

Subject 1063

May 11, 2018

SUMMARY OF TOPICS

The following changes in requirements to the Standard for Machine-Tool Wires and Cables, UL 1063, are being proposed:

1. Addition of Single Conductor, Shielded Type MTW Wire, Revised 1.2, 10.1.1, 13.1.1, 14.1, 15.1, 19, 19.1, 22.1, 23.1 and New Section 20A

STP BALLOTS AND ALL COMMENTS DUE: JUNE 11, 2018

For your convenience in review, proposed additions to existing requirements are shown underlined and proposed deletions are shown ~~lined-out~~.

1. Addition of Single Conductor, Shielded Type MTW Wire, Revised 1.2, 10.1.1, 13.1.1, 14.1, 15.1, 19, 19.1, 22.1, 23.1 and New Section 20A

RATIONALE

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Type MTW wire in a single conductor construction is used for power and/or control, however the current construction does not allow a shield. If non-shielded MTW single conductor construction is used as a power or control conductor, emission noise or conduction noise may occur and EMC will not be maintained.

NFPA 79 does not prohibit a shielded single conductor. In NFPA 79, 12.2.6 implies that a single conductor can be shielded, and not be part of a cable. 12.6.5 also indicates that single conductors can be shielded in sizes 22 AWG and larger.

PROPOSAL

1.2 The two single-conductor constructions covered are described in Table 1.1. Both are PVC-insulated and one includes a nylon jacket over the insulation. These single-conductor constructions may be optionally shielded and jacketed. The multiple-conductor constructions covered consist of assemblies of these single-conductor constructions (sizes and styles may be mixed) enclosed by a PVC jacket.

10.1.1 An insulated conductor or an insulated conductor within a multi-conductor cable, or an assembly of conductors may be enclosed in a conductive shield.

13.1.1 An overall PVC jacket shall cover shielded, single conductor and multiple-conductors cables completely. The jacket shall conform closely to and be readily separable from the surface of the underlying assembly. The average thickness of the jacket and the minimum thickness at any point of the jacket shall not be less than indicated in Table 13.1. The average tensile strength and ultimate elongation of aged and unaged specimens of the jacket from finished cable shall not be less than indicated in Table 8.1.

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14.1 The insulation on finished single-conductor wire of constructions A and B (with shield and jacket removed, if present) and similar wire taken from finished, multi-conductor cable shall comply with the Flexibility at room-temperature (after aging), Heat-shock, and Cold-bend tests specified in the Standard for Thermoplastic-Insulated Wires and Cables, UL 83.

15.1 The insulation on finished single-conductor wire of constructions A and B (with shield and jacket removed, if present) and similar wire taken from finished, multi-conductor cable shall comply with the deformation test (nylon in place for construction B) at $121.0 \pm 1.0^{\circ}\text{C}$ for PVC insulation as required in the Standard for Thermoplastic-Insulated Wires and Cables, UL 83, except that the decrease in thickness shall not be more than 30 percent. The rod is to exert 400 gf or 3.92 N on the size 22 – 7 and the 20 – 16 AWG wires and is to exert the load indicated in UL 83 for the 14 AWG – 1000 kcmil sizes.

19 Spark Testing of Finished Single Conductors and of Individuals Conductors Before Assembly

19.1 The routine factory production testing of finished single-conductor wire and cable made with and without a jacket of nylon or a similar material before it is assembled into a single or multiple-conductor, jacketed cable shall include an a-c spark test on 100 percent of production. The test shall be conducted in accordance with the Standard for Thermoplastic-Insulated Wires and Cables, UL 83, with the conductor earth-grounded at the payoff reel or another point at which continuous contact with the bare conductor, prior to the insulating process, is maintained or at the take-up reel. However, for the size 22 – 7 and the 20 – 10 AWG sizes, an earth-ground connection shall be made at both the payoff and take-up reels unless the size 22 – 7 and the 20 – 10 AWG sizes are tested for continuity and found to be of one integral length. The test potential shall be as indicated in Table 19.1. In any case, each earth-ground connection shall be bonded directly to the earth-ground in the spark tester.

20A Dielectric Testing of Single Conductor, Shielded and Jacketed Constructions

20A.1 The routine factory production testing of single-conductor shielded and jacketed cable shall include a 48 – 62 Hz 60-s dielectric voltage-withstand test on 100 percent of production of the finished cable. The rms test potential shall be 2000 V. The potential shall be applied between each conductor and the conductive shield.

20A.2 The cable is to be stressed by the means described in 18.2.2.

20A.3 The applied potential is to be increased from near zero at an essentially uniform rate that:

- a) Is not less than 100 percent of the voltage rating for the wire or cable in 60 s, and
- b) Is not more than 100 percent in 10 s (the rate of increase is not to exceed 500 V/s in any case). The increase is to continue in this manner until the rms potential reaches 2000 V. If this level is reached without breakdown, the voltage is to be held constant at 2000 V for 60 s and is then to be reduced to near zero at the rate mentioned in (a) or (b) above. The cable from which the specimen was taken is not acceptable if breakdown occurs at less than 2000 V while the applied potential is being increased or decreased or in less than 60 s at 2000 V.

22.1 There shall be no additional covering (braid, wrap, jacket, or the like) on single-conductor wire of constructions A and B, over the jacket on a single conductor, shielded and jacketed construction, or over the PVC jacket on multiple-conductor cable, except that lubricant or a coating for color coding may be provided. Any coating or lubricant employed shall not flake off, reduce the ability of the wire or cable to comply with any of the flame tests mentioned in 16.1, or have any deleterious effect on equipment with which the wire or cable may be used. A paraffin coating is not acceptable.