



HOSE, REINFORCED RUBBER, FUEL/ALCOHOL RESISTANT NON-CONDUCTIVE, LOW PERMEATING >FKM/ECO/Barrier/ECO<

WSA-M96D33-A2

1. SCOPE

This specification defines a non-conductive, reinforced synthetic rubber hose with good resistance to fuel/alcohol permeability.

2. APPLICATION

This specification was released originally for fuel tank filler and vent hoses.

2.1 LIMITATIONS

Vapor lines can be either conductive or non-conductive. Liquid carrying lines must be conductive. This material does not contain UV stabilizers, long term exposure to direct sunlight will cause cracking. All components exposed to direct sunlight must contain UV stabilizers.

3. REQUIREMENTS

3.1 APPROVED SOURCES

This specification requires the use of approved sources. Only the sources identified on the Ford Approved Source List (ASL) can be used when this specification is listed on the drawing, CAD file, or other documents. The list of approved sources is located within Ford at www.mats.ford.com or available externally through a Ford Materials Engineer.

3.2 CONDITIONING AND TEST CONDITIONS

All test values are based on material conditioned for not less than 24 h prior to testing in a controlled environment of 23 +/- 2 °C and 50 +/- 5% relative humidity. Testing of the material should occur in the conditioning environment or soon after removal.

3.3 INFRARED SPECTROPHOTOMETRY AND/OR THERMAL ANALYSIS

IR spectra and thermograms from initial material approval shall constitute the reference standard and shall be kept on file at the designated material laboratory. The material supplier shall ensure that all future material supplied to the specification shall produce IR spectra and thermograms that correspond to the reference standard when tested under the same conditions.

3.4 INITIAL QUALIFICATION

Suppliers seeking approval to this specification must meet the initial qualification processes that include evaluating materials and constructions according to the applicable Fuel System Design Specification (SDS) and individual Design Verification Methods (DVM).

3.5 HOSE CONSTRUCTION

Date	Action	Revisions	Rev. 02
2016 11 23	Revised	See summary of revisions	A. Reaume/G. Kowalski, NA
2006 08 31	Revised	Inserted 3.0; Deleted 3.1,3.2,3.3,3.25 & 4	
1990 10 22	Released	NC00-E-10244447-008	



The hose shall consist of a smooth bore fluoroelastomer (70% fluorine) lined tube, an outer tube layer of epichlorohydrin rubber, one ply of braided knit, or spiral woven fabric, and an outer epichlorohydrin rubber cover.

3.6 ADDITIONAL REQUIREMENTS

Requirements beyond those explicitly stated in this document and the material specification may be specified on the Engineering drawing, Engineering specification (ES), performance specification, System Design Specification (SDS) and/or Attribute Requirement List (ARL).

3.7 PERFORMANCE CRITERIA

Materials approved to this specification must also be approved to the fuel system polymeric materials performance standard: WSS-M98P14-A2

		<u>Veneer</u>	<u>Tube</u>	<u>Cover</u>
3.7.1	Hardness Durometer A (ISO 868/ASTM D2240 Instantaneous, plied up Specimen. Hand held Durometers shall not be used)	65 – 75	65 – 75	65 – 75
3.7.2	Tensile Strength, MPa, min (ISO 37/ASTM D412, Die C 50 mm/minute test speed)	7.0	8.6	8.6
3.7.3	Elongation at Break, %, min (ISO 37/ASTM D412, Die C)	250	200	200
3.7.4	Modulus at 100% Elongation, MPa, min ISO 37/ASTM D412, Die C)	1.9	1.9	1.9
3.7.5	Heat Aged (ISO 188/ASTM D 573, 150 +/- 50 air changes/h, 168 h at 125 °C)			
3.7.5.1	Hardness Change, max	N/R	+20	+15
3.7.5.2	Tensile Strength Change, %, max	N/R	-10	-10
3.7.5.3	Elongation Change, %, max	N/R	-65	-50
3.7.6	Burst Pressure (ASTM D380)	Complete Construction		
	Hose Size(Approximate I.D.)			
	Below 9.53 mm			1.72 MPa, min
	9.53 – 15.87 mm			1.20 MPa, min
	15.87 mm and larger			0.34 MPa, min
		<u>Veneer</u>	<u>Tube</u>	<u>Cover</u>
3.7.7	Compression Set, % max (FLTM BP 108-6, 22 h at 120oC, 25% compression)	50	85	85

