



HOSE, LOW PRESSURE ENGINE OIL COOLER

WSS-M96D44-A

1. SCOPE

The material and construction defined by this specification is a low pressure hydraulic hose composed of a chlorosulfonated polyethylene or chlorinated polyethylene tube and cover (CSM/CPE) separated by one or more plies of braided polyester reinforcement.

2. APPLICATION

This specification was released originally for material used as coupled engine oil cooler hose assemblies. Hose assemblies shall be suited for 1.7 MPa (250 psi) sustained working pressure. The hose shall be designed to operate through a temperature range of -40 to +150 °C oil temperatures and an ambient air temperature of -40 to +125 with occasional excursions to +135 °C.

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 HOSE CONSTRUCTION

The hoses shall have a smooth bore synthetic elastomer inner tube free of visible particulates or other debris. The tube is to be heat and oil resistant. The reinforcement is to be one or more plies of braided synthetic fabric imbedded in and bonded between tube and cover and free of knots or other defects. The cover is to be a heat, oil, ozone, and abrasion resistant synthetic elastomer. The cover shall be non-blooming and black in color. The hose supplied with coupled, corrosion resistant, crimped metal end-fittings.

3.5 DIMENSIONS, mm

Nominal I.D.	Nominal O.D.	Tolerance I.D.	Tolerance O.D.
16.3	23.5	+/- 0.6	+/- 0.8

3.6 MATERIAL TESTING

Unless otherwise specified, the following tests shall be performed on specimens cut from the finished hose where required. Test specimens are to be prepared by mechanically separating the hose constituents using a "band-knife splitter" (preferred) or similar equipment. Alternatively, traditional stripping and buffing techniques may also be used. However, different methods of preparation may not yield comparable results. Therefore, whatever method is selected, it should be applied consistently.

When not feasible to use actual hose, specimens cut from molded test slabs manufactured from the same material with an equivalent cure process shall be used. The test slabs shall be 150 X 150 mm, minimum X 2.0 +/- 0.2 mm. The separated hose constituents or test slabs shall be die-cut using the appropriate ISO/ASTM specimen preparation dies described in the methods referenced.

Date	Action	Revisions
2006 09 13	Revised	Inserted 3.0; Deleted 3.1, 3.2, 3.3, 3.11 & 4
1998 06 22	Activated	



Documents

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**3.7 ORIGINAL PROPERTIES (Tube and Cover)**

3.7.1	Hardness, IRHD (ISO 48, Method A/ASTM D 1415)	70 +/- 5
3.7.2	Hardness, Durometer, Points (ISO 868/ASTM D 2240, Type A, Instantaneous)	70 +/- 5
3.7.3	Tensile Strength, MPa, min (ISO 37/ASTM D 412, Die C)	8.3
3.7.4	Elongation at Break, % min	150

3.8 AGED PROPERTIES

3.8.1	Heat Aged (Cover Only) (ISO 188/ASTM D 573, 168 h at 150 °C)	
	Hardness Change, degrees/points	+15
	Tensile Change, max %	-25
	Elongation Change, max %	-50
	Visual Evaluation	No surface tackiness or cracks when folded flat against itself
3.8.2	Immersion in IRM 903 Reference Oil (Tube Only) (ISO 1817/ASTM D 471, 168 h at 150 °C)	
	Hardness Change, degrees/points	-25
	Tensile Change, max	-50%
	Elongation Change, max	-55%
	Volume Change, max	0 to +55%

3.9 PERFORMANCE TESTS ON FINISHED HOSE ASSEMBLY

3.9.1	Proof Pressure Test (Coupled Hose) (ISO 1817/ASTM D 380/SAE J 1019)	
	No leakage as evidence by the appearance of a bead of water when hydrostatically evaluated at 3 MPa for 5 minutes.	
3.9.2	Burst Pressure at 23 °C (Coupled Hose), min (ISO 1402/ ASTM D 380/SAE J 1019)	16.0 MPa