

ENGINEERING MATERIAL SPECIFICATION

Material Name	Specification Number
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CABLE, LOW TENSION - VINYL INSULATED - STRANDED, FLEXIBLE	ESA-M1L77-A
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1. SCOPE

The material defined by this specification is a stranded vinyl covered low tension flexible cable. The vinyl covering shall have a maximum service temperature of 85 °C.

2. APPLICATION

This specification was released originally for material used for automotive electrical wiring.

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 COLOR

The color of the vinyl cover shall be specified on the engineering drawing and/or release by a numerical suffix following the letter suffix of the material desired. The numerical color coding suffixes shall correspond to the following:

0 - Black	5 - Green
1 - Brown	6 - Blue
2 - Red	7 - Violet
3 - Orange	8 - Gray
4 - Yellow	9 - White or natural

The first color coding numerical suffix shall be the base or body color of the finished cable and the second number shall designate the tracer or other auxiliary marking.

3.2 CABLE CONSTRUCTION

See Table I

3.3 WIRE QUALITY

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

Date	Action	Revisions
2003 04 25	Revised	Para 3.0 inserted; Para 3.5 & 4 deleted
1981 10 07	CAL1-RD588050-7	Metricated and Retyped, Released by BEPE
1964 06 11		Release AS2-465

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3.4 INSULATION QUALITY

Shall be a good grade vinyl chloride copolymer 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.

3.4.1 Mechanical Properties (ASTM D 412 - Die "A" 12 in (305 mm)/min speed)

Standard laboratory test slabs shall be prepared by compression molding the thermoplastic material of the same composition and grade as used for the wire insulation.

Tensile Strength, min	1900 psi (13.1 MPa)
Elongation, min	125%

3.4.2 Dielectric Test

A specimen of the cable 24 in (610 mm) long shall be formed into a loop. One in (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 23 +/- 2 °C, so that not 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 V (rms) at 60 Hz frequency between the conductor and the water for 1 min without rupture of the insulation.

3.4.3 High Temperature Resistance

One in (25 mm) of the insulation shall be removed from each end of a 24 in (610 mm) sample of the finished cable. The sample shall be suspended around a cylindrical mandrel having a diameter of 6.5 in (165 mm). Each end of the conductor shall have suspended from it a weight of 1 lb (0.45 kg). This condition shall be maintained for 120 h at 120 - 122 °C in a circulating air oven.

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 6 in (152 mm) diameter at a rate not to exceed one complete turn/min and then be subjected to the dielectric test, para 3.4.2.

3.4.4 Oil Resistance

A specimen 24 in (610 mm) long shall be immersed to within 1.5 in (38 mm) from the ends in a mixture of equal parts of kerosene and engine lubricating oil at a temperature of 50 +/- 2 °C for a period of 20 h. The sample shall then be removed from the solution, examined for deterioration of the insulating compound, and gaged for swelling.