



HOSE, REINFORCED FLUOROELASTOMER (FKM) RUBBER, OXYGENATED AND OXIDIZED FUEL RESISTANT, IN-TANK HIGH PRESSURE FUEL LINE

ESF-M96D22-A

1. SCOPE

This specification defines a reinforced fluoroelastomer (FKM) rubber hose with good resistance to oxygenated (alcohol modified) and oxidized (sour) fuels.

2. APPLICATION

This specification was released originally for in-tank fuel lines. The hose is for use where oxygenated and/or low oxidative stability fuels may be encountered.

3. REQUIREMENTS

Material specification requirements are to be used for initial qualification of materials.

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Standard Requirements For Production Materials (WSS-M99P1111-A).

3.4 HOSE CONSTRUCTION

The hose shall consist of a smooth bore tube of a suitable fluoroelastomer terpolymer reinforced with one ply of braided, knit, spiral or woven aramid fabric, and covered with a suitable fluoroelastomer rubber.

The following tests where possible, shall be performed on finished hoses and/or test specimens cut from them in accordance with ASTM D 3183 (cutting knife procedure preferred). Greater variation in test values can be anticipated when evaluating materials that are thinner than recommended by an applicable Industry Standard/Test Method.

3.5 ORIGINAL PROPERTIES

	Tube	Cover
Tensile Strength, MPa, min (ASTM D 412, Die C)	6.9	6.9
Ultimate Elongation, % min (ASTM D 412, Die C)	100	100
Modulus at 100% Elongation, MPa, min (ASTM D 412, Die C)	2.4	2.4

Date	Action	Revisions
2006 08 23	Revised	Inserted 3.0; Deleted 3.1, 3.2, 3.3, 3.26 & 4
2001 06 25	Revised	Updated
1988 09 15	Released	107002-185CF4S





	Tube	Cover
3.6 HEAT AGED (ASTM D 573, 70 h at 125 +/- 2 °C)		
Tensile Strength, MPa, min	6.9	6.9
Ultimate Elongation, % min	110	110
Visual Evaluation		
No surface tackiness or cracks when folded flat against itself.		
3.7 IMMERSION IN ASTM FUEL C (ASTM D 471, 48 h at 23 +/- 2 °C)		
Tensile Strength, MPa, min	6.9	6.9
Ultimate Elongation, % min	170	170
Volume Change, % max	+15	+15
3.8 IMMERSION IN INITIAL FILL UNLEADED GASOLINE (ESE-M4C89-) (ASTM D 471, 48 h at 23 +/- 2 °C)		
Tensile Strength, MPa, min	4.7	4.7
Ultimate Elongation, % min	125	125
Volume Change, % max	+10	+10
3.9 IMMERSION IN 90% ASTM FUEL C +10% ETHANOL (ASTM D 471, 48 h at 23 +/- 2 °C)		
Tensile Strength, MPa, min	6.9	6.9
Ultimate Elongation, % min	200	200
Volume Change, % max	+20	+20
3.10 IMMERSION IN 80% ASTM FUEL C +20% ETHANOL (ASTM D 471, 48 h at 23 +/- 2 °C)		
Tensile Strength, MPa, min	6.9	6.9
Ultimate Elongation, % min	200	200
Volume Change, % max	+20	+ 20
3.11 IMMERSION IN 95% ASTM FUEL C +5% METHANOL (ASTM D 471, 48 h at 23 +/- 2 °C)		
Tensile Strength, MPa, min	4.8	4.8
Ultimate Elongation, % min	175	175
Volume Change, % max	+30	+30

