



TUBING, POLYPROPYLENE, EXTRUDED, SEMI-RIGID

WSS-M99D70-A1

1. SCOPE

The material defined by this specification is polypropylene sleeve extruded over polyamide coated steel brake tubes.

2. APPLICATION

This specification was released originally for material used as a barrier coating for protecting brake tubes from environmental and mechanical damage.

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

Whenever possible, all test specimens shall be die-cut from the finished parts. When not feasible, specimen cut from molded test sheets manufactured from the same material and with equivalent cure to molded parts are recommended and need approval by Materials Engineering representative.

Unless stated otherwise, 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 FORMED PART DIMENSIONS

The sleeve material shall be fabricated from extruded polypropylene, it shall be homogeneous and essentially free from flaws, defects, pinholes, bubbles, seams, cracks, and inclusions.

3.3.1 Dimensions (ASTM D 2671) As specified on engineering drawing.

3.3.2 Longitudinal Change +/- 5% max
(100 mm sample as supplied, immerse in 125 +/- 2 °C glycol bath for 1 minute, cool and measure length.)

3.4 TENSILE STRENGTH AT MAXIMUM LOAD 11 MPa min
(ASTM D 638, 20 mm benchmarks, 200 mm specimen length, 200 +/- 20 mm/min test speed)

Date	Action	Revisions	Rev 00
2018 03 16	Released		



Documents

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- 3.5 ELONGATION AT BREAK** 300% min
(Test per paragraph 3.4)
- 3.6 HEAT AGED**
(ASTM D 3045, 24 h at 120 +/- 2 °C)
- 3.6.1 Tensile Strength at Maximum Load 11 MPa min
(Test per paragraph 3.4)
- 3.6.2 Elongation at Break 270% min
(Test per paragraph 3.4)
- 3.7 LOW TEMPERATURE FLEXIBILITY AT -30 °C** No cracks
Condition at -30 °C for 4 hours, bend tube 180 degrees around a mandrel with a 5X tube diameter radius. Examine for visible damage at maximum 10X magnification.
- 3.8 CONCENTRICITY**
Specimens of tubing, as applied, shall be measured for minimum and maximum wall thickness. Concentricity shall be calculated as follows:
- $$C = W_{min}/W_{max} \times 100\%$$
- Where:
Wmin = Minimum Wall Thickness
Wmax = Maximum Wall Thickness
- 3.8.1 Concentricity as Supplied 60% min
- 3.9 COLOR** Black or as specified on engineering drawing
- 3.10 DEFORMATION RESISTANCE** 60% min
Specimens of tubing, as applied, shall be placed in an oven at 140 +/- 2 °C for 10 minutes. After heating, load perpendicular to surface at 2 kg/cm for 5 minutes. Allow to cool in loaded condition. Calculate ratio of final wall thickness to original wall thickness.
- 3.11 IMPACT RESISTANCE** No cracks
Specimens of tubing, as applied, SAE J2260 Section 7.5, room temperature and -40 °C. Examine for visible damage at maximum 10X magnification.
- 3.12 ACID RESISTANCE** No cracks
Specimens of tubing, as applied, immerse six 100 mm samples in 35% by weight sulfuric acid at 50 +/-1 °C for 20 days. Examine for visible damage at maximum 10X magnification.