



ENGINEERING MATERIAL SPECIFICATION

FLUOROELASTOMER (FKM), HIGH TEMPERATURE ROTATING SHAFT OIL SEAL

WSE-M2D391-A2

1. SCOPE

The material defined by this specification is a high heat and oil resistant fluoroelastomer rubber.

2. APPLICATION

This specification was released originally for material used for rotating shaft oil seals in engines.

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).

3.4 SLAB STOCK

3.4.1 Preparation of Test Specimens

All tests are to be performed on specimens die-cut from the molded test sheets manufactured from the same material and with equivalent cure to production parts. The test sheets shall have the following dimensions:

150 x 150 mm, min x 2.0 +/- 0.2 mm

3.4.2 Density
(ISO 1183, Method A/ASTM D 297) 1.95 - 2.01 g/cm³

3.4.3 Hardness, International
(ISO 48/ASTM D 1415) 65 - 75

3.4.4 Hardness, Durometer A
(ISO 868/ASTM D 2240, instantaneous,
plied-up specimen. Hand held durometers
shall not be used) 70 - 80

3.4.5 Tensile Strength, min
(ISO 37/ASTM D 412, Die C) 10 MPa

3.4.6 Elongation at Break, min
(Test Method according to para 3.4.5) 275%

3.4.7 Modulus at 100% Elongation, min
(Test Method according to para 3.4.5) 2.75 MPa

3.4.8 Tear Strength, min
(ISO 34, Method B, Procedure A,
ASTM D 624, Die C) 7.5 kN/m

Date	Action	Revisions
2004 09 16	Revised	Para 3.0 inserted; para 5 revised; 3.1, 3.2, 3.3, 3.10, 3.11 & 4 deleted
1990 04 03		Removed Modulus Requirements; NE01E10000474067
1989 05 01	Released	NE01-E-10000474-041



3.4.9	Brittleness Point, max (ISO 812, Type B specimen, ASTM D 2137, Method A)	-10 °C
3.4.10	Ozone Resistance, max (FLTM BP 101-01, Procedure A)	Rating 0
3.4.11	Compression Set, max (ISO 815/ASTM D 395, Method B, except 25% compression, plied-up Type 1 specimens, 70 h at 150 +/- 2 °C)	55%

3.5 HEAT AGED

(ISO 188/ASTM D 573, 150 +/- 50 air changes/h, 168 h at 150 +/- 2 °C)

3.5.1	Hardness, Durometer A Change	-1 to +5
3.5.2	Tensile Strength Change	-5 to +25%
3.5.3	Elongation Change	-30 to +5%
3.5.4	Visual Evaluation	

No surface tackiness or cracks when folded flat against itself.

3.6 HEAT AGED

(ISO 188/ASTM D 573, 150 +/- 50 air changes/h, 1,000 h at 150 +/- 2 °C)

3.6.1	Hardness, Durometer A Change	-1 to +5
3.6.2	Tensile Strength Change	-5 to +12%
3.6.3	Elongation Change	-42 to +5%
3.6.4	Visual Evaluation	

No surface tackiness or cracks when folded flat against itself.

3.7 IMMERSION IN OIL NO. 1

(ISO 1817/ASTM D 471, 168 h at 150 +/- 2 °C)

3.7.1	Hardness, Durometer A Change	-2 to +8
3.7.2	Tensile Strength Change	-2 to +10%
3.7.3	Elongation Change	-24 to +5%
3.7.4	Volume Change	-2 to +4%
3.7.5	Visual Evaluation	

No surface tackiness or cracks when folded flat against itself.

