

ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

**CABLE, VINYL INSULATED, LOW TENSION,
STRANDED WIRE, TINNED**

ESF-M1L110-A

1. SCOPE

The material defined by this specification is a stranded, vinyl covered low tension cable. The vinyl covering shall be 105 °C classification. The individual strands are tinned together after stranding.

2. APPLICATION

This specification was released originally for material for the speed control.

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 QUALITY

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

3.2 CABLE CONSTRUCTION

SAE Wire Size	No. of Wires	Nominal Strand Size Awg	mm	Stranded Conductor Dia (approx) mm	Area of Conductor mm ²
20	10	30	0.25	0.91	0.507
20	7	28	0.32	0.91	0.507
21	7	29	0.28	0.81	0.428

3.2.1 Insulation Thickness (nominal)

SAE 20 Gage	0.43 mm
SAE 21 Gage	0.38 mm

Date	Action	Revisions
2003 04 29	Revised	Para 3.0 inserted; Para 3.5, 3.6, 3.7, 3.8, 3.9, 4 deleted
1991 10 28	DF00E00107002080	Inactivated ESF-M1L110-A2, updated A L.P. Rumao
1978 07 10	CF4H-MF828052	Released

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3.2.2 Finished Cable Diameter, max

SAE 20 Gage

1.78 mm

SAE 21 Gage

1.65 mm

3.3 INSULATION QUALITY

The insulation material 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.

Insulation thickness shall be in accordance with 3.2.1 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 wall thickness.

3.3.1 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 of 114 mm. Each end of the conductor shall have suspended from it a weight of 0.45 kg. This condition shall be maintained for 168 h at 135 - 137 °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 76 mm diameter at a rate not to exceed one complete turn/minute and then subjected to the dielectric test (para 3.3.2).

3.3.2 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 room temperature, 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 V (rms) at 60 Hz frequency between the conductor and the water for 1 minute without rupture of the insulation.

3.3.3 Oil Resistance

A specimen 610 mm long shall be immersed to within 38 mm from the ends in a mixture of equal parts of kerosene and engine lubricating oils 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.