

## ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

**BATTERY CABLE-FLEXIBLE**

**EST-M1L118-A**

### 1. SCOPE

The material defined by this specification is a stranded, insulated, flexible, copper wire, electrical cable.

### 2. APPLICATION

This specification was released originally for battery cables on heavy duty truck vehicles.

### 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 WIRE SIZE

The wire size shall conform to the American Wire Gage as described in ASTM B 258. The nominal solid diameter and corresponding nominal area are as noted in the following table.

| <u>Size</u> | <u>Diameter- mm</u> | <u>Area - mm<sup>2</sup></u> |
|-------------|---------------------|------------------------------|
| 4/0         | 11.68               | 136.52                       |
| 3/0         | 10.40               | 108.23                       |
| 2/0         | 9.27                | 85.86                        |
| 0           | 8.25                | 68.11                        |
| 1           | 7.35                | 54.00                        |
| 2           | 6.54                | 42.81                        |
| 3           | 5.83                | 33.95                        |
| 4           | 5.19                | 26.93                        |

#### 3.2 CABLE SIZE

The finished cable diameter shall not exceed that noted in the table of physical and electrical requirements Table I. The cable insulation shall have a minimum wall thickness not less than 70% of the nominal wall thickness listed in Table I.

| <b>Date</b> | <b>Action</b>  | <b>Changes</b>                                |
|-------------|----------------|-----------------------------------------------|
| 2003 05 15  | Revised        | Para 3.0 inserted; Para 3.10, 3.11, 4 deleted |
| 1989 01 23  | CHS2-RD253001  | Revised 3.10 Added 3.11, 4.0 Updated          |
| 1981 12 11  | PCR 881510-KPF | Released K. Gillis, B. Towle                  |

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**3.3 COLOR**

Black, unless otherwise specified on the engineering drawing.

**3.4 MARKING**

The cable shall be marked for identification and coded with colored marking ink. The color used shall be that assigned to a specific cable size. The marking shall occur every 200 mm in 5.56 mm high characters with no more than 125 mm between the finish of one marking and the start of another. The specific information to appear on each specific size of cable is listed below. Other sizes are to be determined.

4/0 gage green  
3/0 gage yellow  
2/0 gage blue  
1/0 gage orange

**3.5 INSULATION QUALITY**

The neoprene or synthetic rubber insulation shall meet all applicable requirements of SAE J1127 type SGR.

**3.6 WIRE QUALITY**

The individual strands of the conductor shall consist of ESF-M2L1-A soft or annealed bare copper wire.

**3.7 CABLE CONSTRUCTION**

The cable shall consist of a number of individual strands that are bundled and layed in rope construction. The overall diameter of the bundles shall be served with a paper, polyester or polyester/aluminum tape to facilitate stripping and to prevent corrosion of the conductors. The serving shall be applied either spiraled or parallel lapped. The number of bundles, minimum total strands, AWG size of the individual strand, and the total minimum area of all strands shall be as specified in the table of physical and electrical properties, Table I.

**3.8 RESISTIVITY**

The finished cable shall have a maximum resistance as specified in Table I and measured in accordance with ESF-M2L1-A.

**3.9 PHYSICAL AND ELECTRICAL PROPERTIES**

Four samples of cable are required. One sample for each of the high temperature, low temperature, oil absorption, and acid resistance tests. All samples must pass the dielectric resistance test of para 3.9.5 at the completion of their respective tests. All samples are 610 mm in length with 25 mm of insulation stripped from both ends except for the acid resistance test sample which shall be 1830 mm in length.