UL 1569

STANDARD FOR SAFETY

Metal-Clad Cables

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UL Standard for Safety for Metal-Clad Cables, UL 1569

Fifth Edition, Dated May 4, 2018

Summary of Topics

This is the new harmonized edition of UL 1569/NMX-J-726-ANCE for use in Mexico and the United States. The requirements of this Standard are in accordance with Article 330 of the National Electrical Code in the United States, and Article 330 of the Standard for Electrical Installations, NOM-001-SEDE in Mexico, and that the requirements do not cover medium voltage cables covered in UL 1072 or NMX-J-142/1-ANCE.

The new requirements are substantially in accordance with Proposal(s) on this subject dated August 11, 2017 and January 26, 2018.

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Association of Standardization and Certification
NMX-J-726-ANCE
First Edition

Underwriters Laboratories Inc.
UL 1569
Fifth Edition

Metal-Clad Cables

May 4, 2018

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ANSI/UL 1569-2018

Commitment for Amendments

This standard is issued jointly by the Association of Standardization and Certification (ANCE) and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to ANCE or UL at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE and UL. ANCE will incorporate the same revisions into a new edition of the standard bearing the same date of issue as the UL pages.

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This ANSI/UL Standard for Safety consists of the Fifth Edition. The most recent designation of ANSI/UL 1569 as an American National Standard (ANSI) occurred on May 4, 2018. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

The Department of Defense (DoD) has adopted UL 1569 on July 23, 1983. 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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CONTENTS

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PREFACE

This is the harmonized ANCE and UL standard for Metal-Clad Cables. It is the first edition of NMX-J-726-ANCE, and the fifth edition of UL 1569. This edition of UL 1569 supersedes the previous edition published on November 13, 2014.

This harmonized standard was prepared by the Association of Standardization and Certification, (ANCE) and Underwriters Laboratories Inc. (UL). The efforts and support of the Technical Harmonization Subcommittee 20, Building Wire and Cable on the Harmonization of Electrotechnical Standards of the Nations of the Americas (CANENA), are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

The present Mexican standard was developed by the CT 20, Electric Cables from the Comite de Normalizacion de la Asociacion de Normalizacion y Certificacion, A.C., CONANCE, with the collaboration of CANAME member manufacturers and users.

This standard will be submitted to the American National Standards Institute (ANSI) for publication as an American National Standard.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

Level of Harmonization

This standard is published as an equivalent standard for ANCE and UL.

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Metal-Clad Cables

1 Scope

1.1 These requirements cover round or flat metal-clad cables that contain 0.824 – 1010 mm^2 (18 AWG – 2000 kcmil) insulated circuit conductors with or without one or more optical-fiber members, all enclosed in armor consisting of interlocked metal strip or a smooth or corrugated metal tube. Round cables contain one or more insulated circuit conductors. Flat cable contains two or three insulated circuit conductors. These electrical and hybrid electrical/optical-fiber cables are for use (optical and electrical functions associated in the case of a hybrid cable) as Type MC cable in accordance with Article 330 and other applicable parts of the National Electrical Code, NFPA 70 and in accordance with Article 330 of the Standard for Electrical Installations, NOM-001-SEDE.

Note 1: In the United States, Type AC armored cables are covered in the Standard for Armored Cables, UL 4.

Note 2: In the United States, metal-clad cables for use in Division 1 and Zone 1 hazardous locations are required to comply with this Standard and the Standard for Metal-Clad Cables and Cable-Sealing Fittings for Use in Hazardous (Classified) Locations, UL 2225.

1.2 These requirements cover round or flat armored cables that have thermoplastic or thermoset insulation at voltage ratings not exceeding 600 V (thermoplastic) or 600 or 2000 V (thermoset) where subjected to temperatures not exceeding 75°C or 90°C , depending upon the voltage and temperature ratings of the circuit conductors in the cable. Cables with 600 V conductors that also include one or more optical-fiber members have ″-OF″ supplementing the type letters and are limited to carrying optical energy that has been ruled not hazardous to the human body.

1.3 These requirements do not cover Type MV (medium-voltage) cables rated for 2400 – 35000 V, which are covered in the Standard for Medium-Voltage Cables, UL 1072 or NMX-J-142/1-ANCE. A multiple-conductor Type MV cable with a smooth (other than lead) or corrugated metal sheath or with interlocked metal armor may be marked for use also as Type MC cable.

1.4 These requirements do not cover the optical or other performance of any optical-fiber member or group of such members.

2 Definitions

2.1 The following definitions apply in this Standard:

2.2 ETFE and ECTFE – Thermoplastic materials whose characteristic constituent is either a copolymer of ethylene and tetrafluoroethylene (ETFE) or a copolymer of ethylene and chlorotrifluoroethylene (ECTFE). The material is uncompounded ECTFE or ETFE to which a small amount of pigment, lubricant, or both, is or is not added.

2.3 mPPE – A compounded thermoplastic material whose characteristic constituent is: Poly (2,6-dimethyl-1,4-phenylene ether).

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2.4 PVC – A thermoplastic compound whose characteristic constituent is polyvinyl chloride or a copolymer of vinyl chloride or vinyl acetate.

2.5 PVDF – A thermoplastic material whose characteristic constituent is the homopolymer resin polyvinylidene fluoride. The material is uncompounded PVDF to which it is appropriate to add a small amount of pigment, lubricant, or both.

2.6 PVDF COPOLYMER – A thermoplastic material whose characteristic constituent is a copolymer of polyvinylidene fluoride and hexafluoropropylene. The material is the uncompounded copolymer to which it is appropriate to add a small amount of pigment, lubricant, or both.

2.7 SEMIRIGID PVC (SRPVC) – A partially plasticized thermoplastic compound whose characteristic constituent is polyvinyl chloride or a copolymer of vinyl chloride or vinyl acetate.

2.8 TPE – An extensible compound whose characteristic constituent is a thermoplastic elastomer.

2.9 TPU – Thermoplastic polyurethane, a compounded thermoplastic elastomer material whose characteristic constituent is a polyester- or polyester-based urethane linear polymer resin characterized by soft amorphous segments containing hard crystalline microdomains.

2.10 Type MC – Also known as metal-clad cable for the purpose of this standard, a factory assembly of one or more insulated circuit conductors with or without one or more optical-fiber members, all of which are enclosed in an armor consisting of interlocked metal strip or a smooth or corrugated metallic sheath, with or without an overall jacket.

3 General

3.1 Units of measure

3.1.1 The unit of measure shall be SI. If a value for measurement is followed by a value in other units in parentheses, the second value represents a direct conversion or an alternative value. Except for conductor size, the first stated value is the requirement.

3.2 Compliance

3.2.1 Metal-clad cable shall be designated as Type MC and shall comply in all respects with the applicable requirements for construction details, test performance, and markings.

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3.3 Materials

3.3.1 The insulation in each of the following cables shall be of a material that is acceptable for use in wet locations if the cable has armor consisting of interlocked metal strip, but does not include a jacket over the assembly under the armor:

a) Cable that is marked for direct burial, and

b) Cable that is intended for use in wet locations.

3.4 Reference publications

3.4.1 This Standard refers to the following publications and where reference is made to ANCE or UL Standards, such reference shall be considered to refer to the latest edition and all amendments published to that edition. Where such reference is made to other publications, it shall be to the edition listed below.

ANCE (Association of Standardization and Certification)

NMX-J-010-ANCE
Wires and Cables – Thermoplastic Insulated Wires and Cables – Specifications

NMX-J-012-ANCE
Wires and Cables – Concentric Lay Stranded Copper Conductors for Electrical Purposes – Specifications

NMX-J-036-ANCE
Wires and Cables – Soft or Annealed Copper Wire for Electrical Purposes – Specifications

NMX-J-093-ANCE
Wires and Cables – Determination of the Resistance to Fire Propagation on Electrical Conductors – Test Method

NMX-J-142/1-ANCE
Wires and Cables – Shielded Power Cables, Rated 5Kv through 35Kv, Cross-Linked Polyethylene or Ethylene-Propylene Rubber Insulated – Specifications and Test Methods

NMX-J-177-ANCE
Wires and Cables – Determination of the Thicknesses in Semiconducting Shielding, Insulations and Jackets of Electrical Conductors – Test Method

NMX-J-178-ANCE
Wires and Cables – Ultimate Strength and Elongation of Insulation, Semiconducting Shields and Jackets of Electrical Conductors – Test Method

NMX-J-186-ANCE
Wires and Cables – Accelerated Aging in Forced Convection Oven of Semiconducting Shields, Insulations and Jackets of Electrical Conductors – Test Methods

NMX-J-191-ANCE
Wire and Cables – Heat Distortion of Insulations And Protective Jackets of Electrical Conductors – Test Method

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NMX-J-194-ANCE
Wires and Cables – Oil Immersion, Gasoline or Other Fluid Aging for Insulations and Jackets of Electrical Conductors – Test Method

NMX-J-293-ANCE
Wires and Cables – Alternative Current and Direct Current Dielectric Voltage Withstand – Test Method

NMX-J-300-ANCE
Wires and Cables – Control Cables – Specifications

NMX-J-451-ANCE
Wires and Cables – Thermoset Insulated Wires and Cables – Specifications

NMX-J-472-ANCE
Wires and Cables – Determination of the Amount of Halogen Acid Gas Evolved During the Controlled Combustion of Polymeric Materials Taken from Electrical Cables – Test Method

NMX-J-474-ANCE
Wires and Cables –Determination of Specific Optical Density of Smoke Generated by Electrical Wires and Cables – Test Method

NMX-J-498-ANCE
Wires and Cables – Vertical Tray Flame

NMX-J-516-ANCE
Wires and Cables – Determination of Direction and Length of Lay of Bare and Insulated Conductors – Test Method

NMX-J-532-ANCE
Wires and Cables – AA-8000 Series Aluminum Alloy Wires – Specifications

NMX-J-533-ANCE
Wires and Cables – AA-8000 Series Aluminum Alloy Cables – Specifications

NMX-J-543-ANCE
Connectors – Wires Connectors – Specification and Test Method

NMX-J-553-ANCE
Wires and Cables – Weather Resistance of Insulation or Jacket of Electrical Conductors – Test Method

NMX-J-556-ANCE
Wires and Cables – Test Methods

Steel Chamber of Mexico

NMX-H-014
Test Method for Determining the Weight of Zinc Coating in Galvanized Steel Products

Secretary of Energy

NOM-001-SEDE
Standard for Electrical Installations

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ASTM International (ASTM) Standards

B3-01(2013)
Standard Specification for Soft or Annealed Copper Wire

B800
Standard Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes – Annealed and Intermediate Tempers

B566-04a
Standard Specification for Copper-Clad Aluminum Wire

D471
Standard Test Method for Rubber Property-Effect of Liquids

D5025-99
Standard Specification for Laboratory Burner Used for Small-Scale Burning Tests on Plastic Materials

D5207-98
Standard Practice for Calibration of 20 and 125 mm Test Flames for Small-Scale Burning Tests on Plastic Materials

NFPA Standards

NFPA 70-2017
National Electrical Code

UL (Underwriters Laboratories Inc.) Standards

UL 44
Thermoset-Insulated Wire and Cable

UL 66
Fixture Wire

UL 83
Thermopolastic-Insulated Wire and Cable

UL 83A
Fluoropolymer Insulated Wire

UL 486A-486B
Wire Connectors

UL 1072
Medium-Voltage Power Cables

UL 1277
Electrical Power and Control Tray Cables with Optional Optical-Fiber Members

UL 1685
Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables

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UL 2225
Cables and Cable Fittings for Use In Hazardous (Classified) Locations

UL 2556
Wire and Cable Test Methods

4 Construction

4.1 Conductors

4.1.1 General

4.1.1.1 Only copper, nickel-based alloy, copper-clad aluminum, or an acceptable aluminum alloy shall be used for the conductors in a cable. Soft-annealed copper shall comply with the Standard Specification for Soft or Annealed Copper Wire, ASTM B3 or NMX-J-036-ANCE.

4.1.1.2 Solid aluminum conductors in size 3.31 – 8.37 mm^2 (12 – 8 AWG) shall comply with the requirements for aluminum-wire stock (aluminum-alloy conductor material) in Annex A and in ASTM B800 or NMX-J-532-ANCE .

4.1.1.3 Stranded aluminum conductors shall comply with the requirements for semi-annealed 8000 series aluminum conductors in ASTM B800 or NMX-J-533-ANCE when tested in accordance with the test Resistance of armor in UL 2556 or NMX-J-177-ANCE.

4.1.1.4 Copper-clad aluminum conductors shall comply with the requirements in Annex B. In a given cable, all conductors are not required to be of the same metal.

In Mexico, copper-clad aluminum is not recognized.

4.1.1.5 A copper conductor shall not be smaller than 0.824 mm^2 (18 AWG) and shall not be larger than 1010 mm^2 (2000 kcmil). An aluminum conductor shall not be smaller than 3.31 mm^2 (12 AWG) and shall not be larger than 1010 mm^2 (2000 kcmil).

4.1.1.6 Each 13.3 – 1010 mm^2 (6 AWG – 2000 kcmil) conductor shall be stranded. The 0.824 mm^2 (18 AWG) and larger copper or 3.31 mm^2 (12 AWG) and larger aluminum conductors shall comply with the requirements in 4.1 in UL 44 or NMX-J-451-ANCE, or in 4.1 of UL 83 or NMX-J-010-ANCE, except as modified in this Section.

In the United States, 0.824 or 1.3 mm^2 (18 or 16 AWG) copper conductors shall comply with the requirements for fixture wire in UL 66.

In Mexico, 0.824 or 1.3 mm^2 (18 or 16 AWG) copper conductors shall comply with the requirements for control cables in NMX-J-012-ANCE.

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