

**TUBING, POLYOLEFIN – SELECTIVELY CROSSLINKED
HEAT SHRINKABLE****ESF-M3L65-A****1. SCOPE**

The material defined by this specification is a selectively crosslinked polyolefin tubing which will shrink to a predetermined size upon the application of heat in excess of 135 °C. The inner wall (nonirradiated) will melt and flow at temperatures above 135 °C to form a seal around the object to be insulated. The outer wall (irradiated) is nonmelting and possesses in elastic memory which causes it to reduce to the predetermined size when heated above 135 °C.

2. APPLICATION

This specification was released originally for material used where it is necessary to insulate and encapsulate a component such as in the distributor.

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 DIMENSIONS

As specified on engineering drawing
(see Table I)

Should be specified before shrink. For example, ¼ in tubing will be supplied at a minimum I.D. of ¼ in (6.4 mm). It will then free shrink to 0.080 in (2.03 mm) I.D. maximum, with a wall thickness between 0.041 – 0.053 in (1.04 – 1.35 mm). This tubing will shrink 10% longitudinally.

**3.2 SPECIFIC GRAVITY, max
(ASTM D 792)**

0.99

3.3 FLOW OF INNER WALL

No openings after
sealing

Test Method: Three 150 mm test specimens shall be conditioned for 3 min at 200 +/- 5 °C in an oven. Within 5 s after removal, approximately ¼ in (6.4 mm) of one end shall be lightly pressed together with a pair of needle nose pliers. Only sufficient pressure to completely close the opening is required. Remove specimens from the pliers and allow to remain at room temperature for 10 min. Return specimens to the 200 +/- 5 °C oven for 5 min. Remove and cool to room temperature. Upon examination there shall be no openings in the pressed portion.

Date	Action	Revisions
2003 07 24	Revised	Para 3.0 inserted; Para 3.8 & 4 deleted
1987 05 08	107002-14 CF4R 3.3 & 3.5	Revised Temperatures
1966 06 03		Released (was XF-M3LX13)

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3.4 HEAT SHOCK

Test Method: Three 100 mm specimens of tubing shall be conditioned for 4 h at 250 +/- 5 °C. After which there shall be no evidence of dripping, flowing or cracking of the outer wall.

3.5 COPPER CORROSION

No pitting or
blackening

Test Method: Three 150 mm specimens of the tubing shall be slipped over a straight, clean bare copper conductor. For 1/4 in. and smaller, a single conductor is adequate; for 3/8 in. and larger, several conductors shall be used, 18 AWG or smaller. The conductors should fit snugly in the tubing after shrinking. The specimens shall be conditioned for 16 h at 175 +/- 3 °C. When cooled to room temperature there shall be no evidence of pitting or blackening of the conductor under the tubing. A slight discoloration (normal oxidation) of the wires is permissible.

3.6 DIELECTRIC STRENGTH (ASTM D 876, short time)

20 kV/mm

3.7 LOW TEMPERATURE BRITTLINESS AT – 55 °C (ASTM D 876, 10 specimens, mandrel size specified in Table I)

No failure