

ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

COPPER WIRE, BATTERY CABLE - # 2 GAGE

ESF-M1L64-A

1. SCOPE

The material defined by this specification is a # 2 gage stranded, insulated battery cable.

2. APPLICATION

This specification was released originally for material used for battery starting cables on heavy duty installations.

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).

3.1 CABLE SIZE

The finished cable diameter shall not exceed SAE limits for type SGR cable.

3.2 CABLE QUALITY

Shall meet all the requirements listed herein and must be equal to the original approved samples.

3.3 CABLE CONSTRUCTION

The cable shall consist of 210 strands (nominal) of # 25 gage round wire layed in rope construction and served with 25.4 x 0.08 mm minimum paper or polyester film insulating tape with 12 ½% minimum overlap. Absolute minimum number of strands at any one time to be 203. No individual group is to contain more than 20% of the total strands. Optional construction of this cable shall allow 259 strands (nominal) of # 26 gage round wire. With 252 strands absolute minimum. Construction, serving and maximum strands per group are the same as previously described. Minimum area is 31.55 mm².

3.4 WIRE QUALITY

The conductor strands prior to stranding or bunching shall consist of bare ESF-M2L1-A, soft or annealed round copper wire.

Date	Action	Revisions
2003 04 25	Revised	Para 3.0 inserted; Para 3.9, 3.10, 3.11, 3.12, 3.13, 4 deleted
1991 01 31	DE00300107002086	Revised 3.3 & 3.6; std para added J. Huebner
1963 08 16	CTS4-58846-1	Released Orig./ s/ T.H. Meister

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3.5 INSULATION COLOR Black, unless otherwise specified on the engineering drawing

3.6 INSULATION QUALITY

The elastomer insulation must meet all basic SAE type SGR requirements and have nominal wall thickness of 1.42 mm.

3.7 RESISTIVITY AT 20 °C, max 451 $\mu\Omega/\text{m}$

3.8 PHYSICAL AND ELECTRICAL PROPERTIES

Three samples of cable are required. One for each of the high temperature, low temperature and oil absorption tests. All samples are subjected to the dielectric breakdown test at the completion of there respective tests. These samples 0.6 m in length with 25 mm of insulation stripped from both ends.

3.8.1 High Temperature Resistance No fracture or splitting of the insulation

Test Method: Suspend sample over a 254 mm mandrel with a 2.72 kg weight at each end. Soak at 121 +/- 2 °C for 120 h in a circulating air oven. Cool to 23 +/- 2 °C, remove the weight and bend the sample around the mandrel in a reverse direction at a rate not exceeding 1 turn per minute until a 180 ° bend is completed.

3.8.2 Low Temperature Resistance No fracture or splitting of the insulation

Test Method: Reduce temperature of a straight piece of sample to -34 °C at a rate not to exceed 68 °C per minute. Hold for 3 h and then wrap around a 254 mm mandrel for 180 s at a rate of 1 turn per 10 s.

3.8.3 Oil Absorption Resistance Cable dia shall not increase more than 15% nor shall the insulation fracture or split

Test Method: Immerse sample to within 38 mm from the end into a solution of 50% kerosene and 50% SAE 10W engine oil for 20 h at 49 +/- 2 °C. Wrap sample around a 254 mm mandrel for 180 s

3.8.4 Dielectric Resistance No rupture of the insulation

Test Method : Join exposed ends of sample and immerse loop to within 150 mm of ends in a 5% salt bath (salt content by weight at 27 °C). Soak 5 h and then apply 500 V (RMS) 60 cps (Hz) between sample conductor and salt bath for 1 minute.