



Performance Testing of Elastomeric Windshield Washer Tubing

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 the performance test requirements for elastomeric windshield washer tubing.

1.2 Applicability. This test procedure is applicable to all elastomeric windshield washer tubing.

2 References

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

2.1 External Standards/Specifications.

ASTM D380 ISO 188

2.2 GM Standards/Specifications.

9981293 9985670 GMW16503

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 tubing as supplied.

3.4 Test Time. See Section 4.

3.5 Test Required Information. See Section 4.

3.6 Personnel/Skills. Conform to company 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 through 4.3.5.3.

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.

4.3 Instructions. Procedures described by ASTM D380 shall be followed unless otherwise specified.

4.3.1.1 Conduct Hydrostatic Burst Test per ASTM D380.

4.3.2.1 Assemble a 300 mm sample of tubing with suitable end fittings such that one end may be completely sealed against air leakage and the other end connected to a vacuum pump.

4.3.2.2 Measure the outside diameter (OD_1) of the test specimen and subject the assembly to a vacuum of 88 kPa below atmospheric pressure for 5 minutes.

4.3.2.3 While under vacuum, measure the outer diameter of the tubing again (OD_2). Record the minimum diameter at the cross section of the tubing showing greatest collapse. Calculate OD collapse as follows:

- **OD Collapse** = $(OD_1 - OD_2)/OD_1 \times 100 =$ %

4.3.3.1 Bend a 300 mm long sample 90 degrees over a 40 mm diameter mandrel.

4.3.3.2 Record the average original OD (OD_1) and the minimum flattened diameter over the mandrel (OD_2). Calculate the OD collapse as follows:

- **OD Collapse** = $(OD_1 - OD_2)/OD_1 \times 100 =$ %

4.3.4.1 Assemble samples of tubing on nipples as shown in Appendix A; Figure A1.

4.3.4.2 Subject assemblies to oven aging at +125 °C for 70 h See ISO 188 for oven requirements.

4.3.4.3 After aging, visually examine tubing for cracks, breaks or other detrimental effects induced by the aging.

4.3.5.1 Preparation of Extract. Immerse 20 g sample of tubing in 200 ml of each of the mixtures in 4.3.5.1.1 through 4.3.5.1.2.

4.3.5.1.1 Mixture of 40% (by volume) distilled water and 60% GM Windshield Washer Fluid, 9985670, or 60% Methyl Alcohol 10120763.

4.3.5.1.2 Mixture of 40% (by volume) distilled water and 60% Isopropyl Alcohol, 9981293.

4.3.5.1.3 Reflux at boiling point for 24 h. Record boiling temperature.

4.3.5.2 High Temperature Staining. Cool extract to $+85\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

4.3.5.2.1 Place five (5) drops of the solution on a paint test panel.

Note: For painted panels, see GMW16503.

4.3.5.2.2 Air dry at room temperature for 24 h and examine. Report any staining with written description and photographs.

4.3.5.3 Room Temperature Staining.

Cool extract 1 h at room temperature to +20 °C + 25 °C.

4.3.5.3.1 Perform staining test and evaluation to 4.3.5.2.2.

5.1 Calculations. Calculate the results as defined in the respective tests.

5.2 Interpretation of Results. Note the results of each test and compare with the requirements in the respective material standard.

5.3 Test Documentation. With reference to this test procedure, the results shall be represented in a test report.