



## **Bowed Panel Test Method, Low Angle Stress**

### **1 Scope**

**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 standard describes a test procedure to determine the dynamic shear strength of double sided acrylic foam tape used for bonding moldings, claddings, wheel flares, etc., to approved current exterior automotive paint systems.

**1.2 Foreword.** Not applicable.

**1.3 Applicability.** All vehicles.

### **2 References**

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

#### **2.1 External Standards/Specifications.**

None

#### **2.2 GM Standards/Specifications.**

GMW14665

### **3 Resources**

**3.1 Facilities.** Not applicable.

**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** Panels with dimensions of 305 mm x 51 mm and no thicker than 1.65 mm. Panels shall be prepared from cold rolled steel (CRS) panels, painted on one side with the current exterior paint system, and from chromic acid etched anodized aluminum. Each test sample will require one painted substrate and one anodized aluminum substrate.

**3.2.2** Chromic acid etched anodized aluminum bar (per GMW14665 Type DET), 12.7 mm x 228.6 mm and 1.27 mm thick, fabricated from 24ST3 AA2024-T3 aluminum.

**3.2.3** Mechanical roller 6.8 kg (15 lb) weight.

**3.2.4** Bowed test fixture. See Appendix A.

**3.2.5** Aluminum bar centering guide.

**3.3 Test Vehicle/Test Piece.** Tape to be tested 12.7 mm width.

**3.4 Test Time.**

Calendar time: 2 to 5 days

Test hours: 1 to 72 hours

Coordination hours: Not applicable hours

**3.5 Test Required Information.** Not applicable.

**3.6 Personnel/Skills.** Not applicable.

## 4 Procedure

### 4.1 Preparation.

**4.1.1** All samples are to be conditioned at  $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  before and during testing unless otherwise specified.

**4.1.2** Clean the test substrates with a 1:1 mixture of isopropyl alcohol and distilled water. Wipe and dry thoroughly with a clean cloth or tissue.

**4.1.3** Apply tape non-liner side to anodized aluminum test bar.

**4.1.4** Roll one time with a 6.8 kg (15 lb) roller.

**4.1.5** Slide panel into the aluminum strap centering guide. This is used for alignment only. See Figure A1.

**4.1.6** Place aluminum strap in center of paint panel using the centering guide. Start at one end of the opening and guide the aluminum strap into place so that it lays flat against the guide.

**4.1.7** Remove guide and roll down with a 6.8 kg (15 lb) roller, down and back. (Two (2) passes.)

**4.1.8** Mark the paint panel on both sides at the end edge of the aluminum strap with a fine line marker. This line will be a reference point for measuring the length of the peel. See Figure A2.

**4.1.9** Condition the specimen for 24 h at  $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  or as requested in the specification.

### 4.2 Conditions.

**4.2.1 Environmental Conditions.** All samples are to be conditioned at  $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  before and during testing unless otherwise specified.

**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** Remove the side of the fixture with the red screws. Starting at the stop pin bend the panel and slide it under the lip of the remaining side. Make sure that it is firmly in place. Replace the side and start screwing it down tightly. Do both ends then the middle to hold the sample in place. Place the fixture in the rack provided and condition accordingly. See Figure A3.

#### 4.3.2 How to Take Measurements.

**4.3.2.1** Measurements should be taken before the test begins and after 1 h, 2 h, 4 h, 8 h, 24 h, 48 h and 72 h increments. All measurements should be recorded in a spread sheet. See Figure A4.

**4.3.2.2** Height is measured by determining the distance from the paint panel where the marks were placed to the bottom of the end of each aluminum strap. Using a metric (millimeter) ruler, place the ruler flat against the panel at each end of the bar on the mark referenced in 4.1.8, and measure the distance to the bottom of the aluminum bar. Record this measurement. See Figure A5.

**4.3.2.3** Peel length is measured from the end of each bar to the location where lifting of the tape from the paint panel begins. If no lifting occurs, record zero (0). If lifting occurs, slide the ruler into the gap and measure the distance from the beginning of the peel to the mark signifying the end of the aluminum bar. Any lifting is measured and marked. Cohesive failure (foam split) of the tape core is not measured or considered a failure. If cohesive failure has occurred, measure the distance from the onset of foam split to the mark signifying the end of the aluminum bar. See Figure A6.