



Determination of Cantilever Sag Resistance

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 shall be used for determining the sag resistance of non-homogenous composite materials intended for interior applications.

1.2 Applicability. Interior trim of cars and trucks.

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3221

2.3 Additional References. None.

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.

3.2.1 Apparatus for conditioning to the appropriate requirements as described in GMW3221 Code A, unless otherwise specified in the relevant material specification.

3.2.2 A cantilever sag support apparatus (Appendix A, Figure A1) consisting of two (2) flat plates that can be held in place by hand tightened screws. Flat plates shall be able to hold in place 25 mm $\pm$ 1 mm depth, and minimum 50 mm in width (Appendix A, Figure A2).

3.2.3 Use a calibrated scale capable of measuring to 0.5 mm. Establish a reference point for measuring the sag.

3.2.4 Cutting die or shears for preparation of the test specimens.

3.2.5 Environmental chamber. Capable of maintaining the required temperature to within $\pm$ 3 °C.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time.

Calendar time: 2 d

Test time: 24 h

Coordination time: 48 h

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Test technician shall be qualified on the basis of appropriate education, training, experience, and/or demonstrated skills.

4 Procedure

4.1 Preparation. Test specimens shall be produced as directed in material specification or referring documentation. If not stated, sample material as in 4.1.1 thru 4.1.4.

4.1.1 If testing samples with an identifiable machine direction, cut specimens in the machine direction and perpendicular to the machine direction. If a machine direction cannot be determined, cut specimens in a chosen direction and a direction perpendicular to the chosen direction. The material specification may define that the separate specimens are required to be deflected in both directions.

4.1.2 The size of the test specimen shall be 75 mm ± 3 mm in width by 300 mm ± 3 mm in length.

4.1.3 For each condition, a minimum of three (3) test specimens from each direction shall be tested.

4.1.4 Unless otherwise specified in the relevant material specification, condition specimens for a minimum of 24 h to the requirements of GMW3221 Code A immediately prior to testing.

4.2 Conditions.

4.2.1 Environmental Conditions. Test within environmental chamber at 85 °C unless otherwise specified in the material specification.

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 The test specimen shall be secured between flat plates. Do not compress. Plates shall be level relative to each other; a shim of the material can be used to level the apparatus (Appendix A, Figure A2). Two (2) flat plates should be suspended by more than 100 mm for measurements and fully stable to handle specimen weight. Orient specimens as specified by material specification. Requirements may include appearance side on top or bottom, when mounting the specimen in the fixture.

4.3.2 Secure test specimen in cantilever sag fixture.

4.3.3 Place the assembly in the prescribed environment per the material specification and measure the height of the specimen opposite the secured end from the lowest point of the bottom edge of the specimen to the base of apparatus or fixed point. Record the value as initial height.

4.3.4 At the end of the environment, measure the height of the specimen opposite the secured end from the lowest point of the bottom edge of the specimen to the base of apparatus or fixed point. Record the value as final height.

4.3.5 Record the difference in height (sag) of the initial and final height measurements to the nearest 1 mm. If any specimen indicates a shape change as described in 5.3.2, do not include those results in the reported average for sag with the specimens that sag uniformly.

5 Data

5.1 Calculations.

$$\text{Sag} = \text{Initial Height} - \text{Final Height}$$

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation.

5.3.1 Report the sag for each individual test specimen and the average of each sample group.

5.3.2 Report any other change in shape of the test specimen other than sag (e.g., twist, bow, rise, etc.)