



Test for Stress Mark Susceptibility of Plastic 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 attempts to quantify the blush resistance of plastic materials (primarily used with polypropylene and related color concentrates). It establishes a Stress Evaluation Test (SET) number which can be used to predict blushing due to changes in pigment concentration.

1.2 Applicability. This test is intended for polyolefinic materials only.

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

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 Gardner Impact Tester (Catalog No. IG-1120MA, or equivalent).

3.2.2 Colorimeter (X-rite Color i5 Benchtop Spectrophotometer, or equivalent).

3.2.3 One grained color plaque for each lot of material to be evaluated. Thickness of plaque to be $3.2 \text{ mm} \pm 0.3 \text{ mm}$.

3.2.4 Felt marking pen.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time. Not applicable.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation. Not applicable.

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 Position the grained plaque with the ungrained side up and the smooth title block, if present, at the bottom. Mark the ungrained side of the plaque with a grid five squares by seven squares. The squares will be between 25 mm and 40 mm on each side depending upon the size of the plaque. Considering the first square to be in the upper left-hand corner, define squares 3, 9, 12, 14, 16, 27 and 31 (see Figure 1). The plaque will be marked on the ungrained side to allow the colorimeter readings to be taken on the grained side.

4.3.2 Calibrate the L scale on the colorimeter.

4.3.3 Take L scale readings on the seven predefined squares on the plaque.

4.3.4 Impact the preselected areas on the ungrained surface at the 2.26 J level using the Gardner Impact Tester. (Impact is to be performed at $21\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$.)

4.3.5 Allow the impacted plaque to rest for 4 h at $21\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ before the final evaluation.

4.3.6 Redetermine the L scale values on the seven areas within ten minutes after the 4 h aging period. Blush marks are time dependent and become worse with aging.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results.

- Find the difference of L scale readings for each square.
- Calculate the average of the L scale differences determined in step a. Requirements are located in material specifications.

5.3 Test Documentation. Report the average of L scale differences found in 5.2.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols.

SET Stress Evaluation Test

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:
Test to GMW17141

9 Release and Revisions

This standard was originated in March 2014. It was first approved by the Plastics Global Subsystem Leadership Team in March 2014. It was first published in March 2014.

Issue	Publication Date	Description (Organization)
1	MAR 2014	Initial publication.