

## ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

**RESISTOR WIRE – ALTERNATOR**

**ESB-M2L45-A**

### 1. SCOPE

The material defined by this specification is an insulated, single strand cable made of high resistivity alloy.

### 2. APPLICATION

This specification was released originally for material used for assembling into automotive wiring harness assemblies as a precision resistor alternator warning lamp circuit component.

### 3. REQUIREMENTS

#### 3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

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

#### 3.2 INSULATION COLOR

Shall be specified on the engineering drawing.

#### 3.3 CONSTRUCTION

##### 3.3.1 Conductor

Shall consist of a single strand of #24 Awg (0.0201 in (0.511 mm) nominal diameter) alloy wire.

##### 3.3.1.1 Chemical Composition (nominal) (ASTM E 38)

|          |      |
|----------|------|
| Carbon   | 0.1  |
| Iron     | 72.3 |
| Chromium | 22.5 |
| Aluminum | 4.6  |
| Silicon  | 0.5  |

##### 3.3.1.2 Tensile Strength (ASTM E 21)

100,000 - 130,000 psi  
(690 – 896 MPa)

##### 3.3.1.3 Resistance (nominal) (ASTM B 63)

2.01  $\Omega$  /ft (6.59  $\Omega$  /m)

| Date       | Action  | Revisions                             |
|------------|---------|---------------------------------------|
| 2002 08 14 | Revised | Updated & Renumbered                  |
| 1978 11 27 |         | Metricated and Retyped CAH1-RD572066- |
| 1965 06 17 |         | Released AVI #941                     |

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3.3.2 Cable Insulation (Inner)

A nominal 0.037 in (0.94 mm) thick wall of chlorosulfonated polyethylene rubber. Shall be substantially concentric around the conductor. The material shall adhere closely to, but strip readily from the conductor leaving it reasonably clean and suitable for soldering.

3.3.2.1 Identification

On cables with secondary markings, the finished cable shall have "Resistor Wire - Do Not Cut or Splice" printed on the cable at 5.0 - 6.0 in (125 - 150 mm) intervals instead of the tracer (stripe, hash or dot) color as specified in the ES-DIAB-1274-AA specification. The paint shall be chlorosulfonated polyethylene. On solid color cables, the above note shall be printed using white chlorosulfonated polyethylene paint at 5.0 - 6.0 in (125 - 150 mm) intervals.

|       |                         |                                      |
|-------|-------------------------|--------------------------------------|
| 3.3.3 | Finished Cable Diameter | 0.089 - 0.099 in<br>(2.26 - 2.51 mm) |
|-------|-------------------------|--------------------------------------|

**3.4 INSULATION QUALITY**

|       |                                                                    |                     |
|-------|--------------------------------------------------------------------|---------------------|
| 3.4.1 | Tensile Strength, min<br>(ASTM D 412, speed<br>12 in (305 mm)/min) | 1600 psi (11.0 MPa) |
|-------|--------------------------------------------------------------------|---------------------|

|                 |       |
|-----------------|-------|
| Elongation, min | 250 % |
|-----------------|-------|

|       |                 |                               |
|-------|-----------------|-------------------------------|
| 3.4.2 | Dielectric Test | No rupture of the insulation. |
|-------|-----------------|-------------------------------|

Test Method: A specimen of the cable 24 in (610 mm) long shall be forced into a loop. One inch (25 mm) of the insulation shall be removed from each end of the wire and the ends twisted together. The loop thus armed shall be immersed in water containing 5 % salt by weight at 22 +/- 3 °C, so that no more than 6 in (152 mm) of each end of the specimen protrudes above the solution. After being immersed for 5 h, and while still immersed, the specimen shall withstand the application of 1000 volts (rms) at 60 Hz frequency, between the conductor and the water for 1 min.

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