



UL 1059

STANDARD FOR SAFETY

Terminal Blocks

UL Standard for Safety for Terminal Blocks, UL 1059

Fifth Edition, Dated November 26, 2019

Summary of Topics

This revision of ANSI/UL 1059 dated July 28, 2022 includes Short Circuit Testing; [SA2.1.2](#), [SA2.1.2A](#), [SA2.5.1](#) – [SA2.5.5](#), [Figure SA2.4](#) and [Figure SA2.5](#).

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.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated June 10, 2022.

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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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INTRODUCTION

1 Scope

1.1 These requirements cover assemblies of wiring terminals and supporting blocks intended to provide for the connection of wiring. Compliance with these requirements does not assure that the terminal block is suitable for use as a component of an end product.

1.2 These requirements cover terminal blocks rated 1500 volts or less.

1.3 These requirements also cover protective conductor terminal blocks (PCTB) used to make the electrical and mechanical connection between conductors or between conductors and a fixing support such as a mounting rail. A PCTB is not required to be insulated.

1.4 These terminal blocks are intended to permanently support and insulate wire terminations and joints from each other, and from the surface on which the terminal block is mounted, where the absence of such support or insulation presents a risk of fire, electric shock, or injury to persons.

1.5 The acceptability of a terminal block in any particular application depends upon its suitability for continued use under the conditions that prevail in actual service. Accordingly, for a particular application a terminal block may be affected by the requirements for the equipment in which it is used, and it may be necessary to additionally evaluate that terminal block for features or performance characteristics that are not specified in this standard.

1.6 Terminal blocks employing types of connecting means not covered by this standard such as those in which conductors are secured to the terminals by means of a special tool can be evaluated under this standard but may require separate investigation.

1.7 These requirements do not cover field installed power distribution blocks intended to distribute power in a building to separate units such as apartments, separate heaters, and air conditioning units. Power distribution blocks are investigated to Subject 1953, Outline of Investigation for Power Distribution Blocks.

2 Glossary

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

2.2 **FACTORY WIRING** – The connection of a wire in the end application under controlled conditions, usually at a manufacturer's location.

2.3 **FIELD WIRING** – The connection of a wire, which is made in the field and that is subjected to the requirements for a terminal for field wiring as specified in this standard and the National Electrical Code, NFPA 70.

2.4 **INSULATION PIERCING OR DISPLACEMENT CONNECTOR** – A connector for the connection and possible disconnection of one conductor or the interconnection of two or more conductors, the connection being made by piercing, boring through, cutting through, removing, displacing, or making ineffective in some other manner the insulation of the conductor or conductors without previous stripping.

2.5 **POST CONNECTOR** – A connector utilizing a post (solderless wire wrap and similar for example) onto which one or more conductors are secured by means of a tool.

2.6 PREPARED CONDUCTOR – A conductor, the strands of which are soldered or tinned; or the end of which is fitted with a cable lug, eyelet, quick-connect, ring terminal, spade terminal, or similar component, prior to insertion into the terminal.

2.7 PROTECTIVE CONDUCTOR TERMINAL BLOCK (PCTB) – A device with one or more clamping units for connecting or joining protective conductors (Protective Earthing (PE) conductors) or connecting such conductors to the support for the clamping units. The clamping units can be secured with screw- or screwless-type fixing means. Examples of supports are mounting rails, sheet metal cut-outs, or mounting plates. A PCTB is either uninsulated, non-isolated, or isolated [See (a) and (b)]. Operating insulation is not necessary as a PCTB is intended to be at ground potential.

a) **ISOLATED PROTECTIVE CONDUCTOR TERMINAL BLOCK** – A protective conductor terminal block that provides insulation from live parts of other terminal blocks, adjacent poles of the same terminal block, or other devices and isolation from the support. It does not have provisions for path 2-2 of [Figure 50.1](#). It uses path 1-1 only.

b) **NON-ISOLATED PROTECTIVE CONDUCTOR TERMINAL BLOCK** – A protective conductor terminal block that provides insulation from live parts of other terminal blocks, adjacent poles of the same terminal block, or other devices, but does not provide isolation from the support itself. It is mechanically and electrically attached to its support, path 2-2 in [Figure 50.1](#). It may or may not have path 1-1.

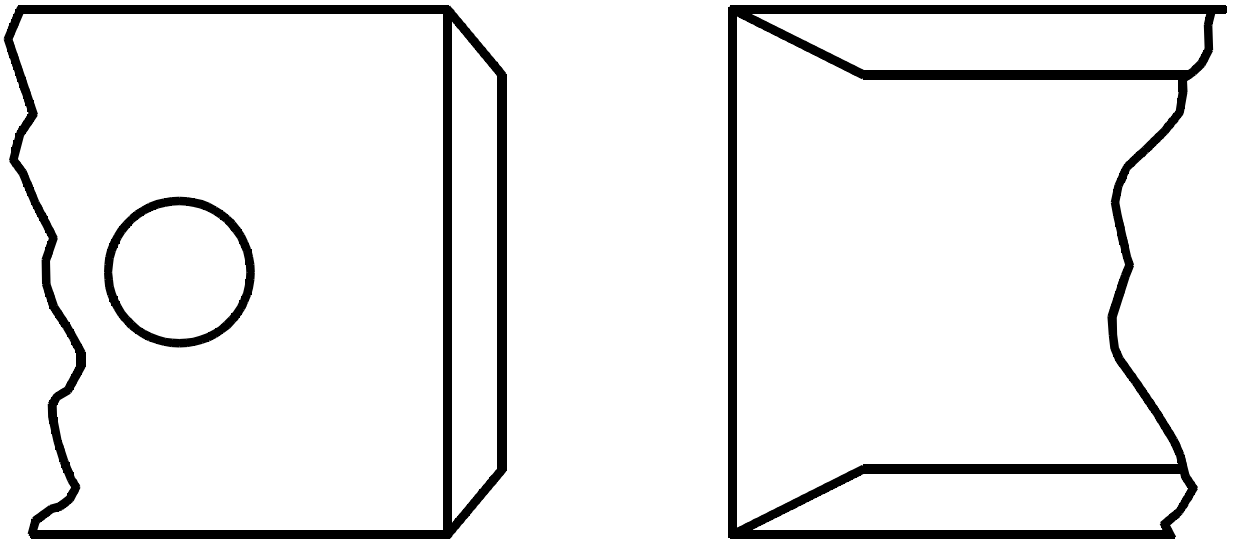
2.8 TERMINAL CONNECTOR – A device that establishes the connection between two or more conductors or between one or more conductors and a terminal by means of mechanical pressure.

2.9 SEPARABLE TYPE CONNECTORS – Connectors consisting of separable, mating members that can be readily engaged or disengaged without the use of tools.

a) **Quick Connect Type** – Typical mating components as shown in [Figure 2.1](#).

b) **Other Types** – Other than quick connect type. Acceptability to be determined by separate investigation.

Figure 2.1
Quick-connect-type connector



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2.10 SOLDER CONNECTORS – A connector in which the conductor is connected to the current-carrying member by soldering.

2.11 SPRING-FORCE CONNECTOR – A connector utilizing a spring action for retaining a conductor.

2.12 STUD AND NUT TYPE CONNECTOR – A connector in which:

- a) An unprepared conductor is looped around a stud and retained by a nut; or
- b) A prepared conductor is assembled to a stud and retained by a nut.

2.13 TERMINAL BLOCK – A terminal block is a rigidly mounted device that is composed of an insulated base with barriers having one or more electrically conductive members. Each electrically conductive member serves as a junction to electrically connect two or more conductors and also provides means to individually connect or disconnect conductors. The device can be a sectional or one-piece design.

2.14 UNPREPARED CONDUCTOR – A conductor which has been cut and the insulation of which has been removed for insertion into a terminal. The conductor end is bare. The conductor in an insulation piercing or displacement connector is considered to be unprepared.

2.15 WIRE BINDING SCREW CONNECTOR – A connector that uses a binding head screw, with or without a flat ring or lock washers, where:

- a) An unprepared conductor is looped around the shank of the screw and secured under the head of the screw; or

- b) A prepared conductor is assembled about the screw shank and retained by the head of the screw.

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 standard shall be interpreted as referring to the latest edition of that code or standard.

5 Components

5.1 Except as indicated in [5.2](#), 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 used in the products covered by this standard.

5.2 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.

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

5.4 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.

PART I – TERMINAL BLOCKS RATED 600 VOLTS AND LESS

CONSTRUCTION

6 Materials

6.1 Current-carrying parts

6.1.1 A current-carrying part intended for use with copper wire shall be of copper, a copper alloy, or other material suitable for the purpose.

6.1.2 A current-carrying part intended for use with aluminum wire shall be of aluminum, an aluminum alloy, copper or a copper alloy, or other material suitable for the purpose. A current-carrying part intended for use with aluminum wire shall be coated with a suitable electrically conductive coating to inhibit oxidation and corrosion.

6.1.3 Tin, applied in a suitable manner, is acceptable for the coating mentioned in [6.1.2](#), and other coatings may be accepted if suitable for the purpose.

6.2 Insulation

6.2.1 Insulation material shall not have less than the minimum values specified in [Table 6.1](#) and shall be subjected to the Mold Stress Relief Test, Section 16. The relative thermal index used shall be the lesser published value from Electrical or Mechanical without Impact. For the purpose of this standard, an insulation material is defined as a material which is in contact with or within 1/32 inch (0.8 mm) to either uninsulated live parts of opposite polarity, or uninsulated live parts and either metal parts that are capable of being grounded in service, or any surface exposed to contact.

Exception No. 1: The relative thermal index of the base material can be as tabulated for the following generic materials:

Unfilled polycarbonate : 105°C

Unfilled nylon : 105°C

Phenolic : 150°C

Molded Melamine : 130°C

Melamine phenolic : 130°C

Urea formaldehyde : 100°C

Exception No. 2: An insulation material having values less than any of those contained in [Table 6.1](#) is capable of being used, when based on end-product performance tests. See the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, and footnotes c, d, and e of [Table 6.1](#).

Exception No. 3: The Mold Stress Relief Test is not required for rigid thermosetting materials, such as phenolic.

Exception No. 4: The Mold Stress Relief Test is not required for materials identified in Exception No. 1, or that have a published relative thermal index (Electrical and Mechanical without Impact) greater than 70°C.

Table 6.1
Maximum performance level category (PLC) values for insulation materials

Test specified ^a	Flammability rating of material ^b			
	V-0	V-1	V-2	HB
Hot Wire Ignition (HWI) ^c	4	3	2	2
High Current Arc Ignition (HAI) ^d	3	2	2	1
Comparative Tracking Index (CTI) ^e	3	3	3	3

^a See the Standard for Polymeric Materials – Short Term Property Evaluations, UL 746A, for these specified tests.

^b These flammability classifications are derived from the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, UL 94. A terminal block shall be permitted to be marked with the flammability classification, see [18.5](#).

^c A material with weaknesses in these values is capable of being used provided an Abnormal Overload or Glow-Wire End product tests are performed. See the Standard for Polymeric Materials – Electrical Equipment Evaluations, UL 746C.

^d A material with weaknesses in these values is capable of being used provided an end product Arcing test is performed at 50 percent power factor and the amperage and voltage that the terminal block is rated for, to a maximum of 30A, 250V. For terminal blocks rated at greater than 30A, 250V, a minimum V-1 flammability rating and minimum CTI of 175 (PLC max of 3), is also required. See the Standard for Polymeric Materials – Electrical Equipment Evaluations, UL 746C.

^e A Proof Tracking Index (PTI) test may be performed on the terminal block for those materials where no CTI rating exists.

6.2.2 Insulation material bases that have been molded or fabricated from regrind materials, blending of materials, use of pigment, colorants, flame retardants, or similar means, shall comply with the Standard for Polymeric Materials – Fabricated Parts, UL 746D.

6.2.3 The insulating material for other than a non-isolated or isolated protective conductor terminal block shall be any color other than green-and-yellow.

7 Wiring Terminals

7.1 A wiring terminal employing a screw or nut for securing the conductors shall be so located that:

- a) It is accessible for examination; and
- b) Connectors can be tightened or wires removed without loosening or removing connectors, conductors, screws, or nuts in any other connector that is not secured by the screws or nuts being loosened or tightened.

7.2 A wiring terminal intended for use with stranded wire shall be such that all strands of the conductor are confined. The clamping movement alone shall adapt the terminal for use with a stated range of wire sizes without permanent removal or addition of parts, if such use is intended.

7.3 There shall be no sharp edges or corners that can damage conductor insulation with which it may come in contact.

7.4 A terminal that is intended to secure a copper wire and an aluminum wire simultaneously shall be such that there will be no direct physical contact between the wires of different metals, unless the terminal is suitable for the purpose.

7.5 A terminal connector provided with or specified for use with a terminal block shall comply with the requirements in the Standard for Wire Connectors, UL 486A-486B, or the Standard for Equipment Wiring Terminals for Use With Aluminum and/or Copper Conductors, UL 486E, as appropriate, and with this standard.

7.6 A nominal 0.110-, 0.125-, 0.187-, 0.205-, or 0.250-inch wide quick-connect terminal shall comply with the applicable requirements in the Standard for Electrical Quick-Connect Terminals, UL 310. Other sizes of quick-connect terminals shall be investigated with respect to crimp pull-out, engagement-disengagement forces of the connector and tab, and temperature rise; all tests are to be conducted in accordance with UL 310. The terminal shall also comply with the performance requirements in this standard.

Exception: The crimp pull-out test need not be conducted on a male tab or female connector that does not have provision for inserting and crimping conductors.

7.7 A wire-binding screw or stud-and-nut type terminal (see [2.12](#) and [2.15](#)) may be employed for conductors 10 AWG (5.3 mm²) and smaller, provided that the application of normal clamping action as intended will not impair the integrity of the joint. See Section [13](#), Solid-Wire Tightening Test.

7.8 A wire-binding screw or stud-and-nut terminal shall be capable of accommodating a three-quarter loop.

7.9 To determine compliance with [7.7](#), the conditions in (a) and (b) shall be met or, for a solid conductor, the test described in [13.2](#) shall be conducted. A stranded conductor shall meet conditions described in (a).

- a) The threaded screw or stud shall not have more than 32 threads per inch (12.6 threads per centimeter) and shall not be smaller than No. 8 (4.2 mm diameter) for 10 AWG (5.3 mm²) and

smaller wire and not smaller than No. 6 (3.5 mm diameter) for 14 AWG (2.1 mm²) and smaller wire. A wire-binding screw or stud-and-nut type terminal shall be provided with upturned lugs, a cupped washer, barriers or other equivalent means, to hold the wires in position even though the screw or nut becomes slightly loose.

b) The tapped terminal plate shall not have less than two full threads, and shall be of metal not less than 0.050 inch (1.3 mm) thick for a wire larger than 14 AWG (2.1 mm²) and not less than 0.030 inch (0.76 mm) thick for 14 AWG (2.1 mm²) or smaller wire. Threads provided by extruding a hole before tapping are to be counted if the thickness of the unextruded metal is not less than the pitch of the thread.

7.10 A terminal block intended for use with other wire connecting means not referenced in 7.5 – 7.7 may be used when it meets the appropriate performance requirements in this Standard.

7.11 A terminal block may use a combination of different types of connectors.

8 Spacings

8.1 The spacings on a terminal block shall be as specified in Table 8.1. Spacings shall be measured through cracks or between sections of a sectional type terminal block. In applying Table 8.1, it is to be assumed that:

a) Adjacent poles are at opposite polarity; and

b) Any mounting surface is at ground potential.

Note – Spacings are measured at all live parts of a terminal block including factory terminations, i.e. printed circuit board solder pins. When soldered or wired in the actual end use application, these spacings must be additionally evaluated in the end product.

Table 8.1
Minimum acceptable spacings

Application	Potential involved in volts	Minimum spacings in inches (mm) between uninsulated live parts of opposite polarity; and between an uninsulated live part and a grounded part including any mounting surface or exposed metal part			
		Through air		Over surface	
A. Service – including dead-front switchboards, panelboards, service equipment, and the like	51 – 150	1/2	(12.7)	3/4	(19.1)
	151 – 300	3/4	(19.1)	1-1/4	(31.8)
	301 – 600	1	(25.4)	2	(50.8)
B. Commercial appliances, including business equipment, electronic data processing equipment, and the like	51 – 150	1/16 ^a	(1.6) ^a	1/16 ^a	(1.6) ^a
	151 – 300	3/32 ^a	(2.4) ^a	3/32 ^a	(2.4) ^a
	301 – 600	3/8	(9.5)	1/2	(12.7)
C. Industrial, general	51 – 150	1/8 ^a	(3.2) ^a	1/4	(6.4)
	151 – 300	1/4	(6.4)	3/8	(9.5)
	301 – 600	3/8	(9.5)	1/2	(12.7)
D. Industrial, devices having limited ratings ^b	51 – 300	1/16 ^a	(1.6) ^a	1/8 ^a	(3.2) ^a
	301 – 600	3/16 ^a	(4.8) ^a	3/8	(9.5)
E. Terminal blocks rated 601 – 1500 V ^c	601 – 1000	0.55	(14.0)	0.85	(21.6)
	1001 – 1500	0.70	(17.8)	1.20	(30.5)

Table 8.1 Continued on Next Page

Table 8.1 Continued

Application	Potential involved in volts	Minimum spacings in inches (mm) between uninsulated live parts of opposite polarity; and between an uninsulated live part and a grounded part including any mounting surface or exposed metal part			
		Through air		Over surface	
F. Industrial, devices using the alternative approach to spacings ^d	51 – 1500	As Determined By Evaluation ^d			
G. LED lighting equipment ^b	51 – 300	1/16 ^a	(1.6) ^a	1/8 ^a	(3.2) ^a
	301 – 600	1/16 – 3/16 ^{a,e}	(1.6 – 4.8) ^{a,e}	1/8 – 3/8 ^{a,e}	(3.2 – 9.5) ^{a,e}
NOTES –					
1) A slot, groove, or similar spacing, 0.013 inch (0.33 mm) wide or less in the contour of insulating material is to be disregarded.					
2) An air space of 0.013 inch (0.33 mm) or less between a live part and an insulating surface is to be disregarded for the purpose of measuring over surface spacings.					
^a The spacing between field wiring terminals of opposite polarity and the spacing between a field wiring terminal and a grounded dead metal part shall not be less than 1/4 inch (6.4 mm) if short-circuiting or grounding of such terminals may result from projecting strands of wire. Examples of means that prevent stray wire strand contact include rating the terminal block for solid wire only, and design features such as recessed terminal pockets.					
^b See 8.5 .					
^c Applies only to terminal blocks investigated to Part II of this standard. See 22.1 .					
^d See 8.6 .					
^e See 8.11 .					

8.2 In a circuit not involving a potential of more than 50 volts, spacings at field-wiring terminals shall be a minimum of 1/8 inch (3.2 mm) through air and 1/4 inch (6.4 mm) over surface, and spacings at other than field-wiring terminals shall be a minimum of 1/16 inch (1.6 mm) through air or over surface; provided that the insulation and clearances between that circuit and a higher potential circuit are in accordance with the requirements that are applicable to the higher potential circuit.

8.3 Spacings shall be measured with terminals connected to the rated conductor that results in the most onerous condition.

Note – In most situations the maximum size conductor would yield the most onerous condition. In some situations, the minimum size conductor may result in less spacings, i.e. underside of a open bottom terminal block with exposed screw would have less spacings to the mounting surface when wired with the minimum size conductor.

8.4 A live screw head or nut on the underside of an insulating base shall be reliably prevented from loosening and shall be adequately insulated or spaced from the mounting surface. This may be accomplished by:

a) Countersinking such parts not less than 1/8 inch (3.2 mm) in the clear and then covering them with a waterproof, insulating sealing compound that does not melt at a temperature of 15°C (27°F) higher than the normal operating temperature in the device, and not less than 100°C (212°F) in any case, or

b) Reliably securing such parts and insulating them from the mounting surface by means of a barrier or the equivalent, or by means of through-air or over-surface spacings as specified in [Table 8.1](#).

8.5 The spacings specified in items D and G of [Table 8.1](#) are applicable to terminal blocks for use only in or with noted equipment types where the load on any single circuit of the terminal block does not exceed 15 amperes at 51 – 150 volts, 10 amperes at 151 – 300 volts, 5 amperes at 301 – 600 volts, or the maximum ampere rating, whichever is less.