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UL 504

Outline of Investigation for Mineral-Insulated, Metal-Sheathed Cable

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Summary of Topics

This first issue of the Outline of Investigation for Mineral-Insulated, Metal-Sheathed Cable, UL 504.

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INTRODUCTION

1 Scope

1.1 This Outline of Investigation covers mineral-insulated (Type MI) metal-sheathed cable, which consists of one or more solid copper conductors insulated with highly compressed magnesium oxide and enclosed in a continuous copper or alloy steel sheath, with or without a nonmetallic jacket.

1.2 Cables rated 600 V may be composed of 16 AWG to 500 kcmil single conductor, 16 to 4 AWG two and three conductor, 16 to 6 AWG four conductor, and 16 to 10 AWG seven conductor constructions. Cables rated 300 V may be composed of two, three, four and seven conductor, sizes 18 to 16 AWG, for use on signaling circuits.

1.3 The copper sheath is suitable as an equipment grounding conductor. For cable with alloy steel outer sheath one of the insulated conductors is to be used for equipment grounding.

1.4 The cable shall be installed in accordance with Article 332 of National Electrical Code, NFPA 70

2 Units of Measurement

2.1 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.

3 Undated References

3.1 Any undated reference to a code or standard appearing in the requirements of this Outline shall be interpreted as referring to the latest edition of that code or standard.

3.2 Wherever the designation "UL 1581" is used in this cable Outline, reference is to be made to the designated part(s) of the Reference Standard for Electrical Wires, Cables, and Flexible Cords, UL 1581. Whenever the designation "UL 2556" is used in this standard, reference is to be made to the designated parts of the Wire and Cable Test Methods, UL 2556.

CONSTRUCTION

4 Materials

4.1 Only materials that are acceptable for the particular use shall be employed in a cable.

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

5 Conductors

5.1 Conductors shall be uncoated copper, nickel or nickel clad copper.

5.2 Uncoated copper conductors shall comply with the requirements of Standard Specification for Soft or Annealed Copper Wire, ASTM B3.

5.3 Nickel-clad copper conductors shall comply with the requirements of Standard Specification for Nickel-Coated Soft or Annealed Copper Wire, ASTM B355.

5.4 Nickel conductors shall comply with the requirements of Standard Specification for Nickel Rod and Bar, ASTM B160

6 Insulation

6.1 The insulation shall consist of highly compressed, powdered magnesium oxide.

6.2 The minimum insulation thickness between conductors and between conductors and sheath(s) shall be 0.055 inches.

6.3 Compliance with 6.2 shall be determined in accordance with the method described in 6.3.1 – 6.3.4.

6.3.1 The end of one specimen shall be filed smooth. The end of the specimen shall be filed perpendicular to the length of the specimen (right-circular cylinder).

6.3.2 The mineral insulation shall be carefully removed from the filed end of the specimen to a depth of at least 0.01 inches without disturbing the position of the conductors within the cable.

6.3.3 A steel gauge shall be inserted between adjacent conductors and between the conductors and the sheath.

6.3.4 A steel gauge of 0.054 inches shall pass between adjacent conductors and between the conductors and the sheath without disturbing the position of the conductors.

7 Metal Sheath

7.1 The sheath shall consist of annealed copper or alloyed steel.

7.2 The thickness of the sheath shall not be less than the values shown in Table 7.1.