 515 are being issued to transition it to electrical resistance trace heating for commercial applications only.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated November 21, 2014 and March 23, 2015.

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UL 515

Standard for Electrical Resistance Trace Heating for Commercial Applications

The first edition was titled the Standard for Electrical Resistance Heat Tracing for Commercial and Industrial Applications.

First Edition – May, 2001

Second Edition

July 17, 2015

This UL Standard for Safety consists of the Second Edition.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at http://csds.ul.com.

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CONTENTS

INTRODUCTION

1 Scope 4
2 Glossary 5
3 Components 6
4 Units of Measurement 6
5 Undated References 6
6 Referenced Publications 6

CONSTRUCTION

7 Conductor Insulating Materials 7
8 Grounding Component 7
9 Supply Connections 8
9.1 Cord-and-plug connected 8
9.2 Permanently connected 8
10 Accessory Equipment 8

PERFORMANCE

11 General 8
12 Temperature Test 9

MARKINGS

13 General 10

INSTRUCTIONS

14 Installation Instructions 10

INTRODUCTION

1 Scope

1.1 These requirements cover electrical resistance trace heating for commercial applications as applied to piping, vessels, traced tube bundles, and mechanical equipment. Trace heating includes heating panels and associated parts. This equipment is intended for installation in ordinary locations in accordance with the following installation guidelines:

a) National Electrical Code, ANSI/NFPA 70, Article 427, and

b) IEEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Commercial Applications, IEEE 515.1.

1.2 These requirements also cover commercial applications of electrical resistance trace heating for deicing roofs, gutters, and pavement. This equipment is intended for installation in ordinary locations in accordance with the following installation guidelines:

a) National Electrical Code, ANSI/NFPA 70, Article 426; and

b) IEEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Commercial Applications, IEEE 515.1.

1.3 Trace heating covered by this Standard is intended for applications where it is exposed to weather, unless specific markings and instructions limit the applications.

1.4 Trace heating may be installed on metal or rigid plastic pipes. Unless specific recommendations are made for the plastic pipe material to be heated, plastic pipes are considered to have a maximum long-term thermal exposure limit of 50°C (122°F).

1.5 Other related equipment standards:

a) For Embedded Floor Warming Applications, refer to the Standard for Electric Space Heating Cables, UL 1673.

b) For Mobile Home Pipe Heating Cables, refer to the Outline of Investigation, UL 1462.

c) For Residential Pipe Heating Cables, refer to the Outline of Investigation, UL 2049.

d) For Roof and Gutter De-Icing Cable Units, refer to the Outline of Investigation, UL 1588.

1.6 This Standard does not cover electrical resistance trace heating for industrial applications such as chemical plants, pipelines, refineries, and other similar locations where the trace heating is expected to be installed by qualified personnel.

2 Glossary

2.1 For the purpose of this Standard the following definitions apply.

2.2 COLD LEAD – An electrically insulated conductor used to connect a heating conductor to the branch-circuit conductors and designed so as not to produce appreciable heat.

2.3 COMMERCIAL APPLICATIONS – Applications such as hotels, warehouses, office buildings, and other non-residential locations where the electrical resistance trace heating is expected to be installed by qualified personnel. Examples of commercial applications of electrical resistance trace heating are to prevent freezing, or to maintain temperature in water piping.

2.4 ELECTRICAL RESISTANCE TRACE HEATING – The utilization of electric trace heaters, other electric heating devices, and support components that are externally applied and used to maintain or raise the temperature of fluids/materials in piping and associated equipment.

2.5 HEATING PANEL – The heating portion of the trace heating that has series or parallel connected heating elements having sufficient flexibility to conform to the shape of the surface to be heated.

2.6 METALLIC COVERING – A metal sheath or braid used to provide physical protection for heating cable and, in some cases, to provide an electrical ground path.

2.7 OVERJACKET – A polymeric sheath, sometimes fabric reinforced, applied over the metallic covering.

2.8 THERMAL INSULATION – Material having air- or gas-filled pockets, void spaces, or heat-reflective surfaces that, when properly applied, will retard the transfer of heat with reasonable effectiveness under ordinary conditions.

2.9 TRACE HEATER – The part of the trace heating that is intended to produce heat.

2.10 TRACE HEATING – The utilization of electric heating cables, other electric heating devices, and support components that are applied and used to reduce or eliminate ice build-up, to prevent the freezing of pipes or surfaces, or to maintain a pipe or surface at a prescribed temperature.

2.11 TRACED TUBE BUNDLES – Pre-traced and thermally insulated instrument tubing that is used for fluid transport, fluid containment, or fluid conditioning systems. The bundle is factory fabricated and consists of tubing, heating cable, thermal insulation, and weatherproof jacket.

3 Components

3.1 Except as indicated in 3.2, a component of a product covered by this standard shall comply with the requirements for that component.

3.2 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 standard, or

b) Is superseded by a requirement in this standard.

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

3.4 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.

4 Units of Measurement

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

5 Undated References

5.1 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.

6 Referenced Publications

ASTM Standards:

ASTM B117
Standard Practice for Operating of Salt Spray (Fog) Apparatus

ASTM E11
Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

IEEE Standards:

ANSI/IEEE 515
IEEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Industrial Applications

IEEE 515.1
IEEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Commercial Applications

Note: IEEE Standards may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 E. 47th St., New York, NY 10017, USA.

NFPA Standards:

ANSI/NFPA 70
National Electrical Code

UL Standards:

UL 213
Standard for Rubber Gasketed Fittings for Fire Protection Service

UL 498
Standard for Attachment Plugs and Receptacles

UL 969
Standard for Marking and Labeling Systems

CONSTRUCTION

7 Conductor Insulating Materials

7.1 An insulated conductor, including both the heating cable and cold leads, shall be rated for the intended voltage and temperature.

7.2 All insulated conductors in their final form (including any overjacket and splices) shall be evaluated for outdoor exposure. This evaluation shall include the weatherometer test as described in Section 9 of Subject 1588, Outline of Investigation for Roof and Gutter De-Icing Cable Units, using either the carbon or xenon arc.

Exception: The trace heating is not required to be subjected to the weatherometer test when specific markings or instructions limit the applications to locations where the trace heating is not exposed to weather.

8 Grounding Component

8.1 A heating cable shall be surrounded by a grounded metal covering. A heating panel shall have a grounded metal covering over the heating element and its electrical insulation on the side opposite the side attached to the surface to be heated. A metal braid on a heating cable shall provide at least 50-percent coverage for trace heating intended for commercial applications.

8.2 For trace heating connected to the power supply by an attachment plug, the grounding component shall be connected to the grounding pin of the attachment plug.

8.3 For trace heating intended for permanent connection to the power supply, the grounding component shall be provided with means for connection to the equipment grounding conductor in accordance with the National Electrical Code, ANSI/NFPA 70.