UL 2460

STANDARD FOR SAFETY

Nonshielded Cable

UL Standard for Safety for Nonshielded Cable UL 2460

First Edition, Dated September 29, 2015

Summary of Topics

This revision of ANSI/UL 2460 dated December 3, 2020 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

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 requirements are substantially in accordance with Proposal(s) on this subject dated September 4, 2020.

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UL 2460

Standard for Nonshielded Cable

First Edition

September 29, 2015

This ANSI/UL Standard for Safety consists of the First Edition including revisions through December 3, 2020.

The most recent designation of ANSI/UL 2460 as a Reaffirmed American National Standard (ANS) occurred on October 23, 2020. 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.

No Text on This Page

CONTENTS

INTRODUCTION

CONSTRUCTION

PERFORMANCE

MARKINGS

No Text on This Page

INTRODUCTION

1 Scope

1.1 This Standard covers single-conductor, nonshielded cables rated 5000 or 8000 volts, 90° C, described in Table 1.1 that are intended solely for use as factory-installed wiring in equipment (internal wiring), in industrial applications where such cable systems are maintained by trained personnel, not as Type MV.

1.2 These requirements do not cover cables that are intended for direct installation in buildings or structures in accordance with the National Electrical Code (NEC), NFPA 70.

1.3 The final acceptance of these cables is dependent upon their use in complete equipment that conforms with the standards applicable to such equipment.

Table 1.1
Constructions

Voltage rating	Size	Use	Insulation material	Insulation thickness	Shield	Overall covering
5000	8 AWG – 1000 kcmil	90°C (194°F) dry	XLPE or EPCV	Table 15.3, Column A, of UL 1072	Nonshielded	none
			XLPE, EPCV, DREP, or EP	Table 15.3, Column B, of UL 1072	Nonshielded	Nonconductive jacket, Table 27.20, Column C, of UL 1072
			XLPE, DREP, or EP	Table 15.3, Column C, of UL 1072	Nonshielded	Nonconductive jacket, Table 27.20, Column C, of UL 1072
8000	8 AWG – 1000 kcmil	90°C (194°F) dry	XLPE, DREP, or EP	Table 7.1	Nonshielded	Table 7.2

2 Components

2.1 Except as indicated in 2.2, a component (including gaskets and polymeric materials) of a product covered by this Standard shall comply with the requirements for that component.

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.

CONSTRUCTION

5 Materials and Workmanship

5.1 Only materials that are acceptable for the particular use shall be employed in a cable. Cables shall be made and finished with the degree of uniformity and grade of workmanship that are practicable in a well-equipped factory.

5.2 Each material used in a cable shall be compatible with all of the other materials used in the cable.

6 Cable Rated 5000 V

6.1 Except for the markings (see Sections 10 and 11), the 5000 V cable is a nonshielded single-conductor cable constructed identically [conductor, conductor stress relief, insulation, and overall jacket (where required)] to the 2400 V, dry-locations only, nonshielded cable described in the Standard for Medium-Voltage Power Cables, UL 1072.

7 Cable Rated 8000 V

7.1 Except for the insulation thickness, the use of a nonconductive jacket, and markings (see Sections 10 and 11), the 8000 V cable is a nonshielded single-conductor cable constructed identically [conductor, conductor stress relief, insulation, and overall jacket (where required)] to the 2400 V, dry-locations only, nonshielded cable described in the Standard for Medium-Voltage Power Cables, UL 1072.

7.2 The average thickness of the insulation and the minimum thickness at any point of the insulation shall not be less than indicated in Table 7.1.

Table 7.1
Thicknesses of insulation and non-conductive jacket in nonshielded single-conductor cables rated 8000 V

Size of conductor	8000 V cable with XLPE, EP, or DREP insulation with a nonconductive jacket over the insulation	
	Minimum average thickness	Minimum thickness at any point
	mils	
8 – 4/0 AWG	180	162
213 – 500 kcmil	210	189
501 – 750	235	212
751 – 1000	250	225
	mm	

Table 7.1 Continued on Next Page

Table 7.1 Continued

Size of conductor	8000 V cable with XLPE, EP, or DREP insulation with a nonconductive jacket over the insulation	
	Minimum average thickness	Minimum thickness at any point
8 – 4/0 AWG	4.57	4.11
213 – 500 kcmil	5.33	4.80
501 – 750	5.97	5.38
751 – 1000	6.35	5.72

7.3 The conductor shielding for cable rated 8000 V shall comply with the requirements for Conductor Stress Relief (Conductor Shielding) in the Standard for Medium-Voltage Power Cables, UL 1072.

7.4 Each circuit conductor rated 8000 V shall be insulated in accordance with Material, Application, and Centering of the Standard for Medium-Voltage Power Cables, UL 1072. Jacketed nonshielded cable rated 8000 V, insulated as indicated in Table 7.2 and having XLPE, EP, or DREP insulation shall have an insulation resistance at 60.0°F (15.6°C) such that the minimum value of K is 12,000 megohms based on 1000 conductor feet or 3650 megohms based on a conductor kilometer. The insulation alone shall have an insulation resistance at 60.0°F (15.6°C) such that the minimum value of K is 20,000 megohms based on 1000 conductor feet or 6100 megohms based on a conductor kilometer.

7.5 Each circuit conductor rated 8000 V shall be provided with a nonconductive jacket. The jacket materials shall be in accordance with the Non-conductive jacket Table of the Standard for Medium-Voltage Power Cables, UL 1072. The jacket properties shall be in accordance with the following Tables in UL 1072 as applicable:

a) Properties of Non-Conductive CP Jacket

b) Physical Properties of Non-Conductive CP Jacket

c) Properties of Non-Conductive CPE Jacket

d) Physical Properties of Non-Conductive CPE Jacket

e) Properties of Non-Conductive NBR/PVC Jacket

f) Physical Properties of Non-Conductive NBR/PVC Jacket

g) Properties of Non-Conductive Neoprene Jacket

h) Physical Properties of Non-Conductive Neoprene Jacket

i) Properties of Non-Conductive PE Jacket

j) Physical Properties of Non-Conductive PE Jacket

k) Properties of Non-Conductive PVC Jacket

l) Physical Properties of Non-Conductive PVC Jacket

m) Properties of Non-Conductive TPEJacket

n) Physical Properties of Non-Conductive TPE Jacket

o) Properties of Non-Conductive XL Jacket

p) Physical Properties of Non-Conductive XL Jacket

The thickness shall be as specified in Table 7.2 when measured in accordance with the Basic Optical Method or in Direct Measurement specified in UL 1072. In case of doubt, the thickness shall be measured by the referee optical method as specified in UL 1072.

Table 7.2
Thickness of non-conductive jacket on nonshielded cables rated 8000 V

Size of conductor	8000 V cable with XLPE, EP, or DREP insulation with a nonconductive jacket over the insulation	
	Minimum average thickness	Minimum thickness at any point
	mils	
8 – 6 AWG	80	64
4 – 2/0	95	76
3/0 – 4/0	110	88
213 – 500 kcmil	110	88
501 – 750	125	100
751 – 1000	140	112
	mm	
8 – 6 AWG	2.03	1.63
4 – 2/0	2.41	1.93
3/0 – 4/0	2.79	2.24
213 – 500 kcmil	2.79	2.24
501 – 750	3.18	2.54
751 – 1000	3.56	2.84

PERFORMANCE

8 Cable Rated 5000 V

8.1 The test program used to evaluate cable rated 5000 V shall be identical to that which is used to evaluate dry locations, 2400 V, nonshielded cable (see 6.1).

9 Cable Rated 8000 V

9.1 General

9.1.1 The test program used to evaluate cable rated 8000 V shall be identical to that which is used to evaluate dry locations, 2400 V, nonshielded cable (see Materials, Section 6) in the Standard for Medium-Voltage Power Cables, UL 1072 except as follows:

a) The Specific Surface Resistivity of Nonshielded Single-Conductor Cable Test, Section 47 of UL 1072 is required.

b) The U-Bend Discharge Test of Nonshielded Single-Conductor Cable, Section 49 of UL 1072 shall be conducted as if testing a 2400 V, dry-rated cable except that the test potential shall be 27 kV and the test period shall be 100 hours.

c) The cables shall be subjected to the A-C Dielectric Withstand Test of Each Nonshielded Conductor, Section 57 of UL 1072. The cable shall withstand for 5 minutes without breakdown a 23 – 62 Hz essentially sinusoidal rms test potential of 18 kV. The initially-applied rms potential may be anywhere in the range of near zero to 8000 V.