



CABLE-LOW TENSION, POLYETHYLENE INSULATED - BARE		ESB-M1L85-A
CABLE-LOW TENSION, POLYETHYLENE INSULATED (THIN WALL) - BARE		ESB-M1L85-B
CABLE-LOW TENSION, POLYETHYLENE INSULATED (EXTRA THIN WALL) - BARE	NOT TO BE USED FOR NEW DESIGN	ESB-M1L85-C
CABLE, STRANDED (FLEXIBLE), LOW TENSION, POLYETHYLENE INSULATED (THIN WALL) BARE	NOT TO BE USED FOR NEW DESIGN	ESB-M1L85-D
CABLE-LOW TENSION, POLYETHYLENE INSULATED - TINNED		ESB-M1L86-A

1. SCOPE

The materials defined by these specifications are stranded flame retardant cross-linked polyethylene or ethylene copolymer-covered low tension cables. The covering shall have a maximum service temperature of 150 °C.

2. APPLICATION

These specifications were released originally for cables used for automotive electrical harnesses. The ESB-M1L85-D specification was released for the truck rear axle brake sensor jumper.

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

Shall be specified on engineering drawings and/or released according to the SAE wire size numbers appearing in Table Ia. Example #16 gage ESB-M1L85-A.

3.2 COLOR

The color of the flame retardant cross-linked polyethylene color shall be specified on the engineering drawing per the ES-D1AB-1274-AA Circuit description and Color Specification. The color shades shall be within the limits specified below (Reference Numbers per Color Association of the U.S., Inc.).

Date	Action	Revisions
2006 11 17	Revised	ESB-M1L85-C/D re-activated back to N-Status; Revised 2, Table 1b, Table III and Table IV R. Lord
2006 09 07	Revised	ESB-M1L85-C/D inactivated and removed; no replacement named R. Lord
1967 07 24	Released	AW1 # 1058



<u>Color</u>	<u>Nominal</u>	<u>Dark</u>	<u>Light</u>
Black	None	None	None
Brown	70107	70108	70106
Tan	70093	70094	70092
Red	70180	70082	70179
Orange	70072	70041	70071
Yellow	70205	70068	70067
Dark Green	70065	70066	70064
Light Green	70062	70063	70061
Dark Blue	70086	70087	70085
Light Blue	70143	70144	70142
Purple	70135	70164	70134
Gray	70152	70153	70185
White	70003	70004	None
Pink	70098	70099	70097

3.3 CABLE QUALITY

The materials shall meet all of the requirements listed herein and shall be equal to the original approved sample.

3.4 WIRE QUALITY

The strands of the conductors prior to stranding shall consist of the following:

ESB-M1L85	ESF-M2L1, soft or annealed copper round bare wire.
ESB-M1L86	ESF-M2L3, soft or annealed copper round tinned wire.

3.5 CABLE CONSTRUCTION

See Tables Ia & Ib

3.6 INSULATATION QUALITY

Shall be a good grade of flame retardant cross-linked polyethylene which will pass the following test requirements:

The material shall adhere closely to, but strip readily from, the conductors leaving them reasonably clean and in suitable condition for soldering.

Insulation thickness shall be in accordance with Table Ib for the various wire sizes and shall be determined by measuring the diameter over the insulation, then removing the insulation and measuring the diameter of the conductor. Half of the difference of the two measurements shall be considered as the average wall thickness. For any cross section of a test specimen, the minimum wall thickness shall not be less than 70% of the maximum wall thickness.



3.6.1 Mechanical Properties

Test specimens of insulation that have been removed from the conductor shall be used. The conductor may be stretched for greater ease in removing the insulation. The specimens may be tested as tubes, slit-tube forms, or as dumbbells. Each specimen shall have marks placed upon it 50 mm apart. The specimen shall then be stretched at the rate of 500 mm/min.

The tensile strength shall be calculated upon the original cross section of the test specimen before stretching. Testing shall be conducted at 25 ± 2 °C. Care should be exercised in cutting samples to obtain uniform cross section. The properties shall be as follows:

Tensile Strength, min	10.4 MPa
Elongation, min	200%

3.6.2 High Temperature Resistance

25 mm of the insulation shall be removed from each end of a 610 mm sample of the finished cable. The sample shall be suspended around a cylindrical mandrel having a diameter specified in Table II. Each end of the conductor shall have suspended from it, the weight shown in Table II. This condition shall be maintained for 120 h in a mechanical convection oven maintained at a temperature of 163 ± 3 °C.

When cool, the weight shall be removed from the specimen and it shall be taken off the mandrel, bent in the reverse direction around a mandrel of the diameter specified for the bend test in Table II at a rate not to exceed one complete turn/min and then be subjected to the dielectric test, para 3.6.3.

3.6.3 Dielectric Test

A specimen of the cable 610 mm long shall be formed into a loop. 25 mm of the insulation shall be removed from each end of the wire and the ends twisted together. The loop thus formed shall be immersed in water containing 5% salt by weight at 22 ± 3 °C, so that not more than 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 between the conductor and the water for 1 min without rupture of the insulation.

3.6.4 Oil Absorption Test (SAE J1128)

Except that the outside diameter of the cable shall not increase more than 15% when measured 4 h after removal from the oil. The sample shall then be bent around a mandrel (Table II) and checked for cracking; after the bend test, the cable shall be subjected to the dielectric test, para 3.6.3.