



HOSE, REINFORCED RUBBER, FUEL RESISTANT, CONDUCTIVE, LOW PERMEATING, NBR OR HNBR TUBE/THV OR CPT/NBR/BARRIER/CM COVER

WSS-M96D33-A12

1. SCOPE

This specification defines a conductive, non-reinforce multi-layer composite hose with enhanced low permeation and good resistance to fuel blends containing methanol. The hose shall consist of an inner layer of NBR or HNBR tube, a barrier layer such as THV or CPT, an NBR layer, a reinforcement layer, and a CM cover. Reinforcement contains one or more plies of braided, knit, or spiral woven para-aramid fabric.

2. APPLICATION

This specification was released originally for liquid carrying fuel line hoses. Vapor management applications may be non-conductive but fill and fill vent applications must be conductive.

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 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.

3.6 HOSE CONSTRUCTION

Date	Action	Revisions	Rev. 01
2017 02 27	Revised	See summary of revisions	A. Reaume/G. Kowalski, NA
1999 06 25	Activated		C. Thomas, NA



The hose shall consist of a smooth bore, electrically conductive inner layer of NBR or HNBR tube, a barrier layer such as THV or CPT, an NBR layer, a reinforcement layer, and a CM cover. Reinforcement contains one or more plies of braided, knit, or spiral woven para-aramid fabric.

3.7 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).

3.8 PERFORMANCE CRITERIA

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

Complete Construction

3.8.1 Burst Pressure (ASTM D380)

Hose Size, (Approximate I.D.)

Below 9.53 mm	1.0 MPa min
9.53 – 15.87 mm	0.68 MPa min
15.87 mm and larger	0.34 MPa min

3.8.2 Compression Set (FLTM BP 108-6, 70 h at 100 °C, 25% compression)

75 %, max

3.8.3 Electrical Resistance (SAE J2260)

Surface resistivity
less than or equal to
 1×10^6 Ohms

3.8.4 Vacuum Collapse (SAE J30R11)

Test Method: For straight hose, a 1 m length of hose or the assembly shall be held in a straight line. On preformed parts, the vacuum collapse test shall be performed on the finished part. No diameter shall decrease by more than 20 % during the application of vacuum for a minimum of 15 seconds and not more than 60 seconds. Hose sizes as listed below shall be subjected to the corresponding vacuum pressure:

Complete Construction

Nominal hose ID <12.7 mm -81 kPa	20 % max
Nominal hose ID 12.7 to 19.0 mm -34 kPa	20 % max
Nominal hose ID >19.0 mm 10 kPa	20 % max

3.8.5 Ovality (Not applicable to hoses with I.D. greater than 16.28 mm, unless otherwise specified on engineering drawing)

75 % min

$$\text{Ovality} = \frac{\text{I.D. minimum}}{\text{I.D. maximum}} \times 100$$

3.8.6 Resistance to Kinking