

UL 1283

Electromagnetic Interference Filters

Document Was Downloaded By Rice, Shi SHIMISHENG
For Use By KUANTECH CO LTD
12039 : 8/13/2007 - 2:59 AM

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL



Documents

Document Sharing Hub

Document Was Downloaded By Rice, Shi SHIMISHENG
For Use By KUANTECH CO LTD
12039 : 8/13/2007 - 2:59 AM

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM



Documents
Document Sharing Hub

Underwriters Laboratories Inc. (UL)
333 Pfingsten Road
Northbrook, IL 60062-2096

UL Standard for Safety for Electromagnetic Interference Filters, UL 1283

Fifth Edition, Dated November 30, 2005

Revisions: This Standard contains revisions through and including July 31, 2007.

SUMMARY OF TOPICS

This revision of ANSI/UL 1283 is issued to extend the future effective date of November 30, 2007 to November 30, 2012. This change applies to entire standard.

Text that has been changed in any manner is marked with a vertical line in the margin. Changes in requirements are marked with a vertical line in the margin and are followed by an effective date note indicating the date of publication or the date on which the changed requirement becomes effective.

A change in an effective date is indicated by a note following the affected item, and giving both the previous effective date and the new date the requirement becomes effective.

The following table lists the future effective dates with the corresponding reference.

Future Effective Dates	References
November 30, 2012	Entire Standard

The revisions dated July 31, 2007 include a reprinted title page (page1) for this Standard.

The revisions dated July 31, 2007 extend the future effective date of November 30, 2007 to November 30, 2012.

As indicated on the title page (page 1), this UL Standard for Safety is an American National Standard. Attention is directed to the note on the title page of this Standard outlining the procedures to be followed to retain the approved text of this ANSI/UL Standard.

As indicated on the title page (page1), this UL Standard for Safety has been adopted by the Department of Defense.

The UL Foreword is no longer located within the UL Standard. For information concerning the use and application of the requirements contained in this Standard, the current version of the UL Foreword is located on ULStandardsInfoNet at: <http://ulstandardsinfo.net/ulforeword.html>

The master for this Standard at UL's Northbrook Office is the official document insofar as it relates to a UL service and the compliance of a product with respect to the requirements for that product and service, or if there are questions regarding the accuracy of this Standard.

UL's Standards for Safety are copyrighted by UL. Neither a printed copy of a Standard, nor the distribution diskette for a Standard-on-Diskette and the file for the Standard on the distribution diskette should be altered in any way. All of UL's Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of UL.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of UL.

Revisions of UL Standards for Safety are issued from time to time. A UL Standard for Safety is current only if it incorporates the most recently adopted revisions.

UL provides this Standard "as is" without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if UL or an authorized UL representative has been advised of the possibility of such damage. In no event shall UL's liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

UL will attempt to answer support requests concerning electronic versions of its Standards. However, this support service is offered on a reasonable efforts basis only, and UL may not be able to resolve every support request. UL supports the electronic versions of its Standards only if they are used under the conditions and operating systems for which it is intended. UL's support policies may change from time-to-time without notification.

UL reserves the right to change the format, presentation, file types and formats, delivery methods and formats, and the like of both its printed and electronic Standards without prior notice.

Purchasers of the electronic versions of UL's Standards for Safety agree to defend, indemnify, and hold UL harmless from and against any loss, expense, liability, damage, claim, or judgement (including reasonable attorney's fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser's computer system.

If a single-user version electronic Standard was purchased, one copy of this Standard may be stored on the hard disk of a single personal computer, or on a single LAN file-server or the permanent storage device of a multiple-user computer in such a manner that this Standard may only be accessed by one user at a time and for which there is no possibility of multiple concurrent access.

If a multiple-user version electronic Standard was purchased, one copy of the Standard may be stored on a single LAN file-server, or on the permanent storage device of a multiple-user computer, or on an Intranet server. The number of concurrent users shall not exceed the number of users authorized.

Electronic Standards are intended for on-line use, such as for viewing the requirements of a Standard, conducting a word search, and the like. Only one copy of the Standard may be printed from each single-user version of an electronic Standard. Only one copy of the Standard may be printed for each authorized user of a multiple-user version of an electronic Standard. Because of differences in the computer/software/printer setup used by UL and those of electronic Standards purchasers, the printed copy obtained by a purchaser may not look exactly like the on-line screen view or the printed Standard.

An employee of an organization purchasing a UL Standard can make a copy of the page or pages being viewed for their own fair and/or practical internal use.

The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the note following the affected item. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL



Documents

Document Sharing Hub

New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Recognition and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

Copyright © 2007 Underwriters Laboratories Inc.

This Standard consists of pages dated as shown in the following checklist:

Page	Date
1.....	July 31, 2007
2-4	November 30, 2005
5-60.....	July 31, 2007
A1-A2.....	November 30, 2005

Document Was Downloaded By Rice, Shi SHIMISHENG
For Use By KUANTECH CO LTD
12039 : 8/13/2007 - 2:59 AM
UL COPYRIGHTED MATERIAL –

NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL



Documents

Document Sharing Hub

No Text on This Page

Document Was Downloaded By Rice, Shi SHIMISHENG
For Use By KUANTECH CO LTD
12039 : 8/13/2007 - 2:59 AM

UL COPYRIGHTED MATERIAL -
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM



Documents

Document Sharing Hub

NOVEMBER 30, 2005
(Title Page Reprinted: July 31, 2007)



ANSI/UL 1283-2005

1

UL 1283

Standard for Electromagnetic Interference Filters

First Edition – October, 1980
Second Edition – March, 1984
Third Edition – June, 1993
Fourth Edition – June, 1998

Fifth Edition

November 30, 2005

The most recent designation of ANSI/UL 1283 as an American National Standard (ANSI) occurred on November 17, 2005.

This ANSI/UL Standard for Safety, which consists of the Fifth edition with revisions through July 31, 2007, is under continuous maintenance, whereby each revision is ANSI approved upon publication.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc. and is not part of the ANSI Standard.

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.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements. 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>.

COPYRIGHT © 2007 UNDERWRITERS LABORATORIES INC.

UL COPYRIGHTED MATERIAL –

NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL



Documents

Document Sharing Hub

No Text on This Page

Document Was Downloaded By Rice, Shi SHIMISHENG
For Use By KUANTECH CO LTD
12039 : 8/13/2007 - 2:59 AM

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL



Documents

Document Sharing Hub

CONTENTS

INTRODUCTION

1 Scope	5
2 Glossary	5
3 Components	6
4 Units of Measurement	7
5 References	7

CONSTRUCTION

6 General	7
7 Appliance Filters	7
8 Frame and Enclosure	8
8.1 General	8
8.2 Metal enclosures	9
8.3 Nonmetallic enclosures	9
9 Corrosion Protection	10
10 Supply Connections	10
10.1 Facility Filters	10
10.2 Cord-connected filters	12
10.3 Direct-plug-in type	13
11 Power Supply Cord Bushings	15
12 Strain Relief	15
13 Receptacles	16
14 Overcurrent Protection	16
15 Switches and Controllers	17
16 Facility Filter Mounting	17
17 Insulating Materials	17
18 Live Parts	18
19 Accessibility of Live Parts	18
20 Flammability Characteristics of Polymeric Materials	21
21 Wiring	21
22 Spacings	22
23 Grounding	26
24 Capacitors	28

PERFORMANCE

25 General	29
26 Leakage Current	30
27 Temperature	33
28 Dielectric Voltage-Withstand	35
29 Insulation Resistance	37
30 Overload	38
31 Endurance	38
32 Abnormal Operation	39
33 Grounding Continuity	41
34 Strain Relief	41
35 Direct Plug-In Units – Mechanical Strength Tests	41
35.1 Blade secureness	41

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL



Documents
Document Sharing Hub

35.2 Impact	42
35.3 Resistance to crushing	42
36 Pullout, Bending, and Twisting	42
37 Capacitance	43
37.1 Capacitor discharge	43
37.2 Capacitance measurement	44
38 Ignition Through Bottom Openings	44
38.1 General	44
38.2 Hot, flaming oil	44
39 Withstand	45
40 Instrumentation and Calibration of High-Capacity Circuits	48
40.1 General	48
40.2 Current and power factor determination (5000 and 10,000 A)	48
40.3 Galvanometers	49
40.4 Circuit calibration	50
40.5 Current and power factor determination (over 10,000 A)	51
40.6 Recovery voltage	53
40.7 Shunting resistance	54

MANUFACTURING AND PRODUCTION TESTS

41 Dielectric Voltage-Withstand	54
42 Grounding Continuity	56

RATINGS

43 Details	56
------------------	----

MARKINGS

44 Details	57
45 Installation Instructions	60

APPENDIX A

Standards for Components.....	A1
-------------------------------	----

Document Was Downloaded By Rice, Shi SHIMISHENG
For Use By KUANTECH CO LTD
12039 : 8/13/2007 - 2:59 AM

UL COPYRIGHTED MATERIAL –

NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM



Documents

Document Sharing Hub

INTRODUCTION

1 Scope

1.1 These requirements cover electromagnetic interference (EMI) filters installed on, or connected to, 600 V or lower potential circuits, 50 – 60 Hz, and installed in accordance with the National Electrical Code.

Effective date for 1.1 changed from November 30, 2007 to November 30, 2012

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.

Effective date for 1.2 changed from November 30, 2007 to November 30, 2012

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

Effective date for 1.3 changed from November 30, 2007 to November 30, 2012

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 Transient Voltage Surge Suppressors, UL 1449. These requirements also do not cover EMI filters for outdoor use.

Effective date for 1.4 changed from November 30, 2007 to November 30, 2012

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 requirements 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.

Effective date for 1.5 changed from November 30, 2007 to November 30, 2012

2 Glossary

2.1 **APPLIANCE FILTER** – A filter intended to be factory-installed as a component part of end-use appliances or equipment connected to (supplied by) the branch circuits of a building wiring system. Included in this category are filters installed in medical and dental equipment, office appliances and business equipment, data processing equipment, and household appliances such as mixers, vacuum cleaners, hand tools, and the like.

Effective date for 2.1 changed from November 30, 2007 to November 30, 2012

2.2 **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 (appliance or other equipment) load.

Effective date for 2.2 changed from November 30, 2007 to November 30, 2012

2.3 **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 (appliance or other equipment) load.

Effective date for 2.3 changed from November 30, 2007 to November 30, 2012

2.4 FACILITY FILTER – A filter installed as part of the service, feeders, or branch circuitry of a building wiring system.

Effective date for 2.4 changed from November 30, 2007 to November 30, 2012

2.5 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.

Effective date for 2.5 changed from November 30, 2007 to November 30, 2012

2.6 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.

Effective date for 2.6 changed from November 30, 2007 to November 30, 2012

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. See Appendix A for a list of standards covering components generally used in the products covered by this Standard.

Effective date for 3.1 changed from November 30, 2007 to November 30, 2012

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.

Effective date for 3.2 changed from November 30, 2007 to November 30, 2012

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

Effective date for 3.3 changed from November 30, 2007 to November 30, 2012

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.

Effective date for 3.4 changed from November 30, 2007 to November 30, 2012

4 Units of Measurement

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

Effective date for 4.1 changed from November 30, 2007 to November 30, 2012

5 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.

Effective date for 5.1 changed from November 30, 2007 to November 30, 2012

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.

Effective date for 6.1 changed from November 30, 2007 to November 30, 2012

7 Appliance Filters

7.1 An appliance filter is to be investigated on the basis of its compliance with the construction requirements in the sections of this Standard as indicated in Table 7.1.

Effective date for 7.1 changed from November 30, 2007 to November 30, 2012

Table 7.1
Applicable requirements for appliance filters

Effective date for Table 7.1 changed from November 30, 2007 to November 30, 2012

Requirements for	Section
Corrosion Protection	9
Supply Connections	10 ^a
Receptacles	13 ^a
Overcurrent Protection	14 ^a
Switches and Controllers	15 ^a
Insulating Materials	17
Live Parts	18
Flammability Characteristics of Polymeric Materials	20
Wiring	21
Spacings	22
Grounding	23
Capacitors	24
^a The requirements in the section are applicable only if the filter is constructed using the features covered in this section.	

8 Frame and Enclosure

8.1 General

8.1.1 The following conditions indicate the maximum acceptable size for any opening in the enclosure of a filter (other than an appliance 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 inches (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 inch (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 8.1 are acceptable. Other patterns and hole sizes are acceptable if they comply with the ignition test described in Ignition Through Bottom Openings, Section 38.

c) Any opening in other than the bottom or top shall not permit the entrance of a rod greater than 20 mm (25/32 inch) in diameter. See also Accessibility of Live Parts, Section 19.

Effective date for 8.1.1 changed from November 30, 2007 to November 30, 2012

Table 8.1
Acceptable perforated-metal bottom plates

Effective date for Table 8.1 changed from November 30, 2007 to November 30, 2012

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

8.1.2 If screening is used as part of the enclosure, the wires shall not be smaller than No. 16 AWG (1.29 mm nominal diameter) for screen openings 1/2 square inch (323 mm²) or less in area, and shall not be smaller than No. 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 inch (1.07 mm) for mesh openings or perforations 1/2 square inch (323 mm²) or less in area, and shall have a thickness of not less than 0.093 inch (2.36 mm) for larger openings.

Effective date for 8.1.2 changed from November 30, 2007 to November 30, 2012

8.1.3 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.

Effective date for 8.1.3 changed from November 30, 2007 to November 30, 2012

8.2 Metal enclosures

8.2.1 A metal enclosure of a filter, other than an appliance filter, shall have a minimum thickness in accordance with Table 8.2 except as provided for perforated bottom plates in Table 8.1.

Effective date for 8.2.1 changed from November 30, 2007 to November 30, 2012

8.2.2 A cover that must be removed for the connection of circuit conductors shall not be provided with any means, such as a knockout for conduit, for the connection of a wiring system.

Effective date for 8.2.2 changed from November 30, 2007 to November 30, 2012

Table 8.2
Minimum acceptable thicknesses of enclosure metal

Effective date for Table 8.2 changed from November 30, 2007 to November 30, 2012

Metal	At small, flat unreinforced surfaces and at surfaces of a shape or size to provide adequate mechanical strength		At surfaces to which a wiring system is to be connected in the field		At relatively larger unreinforced flat surfaces	
	inch	(mm)	inch	(mm) ^a	inch	(mm)
Die-cast metal	3/64	(1.2)	—	—	5/64	(2.0)
Cast malleable iron	1/16	(1.6)	—	—	3/32	(2.4)
Other cast metal	3/32	(2.4)	—	—	1/8	(3.2)
Uncoated sheet steel	0.026	(0.66)	0.032	(0.81)	0.026	(0.66)
Galvanized sheet steel	0.029	(0.74)	0.034	(0.86)	0.029	(0.74)
Nonferrous sheet metal	0.036	(0.91)	0.045	(1.14)	0.036	(0.91)

^a A sheet-steel wall of a thickness less than that specified is acceptable if the area surrounding the knockout has a thickness not less than 0.053 inch (1.35 mm).

8.3 Nonmetallic enclosures

8.3.1 A nonmetallic enclosure is to be investigated under the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.

Effective date for 8.3.1 changed from November 30, 2007 to November 30, 2012

8.3.2 The following are among the factors to be taken into consideration when using the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, to judge the acceptability of an enclosure or frame construction made of materials other than metal:

- Mechanical strength, including crushing resistance for filters considered likely to be stepped on.
- Resistance to impact.
- Moisture-absorptive properties.
- Combustibility.
- Resistance to arcing.

UL COPYRIGHTED MATERIAL –

NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM



Documents

Document Sharing Hub

f) Resistance to temperatures to which the material might be subjected under conditions of normal or abnormal use.

g) Aging characteristics.

Exception: Direct plug-in filters are to be tested for crushing and impact, (a) and (b), as indicated in Direct Plug-In Units – Mechanical Strength Tests, Section 35.

Effective date for 8.3.2 changed from November 30, 2007 to November 30, 2012

8.3.3 Direct plug-in filters are to be tested for blade secureness as indicated in Direct Plug-In Units – Mechanical Strength Tests, Section 35.

Effective date for 8.3.3 changed from November 30, 2007 to November 30, 2012

9 Corrosion Protection

9.1 Iron and steel parts shall be protected against corrosion by painting, enameling, galvanizing, plating, or other equivalent means if the malfunction of such unprotected parts is likely to result in a fire or electric shock.

Exception: If the oxidation of iron or steel from exposure of the metal to air and moisture is not likely to be appreciable – thickness of metal and temperature also being factors – surfaces of sheet-steel and cast-iron parts within an enclosure may not be required to be protected against corrosion. Bearings, laminations, or minor parts of iron or steel (such as washers, screws, and the like) need not comply with this requirement. Terminals passing through glass heads in a filter enclosure need not comply with this requirement.

Effective date for 9.1 changed from November 30, 2007 to November 30, 2012

10 Supply Connections

10.1 Facility Filters

10.1.1 A facility filter shall have provision for the permanent connection of one of the wiring methods in the National Electrical Code, ANSI/NFPA No. 70. See Grounding, Section 23, for grounding requirements.

Effective date for 10.1.1 changed from November 30, 2007 to November 30, 2012

10.1.2 A sheet-metal member to which a wiring system is to be connected in the field shall have a thickness as indicated in Table 8.2 for points of wiring system connections.

Effective date for 10.1.2 changed from November 30, 2007 to November 30, 2012

10.1.3 A terminal box or compartment in which field-wiring connections are intended to be made shall be so located that, after the filter is installed as intended, the field-wiring connections can be readily made and inspected without disturbing the wiring or the filter.

Effective date for 10.1.3 changed from November 30, 2007 to November 30, 2012

10.1.4 A terminal compartment intended for connection of a supply raceway shall be so attached to the filter that the compartment cannot turn.

Effective date for 10.1.4 changed from November 30, 2007 to November 30, 2012

UL COPYRIGHTED MATERIAL –

NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM



Documents

Document Sharing Hub

10.1.5 A filter shall be provided with field-wiring terminals or leads for the connection of circuit conductors having an ampacity of not less than 125 percent of the current rating of the filter.

Effective date for 10.1.5 changed from November 30, 2007 to November 30, 2012

10.1.6 The free length of a lead inside a wiring compartment shall be 6 inches (152 mm) or more if the lead is intended for field connection to an external circuit.

Exception: A lead may be less than 6 inches (152 mm) in length if it is evident that the use of a longer lead might result in adverse effects.

Effective date for 10.1.6 changed from November 30, 2007 to November 30, 2012

10.1.7 A field-wiring terminal shall be prevented from turning by means other than friction alone. Lockwashers, properly applied, may be acceptable.

Effective date for 10.1.7 changed from November 30, 2007 to November 30, 2012

10.1.8 A field-wiring terminal shall be provided with a soldering lug or pressure terminal connector firmly bolted or held by a screw.

Exception: A wire-binding screw may be employed at a wiring terminal intended to accommodate a No. 10 AWG (5.3 mm²) or smaller conductor if upturned lugs, cupped washers, or the equivalent are provided to hold the wire in position.

Effective date for 10.1.8 changed from November 30, 2007 to November 30, 2012

10.1.9 Upturned lugs, cupped washers, and the equivalent shall be capable of retaining a supply conductor of the size indicated in 10.1.5 under the head of the screw or washer.

Effective date for 10.1.9 changed from November 30, 2007 to November 30, 2012

10.1.10 A wire-binding screw shall not be smaller in size than No. 10 (4.8 mm diameter).

Effective date for 10.1.10 changed from November 30, 2007 to November 30, 2012

10.1.11 A terminal plate for a field-wiring wire-binding screw shall be of metal not less than 0.050 inch (1.27 mm) thick, except that a plate not less than 0.030 inch (0.76 mm) thick is acceptable if tightening of the wire-binding screw does not strip the threads from the terminal plate or the screw. There shall be two or more full threads in the metal, which may be extruded if necessary to provide the threads.

Effective date for 10.1.11 changed from November 30, 2007 to November 30, 2012

10.1.12 A filter intended for connection to a supply circuit that includes a grounded circuit conductor shall have one terminal or lead that is identified for the connection of the grounded conductor of the supply circuit.

Effective date for 10.1.12 changed from November 30, 2007 to November 30, 2012

10.1.13 A field-wiring terminal intended for the connection of a grounded supply conductor shall be identified by means of a metal coating that is substantially white in color and shall be easily distinguishable from the other terminals, or proper identification of the terminal for the connection of the grounded conductor shall be clearly shown in some other manner, such as on an attached wiring diagram. If wire leads are provided instead of terminals, the identified lead shall have a white or gray color and shall be distinguishable from the other leads.

Effective date for 10.1.13 changed from November 30, 2007 to November 30, 2012

10.1.14 If a knockout or hole is provided for the field connection of a wiring system, the knockout or hole shall be surrounded by a flat surface. The surface shall have an area large enough to permit the assembly to the filter of a length of standard rigid steel conduit, of the largest size that the knockout or hole will accommodate, by means of a hexagon-shaped locknut.

Effective date for 10.1.14 changed from November 30, 2007 to November 30, 2012

10.1.15 The minimum diameter of the flat surface surrounding knockouts of the 1/2-, 3/4-, and 1-inch trade sizes shall be 1-5/32, 1-29/64, and 1-13/16 inches (29.4, 36.9, and 46.0 mm), respectively.

Effective date for 10.1.15 changed from November 30, 2007 to November 30, 2012

10.1.16 Knockouts shall be so secured in place that they can be removed readily without distortion of the enclosure and will remain in place during normal handling.

Effective date for 10.1.16 changed from November 30, 2007 to November 30, 2012

10.2 Cord-connected filters

10.2.1 A supply cord either shall be permanently attached to the filter, or shall be a detachable power-supply cord having a cord connector for connection to a mating male attachment plug inlet attached to the filter.

Effective date for 10.2.1 changed from November 30, 2007 to November 30, 2012

10.2.2 The flexible cord shall be Type SJO, SJT, SJTO, SO, ST, or STO.

Exception: A lighter insulated type cord may be used on a filter if the filter is intended for a specific appliance that can use a lighter cord and the filter is marked in accordance with 44.13.

Effective date for 10.2.2 changed from November 30, 2007 to November 30, 2012

10.2.3 A supply cord shall have a voltage rating not less than the rated voltage of the filter, and shall have an ampacity not less than the current rating of the filter.

Effective date for 10.2.3 changed from November 30, 2007 to November 30, 2012

10.2.4 The length of a supply cord measured from the outside surface of the enclosure of a filter to the plane of the face of the attachment plug shall not exceed 15 ft (4.6 m).

Effective date for 10.2.4 changed from November 30, 2007 to November 30, 2012

10.2.5 If the attachment plug is other than the nonpolarity type, one of the circuit conductors in the flexible cord shall be identified for connection of the grounded supply conductor if the filter is rated at 125 V or less or at 125/250 V or less (3 wires).

Effective date for 10.2.5 changed from November 30, 2007 to November 30, 2012

10.2.6 An attachment plug shall have a current rating not less than the rated current of the filter, and a voltage rating consistent with the voltage rating of the filter.

Effective date for 10.2.6 changed from November 30, 2007 to November 30, 2012

UL COPYRIGHTED MATERIAL -

NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM



Documents

Document Sharing Hub

10.3 Direct-plug-in type

10.3.1 The blade assembly shall comply with the applicable requirements for attachment plugs, and the blade configuration and any grounding pin shall be for use with 15 A, 125 V general-purpose nonlocking receptacles.

Effective date for 10.3.1 changed from November 30, 2007 to November 30, 2012

10.3.2 A product having integral blades for direct insertion into a receptacle shall comply with the specifications in Table 10.1.

Effective date for 10.3.2 changed from November 30, 2007 to November 30, 2012

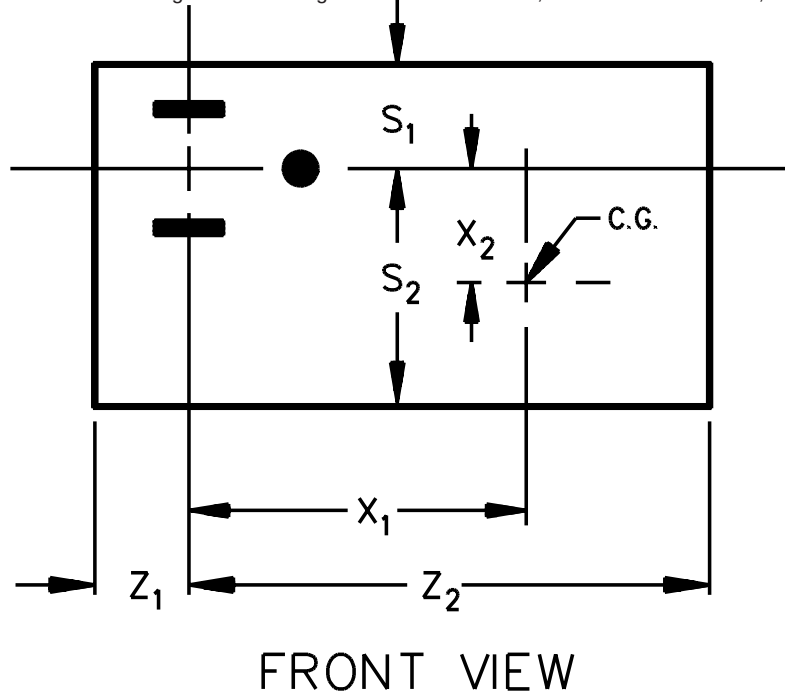
Table 10.1
Specifications for plug-in products

Effective date for Table 10.1 changed from November 30, 2007 to November 30, 2012

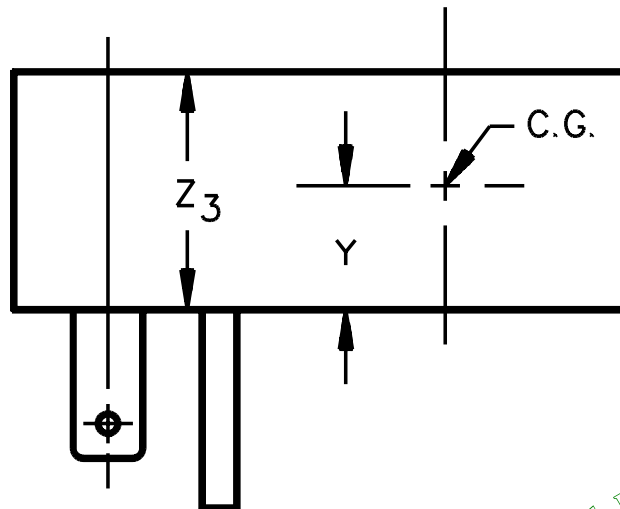
M	≤	28 oz (0.79 kg)
WY/Z	≤	48 oz (1.36 kg)
WY/S	≤	48 oz (1.36 kg)
WX	≤	80 oz-in (0.57 N·m)
Z ₃	≤	3-1/4 in (82.6 mm)
S ₁ , S ₂ , Z ₁ , and Z ₂	≤	5 in (127 mm), each
In which: M is the mass in oz (kg) W is the weight in oz (kg) Y and Z ₃ are the distances, in inches (mm), illustrated in Figure 10.1 Z is the shorter distance, in inches (mm), of Z ₁ or Z ₂ S is the shorter distance, in inches (mm), of S ₁ or S ₂ illustrated in Figure 10.1 X is the longer distance, in inches (mm), of X ₁ or X ₂ illustrated in Figure 10.1		

Figure 10.1
Dimensions of a plug-in product

Effective date for Figure 10.1 changed from November 30, 2007 to November 30, 2012



FRONT VIEW



SIDE VIEW

C.G. = Center of Gravity

CP100

UL COPYRIGHTED MATERIAL -
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM



Documents
Document Sharing Hub

10.3.3 When inserted in a parallel-blade duplex receptacle, no part of a product shall interfere with full insertion of an attachment plug in the adjacent receptacle.

Exception: A product need not comply with this requirement if it renders the adjacent receptacle completely unusable.

Effective date for 10.3.3 changed from November 30, 2007 to November 30, 2012

10.3.4 The unit shall not be provided with a mounting tab.

Effective date for 10.3.4 changed from November 30, 2007 to November 30, 2012

10.3.5 The enclosure of a unit shall be capable of being gripped for removal from the receptacle to which it is connected, and the perimeter of the face section from which the blades project shall not be less than 5/16 inch (7.9 mm) from any point on either blade.

Effective date for 10.3.5 changed from November 30, 2007 to November 30, 2012

11 Power Supply Cord Bushings

11.1 At each point where a supply cord passes through an opening in a metal or other wall, barrier, or enclosing case, a smooth, well-rounded surface against which the cord can bear shall be provided to protect the cord against damage. An insulating bushing shall be provided if a Type SPT-2 or SPT-3 cord is employed and the opening is in metal.

Effective date for 11.1 changed from November 30, 2007 to November 30, 2012

11.2 Ceramic materials and some molded compositions are generally acceptable for insulating bushings, but bushings of wood or hot-molded shellac and tar compositions are not acceptable.

Effective date for 11.2 changed from November 30, 2007 to November 30, 2012

11.3 Vulcanized fiber may be employed if the bushing is not less than 3/64 inch (1.2 mm) thick and is so formed and secured in place that it cannot be affected adversely by conditions of ordinary moisture.

Effective date for 11.3 changed from November 30, 2007 to November 30, 2012

12 Strain Relief

12.1 Strain relief shall be provided so that a mechanical stress on a supply cord is not transmitted to terminals, splices, or interior wiring.

Effective date for 12.1 changed from November 30, 2007 to November 30, 2012

12.2 The strain relief means shall comply with the strain-relief requirements in Strain Relief, Section 34.

Effective date for 12.2 changed from November 30, 2007 to November 30, 2012

12.3 Means shall be provided so that the supply cord cannot be pushed into the filter through the cord-entry hole if such displacement is likely to subject the cord to mechanical damage or expose it to a temperature higher than that for which the cord is rated or if such displacement is likely to reduce spacings (such as to a metal strain-relief clamp) below the minimum acceptable values.

Effective date for 12.3 changed from November 30, 2007 to November 30, 2012