



CABLE, LOW TENSION, CROSSLINKED ETFE INSULATED, TINNED SINGLE AND MULTIPLE CONDUCTOR

WSA-M1L130-A

1. SCOPE

The materials defined by this specification are either stranded insulated low tension wire, or twisted combinations of low tension wires. The combined wires (referred to as "cables" in this specification) may or may not have an overall jacket. The wire insulation system shall be suitable for continuous operation between temperatures of -65 to 150 °C, but capable with intermittent temperatures as high as 300 °C without damage.

2. APPLICATION

The products described by this specification are intended for use in automotive electrical systems and harnesses, especially in areas where mechanical toughness, temperature, fluids, and flex life areas are of concern.

3. REQUIREMENTS

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.4 CONDUCTOR

3.4.1 Conductor Material
(ASTM B 33, prior to bunching)

3.4.2 Conductor Elongation
(ASTM B 33, values per Table 1, prior to insulating)

3.4.3 Conductor Diameter
(ASTM D 3032, Section 15 optical method, values per Table 1)

3.4.4 The conductor area may be determined by measuring individual strand diameters and calculating the sum of the individual strand areas.

3.4.5 Conductor Resistance
(Table 1)

Date	Action	Revisions
2003 08 13	Revised	Para 3.0 inserted; Para 3.1, 3.2, 3.3, 3.21, 4 deleted
1994 01 06	NC00E10244447020	Revised Table I Resistance L. Mastrofrancesco
1991 12 09	NC00E101404840001	Released L. Mastrofrancesco

**3.5 FINISHED WIRE**

(Prior to twisting or combining with other wires)

- 3.5.1 The insulating material shall be a radiation cross-linked ethylene-tetrafluoroethylene (ETFE) extrusion. The surface shall be smooth and even without cracks, knots, blisters or other faults.
- 3.5.2 Dimensions
(ASTM D 3032, Section 15 and 16)
- 3.5.3 The color of the finished wires are per the Munsell Color Coding system and shall conform to Table IV. The following method shall be used to evaluate the color of the cables.

Comparison must be made by a person with normal or corrected vision, under cool white fluorescent lighting. The surface being inspected and the tolerance set must be in the same plane. Cable samples must be placed flat, overlapping the color standard. Color tolerance Reference Sets are available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

3.6 MULTICONDUCTOR CABLE (Finished Multiconductor)

- 3.6.1 When the grouped cables require an overall jacket, the jacket material shall be a radiation-crosslinked continuous extrusion of modified polyvinylidene fluoride (PVDF). The jacket surface shall be smooth and without cracks, knots, blisters or other faults. The grouped cables may be specified as twisted or not twisted in Table III.
- 3.6.2 Dimensions
(ASTM D 3032, Sec. 15 and 16, per Table III)
- 3.6.3 Tensile and Elongation
(ASTM D 3032, Sec. 17 using 25 mm jaw separation and bench marks, and a jaw separation speed of 50 mm/minute)
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|---------|-----------------------|----------|
| 3.6.3.1 | Tensile Strength, min | 27.6 MPa |
| 3.6.3.2 | Elongation, min | 200% |

3.7 FAULT TESTING OF THE COMPLETE DELIVERY (in process testing)

- 3.7.1 When pulling the grounded dry cable through the test electrodes connected to the test voltage, there must be no punctures. The test electrodes may consist of a coil, a metal tube, metal ball chains or any other type of suitable electrode.
- 3.7.2 Test Voltage 1.5 kVeff

The power supply shall be a transformer delivering a sinusoidal voltage. The electrode length and the frequency of the AC voltage shall be chosen, considering the speed of the cable running through the field of the electrode, so that each point of the cable shall be loaded by at least nine voltage cycles. If in place of a sinusoidal voltage unidirectional pulses are applied, there must be 18 pulses on each point of the cable.