



UL 497C

STANDARD FOR SAFETY

Protectors for Coaxial Communications Circuits



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UL Standard for Safety for Protectors for Coaxial Communications Circuits, UL 497C

Second Edition, Dated August 3, 2001

Summary of Topics

This revision of ANSI/UL 497C is being issued to reaffirm ANSI approval of the Standard.

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. 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.

The revisions are substantially in accordance with Proposal(s) on this subject dated October 26, 2012.

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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that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

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1

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Standard for Protectors for Coaxial Communications Circuits

First Edition – March, 1998

Second Edition

August 3, 2001

This ANSI/UL Standard for Safety consists of the Second Edition including revisions through December 21, 2012.

The most recent designation of ANSI/UL 497C as a Reaffirmed American National Standard (ANS) occurred on December 21, 2012. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or effective date information.

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	7
2 General	7
2.1 Components	7
2.2 Units of measurement	8
2.3 Undated references	8
3 Glossary	8

CONSTRUCTION

4 General	9
5 Enclosures	10
5.1 General	10
5.2 Sheet metal	10
5.3 Nonmetallic	12
6 Protection Against Corrosion	13
6.1 General	13
6.2 Outdoor use	13
6.3 Grommets	13
7 Field-Wiring Connections	14
8 Components	15
8.1 General	15
8.2 Arrester assemblies	15
8.3 Electrical insulation material	15
9 Spacings	15

PERFORMANCE

10 General	18
11 I ² t Limiting Test	22
12 Abnormal Sustained Current Test	23
13 Component Temperature Test	25
14 Breakdown Voltage Measurement Test	26
15 Impulse Sparkover Voltage Measurement Test	27
16 Limited Short-Circuit Test	27
17 High Current Ground Path Test	30
18 Cable Shield Fuse Test	31
19 Endurance Conditioning Test	31
20 Induced Low Current Test	32
21 Distortion Test	32
22 Flame Test	32
23 Impact Test (Polymeric Enclosures)	33
24 Jarring Test	34
25 Water Spray Test	34
26 Leakage Current Test	38
27 Dielectric Voltage-Withstand Test	39
28 Ultraviolet Light and Water Exposure	40

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29 Tensile Strength and Elongation Tests	41
30 Air Oven Aging Test	42
31 Ozone Exposure Test	42
32 Indoor Corrosion Test	42
32.1 General	42
32.2 Hydrogen sulfide exposure	43
32.3 Sulfur dioxide-carbon dioxide	43
33 Outdoor Corrosion Test	43
33.1 General	43
33.2 Hydrogen sulfide exposure	43
33.3 Sulfur dioxide-carbon dioxide exposure	43
33.4 Salt spray exposure	44

MARKINGS

34 General	44
------------------	----

INSTALLATION INSTRUCTIONS

35 General	45
------------------	----

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INTRODUCTION

1 Scope

1.1 These requirements cover protectors for use on coaxial cable circuits to be used in accordance with the applicable requirements of the National Electrical Code, NFPA 70.

1.2 As covered by these requirements, a coaxial cable circuit protector consists of single or multiple air gap arresters, gas tube arresters, or solid-state arresters, with or without fuses or other current-limiting devices. A circuit protector is intended to protect equipment, wiring, and personnel at the subscriber premises against the effects of excessive potentials and currents on the coaxial line caused by lightning, contacts with power conductors, power induction, or rises in ground potential.

1.3 This standard does not cover the following:

- a) Lightning protective devices for the protection of secondary distribution wiring systems and equipment.
- b) Antenna discharge units for radio and television receiving appliances.
- c) Lightning conductor and air terminals for connection of lightning rods for building protection.
- d) Protectors for fire alarm signaling circuits that are covered by the Standard for Protectors for Data Communications and Fire-Alarm Circuits, UL 497B.
- e) Equipment covered by the Standard for Secondary Protectors for Communications Circuits, UL 497A.
- f) Equipment covered by the Standard for Transient Voltage Surge Suppressors, UL 1449.
- g) Equipment covered by the Standard for Protectors for Paired-Conductor Communications Circuits, UL 497.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.1.2 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.

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

2.1.4 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.

2.2 Units of measurement

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

2.2.2 Unless otherwise indicated, all voltage and current values specified in this standard are root-mean-square (rms).

2.3 Undated references

2.3.1 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.

3 Glossary

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

3.2 ARRESTER – An overvoltage component or assembly of components which permit current to flow through it when a designed voltage limit is reached. The arrester may consist of a spark gap, gas tube, solid-state component or the equivalent, coupled with other hardware which serves to support, position, and align the current-carrying components that make up the arrester.

3.3 CURRENT-LIMITING – This condition is achieved when the abnormal high current condition is reduced to a maximum current value equal to the normal operating current of the circuit.

3.4 CURRENT-LIMITING DEVICE – This device reacts to an abnormal high current condition to prevent overheating of the normal current path and/or circuit in series with the current-limiting device. These devices may take the form of a thermo-resistance or thermo-mechanical device.

3.5 INDOOR USE (CONTROLLED ENVIRONMENT) – Installation of equipment in an area where the atmosphere is artificially controlled. For the purpose of this standard, indoor ambient is limited to a temperature of 0 – 30°C (32 – 86°F). Limits for corrosion concentrations are defined in the test program. Rain does not occur.

3.6 MINIMUM CURRENT-LIMITING POINT – The minimum abnormal current value which causes operation of the current-limiting device that reduces the current flow to a current-limited state.

3.7 NORMAL-USE POSITION (Position of Normal Use) – A mounting or positioning of the product in an intended manner that is prescribed in the installation instructions of the manufacturer and conforms to the installation requirements of the National Electrical Code, ANSI/NFPA 70.

3.8 OUTDOOR USE (UNCONTROLLED ENVIRONMENT) – An area subjected to the natural environmental conditions which make-up the ambient and moisture extremes of this plant. For the purpose of consistency, the ambient and moisture extremes are defined in the various tests of this standard.

3.9 OUTSIDE PLANT (OSP) – That part of the communications circuit extending from the subscriber premise protector to the main distribution frame of the public utility company providing the service.

3.10 PROTECTOR – A device comprised of an overvoltage, overcurrent component, or both and is intended to prevent damage to a circuit or system when abnormally high voltage and/or current occur.

3.11 TRUE RMS – Unit of electrical measurement by a meter capable of sampling, over time, the varying magnitude of a complex waveform to produce a computed root-mean-square value equivalent to the same direct current value which produces the same heating effect.

CONSTRUCTION

4 General

4.1 A coaxial cable circuit protector shall be constructed to withstand, without damage, its intended installation and use and shall comply with the applicable performance requirements specified in Sections 10 – 33.

4.2 A fuseless coaxial protector shall consist of an assembly comprising:

- a) An insulating base or grounded metallic base supporting an overvoltage arrester;
- b) Provision for connecting the center conductors of a coaxial cable circuit; and
- c) Provision for connecting at least one grounding conductor.

An arrester shall be connected between the coaxial center conductor and ground. The connection or connections for the grounding conductor shall be conductively connected to a ground electrode or terminal.

4.3 A fused coaxial protector shall consist of an assembly comprising:

- a) An insulating base supporting an arrester;
- b) Provision for mounting a center conductor fuse;
- c) Provision for connecting the center conductors of a coaxial cable circuit; and
- d) Provision for connecting at least one grounding conductor.

The fuse or current-limiting device shall be connected in series between each incoming center conductor of the outside plant (OSP) and the corresponding subscriber premises termination. The connection or connections for the grounding conductor or conductors shall be conductively connected to the ground electrodes or terminal of the coaxial protector. The overvoltage arrester shall be connected to the station termination end of the fuse or current-limiting device. A cover may be provided over the assembly.

4.4 A protector shall not have provision for adjustment of its components.

5 Enclosures

5.1 General

5.1.1 An enclosure for coaxial protectors shall have the strength and rigidity to resist total or partial collapse with attendant reduction of spacings, loosening or displacement of parts, or other conditions that impair the operation of the product and increase the risk of fire, electric shock, or injury to persons.

5.1.2 Enclosures for individual components, outer enclosures, and combinations of the two are considered in determining compliance with 5.1.1.

5.1.3 Protector enclosures shall have provision for mounting.

5.1.4 A protector intended for outdoor use shall be provided with a water-resistant cover or enclosure.

5.2 Sheet metal

5.2.1 The thickness of sheet metal used for an enclosure of a protector shall not be less than the applicable value specified in Table 5.1 or 5.2.

Exception: Sheet metal of lesser thickness is not prohibited from being used when, considering the shape, size, and function of the enclosure, it is determined to provide equivalent mechanical strength.

Table 5.1
Minimum thickness of sheet metal for electrical enclosures – carbon steel or stainless steel

Table 5.1 revised June 14, 2004

Without supporting frame ^a		With supporting frame or equivalent reinforcing ^a		Minimum thickness	
Maximum width, ^b	Maximum length, ^c	Maximum width, ^b	Maximum length, ^c	Uncoated,	Metal coated,
inches (cm)	inches (cm)	inches (cm)	inches (cm)	inches (mm) [MSG]	inches (mm) [GSG]
4.0 (10.2)	Not limited	6.25 (15.9)	Not limited	0.020 (0.51)	0.023 (0.58)
4.75 (12.1)	5.75 (14.6)	6.75 (17.1)	8.25 (21.0)	[24] [24]	
6.0 (15.2)	Not limited	9.5 (24.1)	Not limited	0.026 (0.66)	0.029 (0.74)
7.0 (17.8)	8.75 (22.2)	10.0 (25.4)	12.5 (31.8)	[22] [22]	
8.0 (20.3)	Not limited	12.0 (30.5)	Not limited	0.032 (0.81)	0.034 (0.86)
9.0 (22.9)	11.5 (29.2)	13.0 (33.0)	16.0 (40.6)	[20] [20]	
12.5 (31.8)	Not limited	19.5 (49.5)	Not limited	0.042 (1.07)	0.045 (1.14)
14.0 (35.6)	18.0 (45.7)	21.0 (53.3)	25.0 (63.5)	[18] [18]	
18.0 (45.7)	Not limited	27.0 (68.6)	Not limited	0.053 (1.35)	0.056 (1.42)
20.0 (50.8)	25.0 (63.5)	29.0 (73.7)	36.0 (91.4)	[16] [16]	
22.0 (55.9)	Not limited	33.0 (83.8)	Not limited	0.060 (1.52)	0.063 (1.60)
25.0 (63.5)	31.0 (78.7)	35.0 (88.9)	43.0 (109.2)	[15] [15]	
25.0 (63.5)	Not limited	39.0 (99.1)	Not limited	0.067 (1.70)	0.070 (1.78)
29.0 (73.7)	36.0 (91.4)	41.0 (104.1)	51.0 (129.5)	[14] [14]	
33.0 (83.8)	Not limited	51.0 (129.5)	Not limited	0.080 (2.03)	0.084 (2.13)

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Table 5.1 Continued

Without supporting frame ^a		With supporting frame or equivalent reinforcing ^a		Minimum thickness	
Maximum width, ^b	Maximum length, ^c	Maximum width, ^b	Maximum length, ^c	Uncoated,	Metal coated,
inches (cm)	inches (cm)	inches (cm)	inches (cm)	inches (mm) [MSG]	inches (mm) [GSG]
38.0 (96.5)	47.0 (119.4)	54.0 (137.2)	66.0 (167.6)	[13] [13]	
42.0 (106.7)	Not limited	64.0 (162.6)	Not limited	0.093 (2.36)	0.097 (2.46)
47.0 (119.4)	59.0 (149.9)	68.0 (172.7)	84.0 (213.4)	[12] [12]	
52.0 (132.1)	Not limited	80.0 (203.2)	Not limited	0.108 (2.74)	0.111 (2.82)
60.0 (152.4)	74.0 (188.0)	84.0 (213.4)	103.0 (261.6)	[11] [11]	
63.0 (160.0)	Not limited	97.0 (246.4)	Not limited	0.123 (3.12)	0.126 (3.20)
73.0 (185.4)	90.0 (228.6)	103.0 (261.6)	127.0 (322.6)	[10] [10]	

NOTE – Sheet steel for an enclosure intended for outdoor use (watertight) shall be at least 0.036 inch (0.91 mm) thick when zinc-coated and at least 0.032 inch (0.81 mm) thick when uncoated.

^a A supporting frame is a structure of angle or channel or a folded rigid section of sheet metal that is rigidly attached to and has essentially the same outside dimensions as the enclosure surface and that has sufficient torsional rigidity to resist the bending moments which may be applied via the enclosure surface when it is deflected. Construction that is considered to have equivalent reinforcing may be accomplished by designs that will produce a structure that is as rigid as one built with a frame of angles or channels. Construction considered to be without supporting frame includes:

- 1) A single sheet with single formed flanges (formed edges),
- 2) A single sheet which is corrugated or ribbed, and
- 3) An enclosure surface loosely attached to a frame, for example, with spring clips.

^b The width is the smaller dimension of a rectangular sheet metal piece which is part of an enclosure. Adjacent surfaces of an enclosure may have supports in common and be made of a single sheet.

^c For panels which are not supported along one side (for example, side panels of boxes) the length of the unsupported side shall be limited to the dimensions specified unless the side in question is provided with a flange at least 1/2 inch (12.7 mm) wide.

Table 5.2

Minimum thickness of sheet metal for electrical enclosures – aluminum, copper, or brass

Table 5.2 revised June 14, 2004

Without supporting frame ^a		With supporting frame or equivalent reinforcing ^a		Minimum thickness,	
Maximum width, ^b	Maximum length, ^c	Maximum width, ^b	Maximum length, ^c	inches	(mm)
inches (cm)	inches (cm)	inches (cm)	inches (cm)		
3.0 (7.6)	Not limited	7.0 (17.8)	Not limited		
3.5 (8.9)	4.0 (10.2)	8.5 (21.6)	9.5 (24.1)	0.023	(0.58)
4.0 (10.2)	Not limited	10.0 (25.4)	Not limited		
5.0 (12.7)	6.0 (15.2)	10.5 (26.7)	13.5 (34.3)	0.029	(0.74)
6.0 (15.2)	Not limited	14.0 (35.6)	Not limited		
6.5 (16.5)	8.0 (20.3)	15.0 (38.1)	18.0 (45.7)	0.036	(0.91)
8.0 (20.3)	Not limited	19.0 (48.3)	Not limited		
9.5 (24.1)	11.5 (29.2)	21.0 (53.3)	25.0 (63.5)	0.045	(1.14)
12.0 (30.5)	Not limited	28.0 (71.1)	Not limited		
14.0 (35.6)	16.0 (40.6)	30.0 (76.2)	37.0 (94.0)	0.058	(1.47)
18.0 (45.7)	Not limited	42.0 (106.7)	Not limited		

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