UL 486E

STANDARD FOR SAFETY

Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors

UL Standard for Safety for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors, UL 486E

Fifth Edition, Dated September 30, 2015

Summary of Topics

This revision to ANSI/UL 486E dated April 2, 2019 includes the following changes in requirements:

Conductor Insulation Type

The revised requirements are substantially in accordance with Proposal(s) on this subject dated February 8, 2019.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

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Standard for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors

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Third Edition – December, 1994
Fourth Edition – May, 2009

Fifth Edition

September 30, 2015

This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through April 2, 2019.

The most recent designation of ANSI/UL 486E as an American National Standard (ANSI) occurred on April 2, 2019. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

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 https://csds.ul.com.

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1 Scope

1.1 This Standard applies to equipment wiring terminals for use with all alloys of copper, aluminum, or copper-clad aluminum conductors, in accordance with the National Electrical Code, ANSI/NFPA 70, as follows:

a) equipment wiring terminals intended to hold one or more conductor(s);

b) equipment wiring terminals intended for use in appliances and equipment that comply with the requirements for such appliances and equipment;

c) ampere-rated equipment wiring terminals;

d) horsepower rated equipment wiring terminals; and

e) wire range rated equipment wiring terminals.

1.2 These requirements apply to field wired equipment wiring terminals which are an integral part of the equipment, or are intended for use in specific equipment.

1.3 This Standard is intended for equipment wiring terminals suitable for use with conductors in the size ranges as follows:

a) Aluminum

1) 12 AWG (3.3 mm^2) and 10 AWG (5.3 mm^2) solid; and

2) 12 AWG (3.3 mm^2) to 2 000 kcmil (1 010 mm^2) stranded, Class B concentric, compressed, and compact.

b) Copper-Clad Aluminum

1) 12 AWG (3.3 mm^2) and 10 AWG (5.3 mm^2) solid; and

2) 12 AWG (3.3 mm^2) to 2 000 kcmil (1 010 mm^2) stranded, Class B concentric.

c) Copper

1) 30 AWG (0.05 mm^2) to 10 AWG (5.3 mm^2) solid; and

2) 30 AWG (0.05 mm^2) to 2 000 kcmil (1 010 mm^2) stranded, Class B concentric and compressed, and Class C concentric.

d) Compact-stranded copper conductors for 2 AWG (33.6 mm^2) and larger.

e) Rigid (solid and stranded) metric wire falling within the ranges of the above AWG sizes.

Note: For example, an equipment wiring terminal rated for 6 AWG – 250 kcmil may be additionally rated for 16 – 120 mm^2.

f) Other class and strand configurations as indicated by marking.

1.4 This Standard is intended for equipment wiring terminals suitable for currents not exceeding the ampacity of insulated conductors rated 75°C or 90°C in accordance with the rating of the equipment wiring terminal, if provided.

1.5 This Standard does not apply to:

a) insulated equipment wiring terminals; and

b) wire binding screw terminals.

2 Reference Publications

2.1 Normative references

2.1.1 For undated references to Standards, such reference shall be considered to refer to the latest edition and all revisions to that edition up to the time when this Standard was approved. For dated references to Standards, such reference shall be considered to refer to the dated edition and all revisions published to that edition up to the time the Standard was approved.

2.1.2 **NFPA* Standard**

ANSI/NFPA 70-2011,

National Electrical Code (NEC)

*National Fire Protection Association

2.2 Informative references

2.2.1 See Annex A for a listing of supplemental standards.

3 Units of Measurement

3.1 The values given in SI (metric) units shall be normative, except for AWG/kcmil conductor sizes. Any other values are for information only.

4 Definitions

4.1 For the purpose of this Standard, the following terms and definitions apply.

4.2 circular mil (cmil) – the area of a circle with a diameter of 0.001 inch.

4.3 control conductor – an unbroken conductor, which is included in the current-cycling test loop.

4.4 crimping die – that part of a crimping tool which forms the crimp(s) and usually incorporates the crimp anvil(s), the crimp indentor(s), and the positioner.

Note: Crimping dies may have separate or integral sections for compressing the insulation grip, if provided.

4.5 equalizer – a busbar that provides a point of equipotential and uniform current flow in a stranded conductor without adversely affecting the temperature of the equipment wiring terminal(s).

4.6 equipment wiring terminal – establishes a connection between one or more conductors to a terminal plate or stud, or to any similar device, by means of mechanical pressure.

4.7 packaging container – the container in which the unit containers are packaged.

4.8 rated current (ampere rating) – current assigned to the equipment wiring terminal by the manufacturer.

4.9 stability factor S – the measure of temperature stability of a equipment wiring terminal during the current-cycling test.

4.10 temperature rise – denotes the difference of the temperature of the equipment wiring terminal, measured under load, and the ambient temperature.

4.11 unit container – the smallest container in which equipment wiring terminals are packaged.

5 Symbols and Abbreviations

5.1 ° – Degree

5.2 A – Amps, Amperes

5.3 Al – Aluminum

5.4 AWG – American Wire Gage/gauge

5.5 C – Celsius

5.6 CC – Copper-Clad Aluminum

5.7 Cu – Copper

5.8 d – Days

5.9 f – Flexible

5.10 h – Hours

5.11 $HgNO_3$ – Mercurous nitrate

5.12 Hz – Hertz, cycles per second

5.13 in – Inch, Inches

5.14 kcmil – Thousand circular mil

5.15 m – Meter

5.16 mil – Thousandth of an inch

5.17 min – Minutes

5.18 ml – Milliliter

5.19 mm – Millimeter

5.20 mm^2 – Square millimeter

5.21 N – Newton - kilogram meter/sec^2

5.22 NH_4 – Ammonia

5.23 r – Rigid solid and rigid stranded

5.24 rpm – Revolutions per minute

5.25 s – Seconds

5.26 SAE – Society of Automotive Engineers

5.27 sol – Solid

5.28 str – Stranded

5.29 V – Volts

6 Construction Requirements

6.1 General

6.1.1 The design and construction of an equipment wiring terminal intended for use with stranded conductors shall be such that all strands of the conductor shall be contained within the equipment wiring terminal.

6.1.2 An equipment wiring terminal that is suitable for compact-stranded conductors shall also accept all strands of a Class B concentric-stranded conductor of the same size.

6.1.3 An equipment wiring terminal intended for use with conductors of different sizes shall have a clamping mechanism that adapts to conductors of different sizes without permanent removal or addition of parts. Some examples of clamping mechanisms are:

a) direct bearing screws with or without use of a pressure plate;

b) a pressure plate or plates and a screw or screws;

c) deformation of the equipment wiring terminal barrel (crimping) using a special tool;

d) a spring pressure terminal; and

e) an element for insulation-piercing or displacement.

6.1.4 Any rearrangement or adjustment of an equipment wiring terminal that is necessary to adapt it to various sizes of conductors shall be obvious unless the equipment wiring terminal is marked as described in 10.11.

6.1.5 There shall be no sharp edges or corners on the outer surface of an equipment wiring terminal that result in damage to insulation that the equipment wiring terminal contacts.

6.1.6 The construction of an equipment wiring terminal intended to secure more than a single conductor shall be such that there will be no intermixing (direct conductor contact) between the conductors of different materials unless the equipment wiring terminal is investigated and found to meet the performance requirements of this Standard and is marked in accordance with 10.20.

6.1.7 If the method of mounting an equipment wiring terminal is such that the mounting means cannot be retightened after wires are installed, or after the equipment wiring terminal is mounted in equipment, the mounting means – by inherent features or manufacturer's specifications – shall limit rotation of the terminal around its mounting means to 30 degrees or less.