



Shrinkage of Heat-Bonding Sheet-Form Materials

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 procedure describes a method for determining the shrinkage of materials during baking.

1.2 Applicability. This test procedure applies to sheet-form materials which are applied to the body on the paint shop sealer line and baked through the Primer Oven (traditional paint shops) or through the Sealer Oven (compressed process paint shops). Typical materials include floor pan vibration dampers and floor pan plug sealers. The shrinkage measured is that in the plane of the material only; thickness changes are not evaluated. The results obtained are for unrestrained shrinkage of the material and are not representative of values experienced in actual use when the material bonds to a restraining surface.

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.

None

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 Oven. Forced-air, circulating-type oven, capable of maintaining a set temperature within $\pm 3^\circ\text{C}$.

3.2.2 Measuring Scale. Measuring scale with 1 mm increments.

3.3 Test Vehicle/Test Piece. All dimensions are as specified below, unless otherwise specified or agreed upon by the GM approving engineer.

3.3.1 Test Material. Samples of the material to be evaluated, sufficient to make three (3) pieces, each 100 mm x 100 mm.

3.3.2 Release Agent. Use one of the following: Talcum powder or release paper.

3.3.3 Metal Panel. Electrocoated (ELPO) sheet metal panel large enough to fit three (3) test samples.

3.4 Test Time.

Calendar time: 1 day
 Test hours: 2 hours
 Coordination hours: 1 hour

3.5 Test Required Information. See 5.3.**3.6 Personnel/Skills.** Trained lab technician or test engineer.**4 Procedure**

4.1 Preparation. Cut three (3) samples, each 100 mm x 100 mm. Two (2) edges must be parallel to machine direction, and this orientation must be marked on each sample.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

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 Dust the ELPO panel liberally with talcum powder. Apply enough talcum powder so that the test samples remain totally unbonded from the ELPO panel through the bake process. Alternately apply release paper.

4.3.2 Place the test samples on the dusted panel and bake according to the material specification. If no bake is specified, use the appropriate maximum bake as specified in Table 1.

Table 1: Bake Conditions ^{Note 1}

Paint Shop Type	For Materials That Bake in This Oven	Use This Maximum Bake
Traditional Paint Shops	Primer Surfacer Oven Low Bake	90 minutes at 158 °C
	Primer Surfacer Oven High Bake	60 minutes at 180 °C
	Primer Surfacer Oven Powder Bake	60 minutes at 190 °C
Compressed Process Paint Shops	Sealer Oven	20 minutes at 163 °C

Note 1: All bakes are specified as times at metal temperature.

4.3.3 Allow to cool. Check that the samples are totally unbonded from the panel. If any bonding exists, repeat the baking process using new samples and a heavier dusting of talcum powder or a different release paper.

4.3.4 Measure the X (machine direction) and the Y dimensions of the baked samples. Make the measurements at the center of the sample. Sum the three (3) measurements in each direction: ΣX and ΣY .

5 Data

5.1 Calculations. Calculate the shrinkage in each (X and Y) direction:

- Percent (%) X Shrinkage = $((300 - \Sigma X)/300) \times 100\%$
- Percent (%) Y Shrinkage = $((300 - \Sigma Y)/300) \times 100\%$

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. Report the percent (%) shrinkage in the X (machine direction) and Y directions.