



Performance Testing of Engine and Transmission Oil Cooler Hoses

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This test procedure describes performance tests for engine and transmission oil cooler hoses.

1.2 Applicability. This test procedure is applicable to all engine and transmission oil cooler hoses.

1.3 Remarks. These tests shall be used to determine the performance properties of engine and transmission oil cooler hoses.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM D380

2.2 GM Standards/Specifications.

GMW16171

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment. See Section 4.

3.3 Test Vehicle/Test Piece. See Section 4.

3.3.1 Tests are to be conducted on hoses as supplied.

3.4 Test Time. See Section 4.

3.5 Test Required Information. See Section 4.

3.6 Personnel/Skills. Conform to GM and/or laboratory requirements. Technician training records must be available upon request.

4 Procedure

4.1 Preparation.

4.1.1 Test Sample Preparation. See 4.3.1 thru 4.3.6.

4.2 Conditions.

4.2.1 Environmental Conditions. The minimum time between manufacturing and testing shall be 72 h. The test pieces shall be maintained at a temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and $50\% \pm 5\%$ relative humidity for at least 24 h prior to test and shall be free from strain during this period.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Kink Resistance.

4.3.1.1 The test shall use a board or plate approximately 20 mm thick with whole (bore) diameter, center distance, and sample length as shown in Table 1.

4.3.1.2 Condition sample length of hose for 2°h at 20 °C to 27 °C.

4.3.1.3 Insert one (1) end of the hose into board with end flush with the opposite side of the board.

4.3.1.4 Carefully bend hose along its natural curvature and insert the other end carefully into the second hole until it projects 65 mm out of the other side.

4.3.1.5 After hose has been in this position for 5 minutes, insert a steel ball having diameter equal to one-half ($\frac{1}{2}$) the hose nominal inner diameter (ID) and attempt to roll this from one (1) end of the hose to the other.

Table 1: Dimension for Kink Resistance

Hose Size (Nominal Diameter)		Hose Sample Length (mm)	Test Fixture		
(mm)	Acceptable U.S. Standard Units (in)		Hole Center Distance (mm)	Hole Diameter (mm)	
				Minimum	Maximum
7.94	⁵ / ₁₆	275	25	15.5	16.0
9.53	³ / ₈	300	75	17.0	17.5
10.00	¹³ / ₃₂	300	100	19.5	20.0
12.70	¹ / ₂	300	100	21.0	21.5
15.88	⁵ / ₈	300	100	24.5	25.0

4.3.2. Hot Oil Burst Strength.

4.3.2.1 Test shall be conducted per ASTM D380.

4.3.2.2 Precondition the hose and burst test pressurization medium to 150 °C until equilibrated at that temperature.

4.3.2.3 While maintaining the hose and pressurization medium at 150 °C, increase the internal pressure of the hose until the hose bursts (loss of fluid).

4.3.3 Vacuum Collapse.

4.3.3.1 Immerse a 300 mm length of hose with the specified fluid, depending on the intended application, to completely expose both outer diameter (OD) and ID of the hose.

4.3.3.2 Expose immersed hose to 150 °C $\pm$ 2 °C for 70 h.

4.3.3.3 Return to room temperature for 30 minutes and drain fluid from the hose.

4.3.3.4 Insert a steel ball having a diameter equal to one-half ($\frac{1}{2}$) the tubing nominal inner diameter.

4.3.3.5 Assemble suitable end fittings on hose so that one end may be completely sealed against air leakage and the other end may be connected to a vacuum supply.

4.3.3.6 Subject hose for 15 s to 30 s to a vacuum of 88 kPa below atmospheric pressure or lower.

4.3.3.7 With vacuum applied and hose held in a straight position, attempt to roll ball from one (1) end of hose to the other.