



## HOSE, HIGH TEMPERATURE - LOW PRESSURE - OIL RESISTANT

ESA-M2D52-A

### 1. SCOPE

The material defined by this specification is a high temperature, oil resistant, low pressure hose.

### 2. APPLICATION

This specification was released originally for material used as a transmission oil cooler hose.

### 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 CONSTRUCTION

Shall be constructed of a high temperature, oil resistant, synthetic rubber tube. The tube shall be covered with a single fabric braid reinforcement, or a single fabric braid covered with a heat and ozone resistant rubber outer cover.

#### 3.2 ELONGATION AND CONTRACTION

+2 to -4%

(At 40 +/- 5 psi (276 +/- 34 kPa) working pressure)

#### 3.3 BURSTING STRENGTH

(ASTM D 380)

Must not burst below the minimum specified in Table I.

#### 3.4 TENSILE STRENGTH

(ASTM D 380, 1 in (25 mm)/min)

This requirement applies only when couplings are used with the hose. Assemblies must withstand a minimum pull as specified in Table I without the couplings pulling off or rupture of the hose.

#### 3.5 ADHESION, min

8 lb/in  
(1.4 kN/m)

Test Method: Measure the force of pull required to strip 1 in (25 mm) width of cover from the braid, as applied at right angle to the center line of the hose.

#### 3.6 VOLUME CHANGE, Inner Tube, max

+110%

(ASTM D 380, immersion in ASTM No. 3 oil for 70 h at 149 °C)

| Date       | Action  | Revisions                                      |
|------------|---------|------------------------------------------------|
| 2004 09 09 | Revised | Inserted 3.0; Deleted 3.11 & 4                 |
| 1979 12 17 |         | Metricated, Renumbered and Retyped after Rev A |
|            |         | CAJ2-822980-C6                                 |

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### 3.7 COLD FLEXIBILITY

No breaking or cracking

#### 3.7.1 As Received

Test Method: Condition hose assembly in a straight position at  $-40 \pm 1$  °C for 70 h. After conditioning and without removal from the cold box, bend the hose around a temperature conditioned mandrel, having a radius equal to the minimum bend radius as shown in Table I.

#### 3.7.2 Aged

Hose assembly shall be oil aged at 149 °C for 24 h. Oil aging medium shall be a Ford Motor Company approved automatic transmission fluid. The oil aged hose assembly, after cooling to  $23 \pm 2$  °C, shall be conditioned in a cold box in straight position at  $-40$  °C for 4 h. After conditioning and without removal from cold box, the hose assembly shall be bent around a temperature conditioned mandrel, having a radius equal to the minimum bend radius as shown in Table I.

### 3.8 IMPULSE, min

100,000 cycles

Test Method: Age the samples in a Ford Motor Company approved automatic transmission fluid at  $149 \pm 3$  °C for 70 h. The aged hose assemblies must withstand 100,000 cycles at the maximum working pressure listed in Table I without showing signs of deterioration.

### 3.9 OZONE RATING (FLTM BP 101-01)

Must meet  
ESB-M9P1-A

### 3.10 DETERIORATION

Hose assemblies shall be oil aged for 70 h at 149 °C. Oil aging medium shall be a Ford Motor Company approved automatic transmission fluid. The oil aged hose assemblies shall be subjected to the burst and tensile tests. The results of the tests shall average not more than 15% below the average of the original results. (para. 3.3 and 3.4)