



UL 1283

STANDARD FOR SAFETY

Electromagnetic Interference Filters

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UL Standard for Safety for Electromagnetic Interference Filters, UL 1283

Seventh Edition, Dated May 17, 2017

SUMMARY OF TOPICS

This revision of ANSI/UL 1283 dated June 26, 2020 includes the replacement of reference to UL 508C with UL 61800-5-1; [7.1.4](#)

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 requirements are substantially in accordance with Proposal(s) on this subject dated May 1, 2020.

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The most recent designation of ANSI/UL 1283 as an American National Standard (ANSI) occurred on June 3, 2020. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

The Department of Defense (DoD) has adopted UL 1283 on August 2, 1989. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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 electromagnetic interference (EMI) filters installed on, or connected to, 1,000 V or lower potential circuits, 50 – 60 Hz, or up to 1,500 Vdc, and installed in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements cover filters used to attenuate unwanted radio-frequency signals (such as noise or interference) generated from electromagnetic sources. These filters consist of capacitors and inductors used alone or in combination with each other and may be provided with resistors.

1.3 These requirements cover facility filters, cord-connected filters, and direct plug-in filters.

1.4 These requirements do not cover transient-voltage surge suppressors (that is, devices for repeated limiting of voltage surges on power circuits such as silicone avalanche diodes, metal oxide varistors, gas tubes, spark-gaps, etc). Transient Voltage Surge Suppressors are investigated under the Standard for Surge Protective Devices, UL 1449. These requirements also do not cover EMI filters for outdoor use. Appliance filters are covered under the Standard for Passive Filter Units for Electromagnetic Interference Suppression – Part 3: Passive Filter Units for Which Safety Tests are Appropriate, UL 60939-3.

1.5 These requirements do not cover direct plug-in products and cord-connected products provided with more than two receptacles. A direct plug-in product employing more than two receptacles and having an EMI filter is investigated under the requirements for current taps in the Standard for Attachment Plugs and Receptacles, UL 498. A cord-connected product employing more than two receptacles and having an EMI filter is investigated under the Standard for Relocatable Power Taps, UL 1363. The EMI filter part of these products would be investigated to determine compliance with the requirements in this standard in so far as they apply.

2 Components

2.1 Except as indicated in [2.2](#), 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 generally used in the products covered by this Standard.

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 standard; or
- b) Is superseded by a requirement in this standard.

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

5 Glossary

5.1 CORD-CONNECTED FILTER – A filter provided with a supply cord having an attachment plug for connecting the filter to a branch-circuit receptacle. It is also provided with one or two receptacles for distribution of the filtered voltage to an external (other equipment) load.

5.2 DIRECT PLUG-IN FILTER – A filter provided with blades at the filter body that plug directly into a 15 A, 120 V branch-circuit receptacle. It is also provided with one or two receptacles for the distribution of the filtered voltage to an external (other equipment) load.

5.3 FACILITY FILTER – A filter intended for installation on the load side of the service equipment overcurrent device; including filters located at the branch panel.

5.4 FIELD-WIRING TERMINAL – Any terminal to which a supply conductor or other wire can be connected by an installer in the field. However, if a wire is provided as part of the filter and a pressure terminal, connector, soldering lug, crimped eyelet, or other means for making the field connection is factory assembled to the wire, the combination of the wire and the connecting means is not considered to be a field-wiring terminal.

5.5 OPPOSITE POLARITY – A difference in potential between two points, such that shorting of these two points would result in a condition involving an overload, rupturing of printed wiring-board tracks, components, or fuses, and similar results.

CONSTRUCTION

6 General

6.1 Only materials that are acceptable for the particular use shall be used in an EMI filter. Every filter shall be made and finished with the degree of uniformity and grade of workmanship that are practicable in a well-equipped factory.

7 Frame and Enclosure

7.1 General

7.1.1 The following conditions indicate the maximum acceptable size for any opening in the enclosure of a filter including a hole, louver, or an opening protected by means of wire screening, expanded metal, or a perforated cover:

a) A floor-mounted filter over 48-in (1.22-m) high and a table- or desk-mounted filter shall have no top openings having a maximum linear dimension (in any direction) greater than 3/16 in (4.8 mm). Any other type of filter shall have no top openings.

b) Bottom openings of perforated metal not larger than described in [Table 7.1](#) are acceptable. Other patterns and hole sizes are acceptable if they comply with the ignition test described in Ignition Through Bottom Openings, Section [37](#).

c) Any opening in other than the bottom or top shall not permit the entrance of a rod greater than 25/32 in (20 mm) in diameter. See also Accessibility of Live Parts, Section [18](#).

**Table 7.1
Acceptable perforated-metal bottom plates**

Nominal thickness in (mm)	Minimum thickness in (mm)	Maximum diameter of holes in (mm)	Minimum spacing of holes center to center in (mm)
0.030 (0.76)	0.026 (0.66)	0.045 (1.14)	0.067 (1.70) (233 holes per in ² or 36 holes per cm ²)
0.030 (0.76)	0.026 (0.66)	3/64 or 0.047 (1.19)	3/32 or 0.094 (2.36)
0.035 (0.89)	0.032 (0.81)	0.075 (1.91)	1/8 or 0.125 (3.18) (72 holes per in ² or 11 holes per cm ²)
0.040 (1.02)	0.036 (0.91)	1/16 or 0.063 (1.60)	7/64 or 0.109 (2.77)
0.040 (1.02)	0.036 (0.91)	5/64 or 0.078 (1.98)	1/8 or 0.125 (3.18)

7.1.2 If screening is used as part of the enclosure, the wires shall not be smaller than 16 AWG (1.29 mm nominal diameter) for screen openings 1/2 in² (323 mm²) or less in area, and shall not be smaller than 12 AWG (2.05 mm nominal diameter) for larger screen openings. Sheet metal used for expanded-metal mesh and perforated sheet metal shall have a thickness of not less than 0.042 in (1.07 mm) for mesh openings or perforations 1/2 in² (323 mm²) or less in area, and shall have a thickness of not less than 0.093 in (2.36 mm) for larger openings.

7.1.3 An opening into a wiring compartment shall be so located or so shielded that direct emission of molten metal, burning insulation, and the like from components other than wiring does not occur under fault conditions.

7.1.4 Insulated live parts or portions of insulated live parts which extend through a primary Type 12 enclosure, as defined in the Standard for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E, shall be protected from dripping non-corrosive liquids and circulating dust by either of the following methods:

a) When protection from dripping non-corrosive liquids is provided by electrical insulation integral to the insulated live part, the insulation material shall meet the requirements for Flame Rating, RTI, HWI, HAI and CTI as described in the requirements for Insulating Material in the Standard for Adjustable Speed Electrical Power Drive Systems – Part 5-1: Safety Requirements – Electrical, Thermal and Energy, UL 61800-5-1, and additionally the requirements for Volume Resistivity and Dielectric Strength, both of the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, following exposure to water in accordance with the requirements for Water Exposure and Immersion of UL 746C.

b) When protection from dripping liquids is provided by mechanical means such as a cavity, channel, hood, or guard, the construction shall inhibit contact with dripping liquids when the assembly including primary enclosure is subjected to the Drip Test in the Standard for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E, with the enclosure mounted in all orientations allowed.

c) Protection from circulating dust shall be verified by either the Dust Test or the Atomized Water Test of UL 50E. At the conclusion of either the Dust Test or Atomized Water Test, no contaminants (cement particles or water droplets) are allowed to be in contact with uninsulated live parts. Water droplets or cement particles are allowed to contact insulating material. Verification of contaminant ingress is to be accomplished by disassembly and visual inspection immediately following the conclusion of the test.

Exception: At the conclusion of either the Dust or Atomized Water Test in (c), contaminants are allowed in contact with uninsulated live parts in Class 2 or limited voltage/current circuits, as