



Panel Preparation for Evaluation of Yellowing of Clearcoat Systems

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 standard covers the requirements to determine yellowing of clearcoat systems for conventional, integrated three (3) wet topcoat technologies and powder systems, simulating several in-line repair (ILR) reprocesses according to specified conditions. This standard may also be used to assess clearcoats for plastic parts.

1.2 Applicability. Any clearcoat or clearcoat system.

1.3 Remarks. None.

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 Specifications.

Material Specification

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. Deviations must be agreed by the GM vehicle systems approving engineer.

3.2 Equipment.

3.2.1 Automated application unit (e.g., spraymation or similar).

3.2.2 Film build gauge (e.g., Elcometer 465 or similar).

3.2.3 Panel shears, sheet metal cutter, metal scissors or equal equipment.

3.2.4 Paint Bake Oven. Test technician must document oven type used (for testing performed in North America, gas-fired ovens shall be utilized.)

3.2.5 Oven monitoring equipment (thermocouples) Datapaq or equivalent.

3.2.6 Multi-angle spectrophotometer (e.g., MA 68, X-Rite or BYK-Mac.)

3.3 Test Vehicle/Test Piece.

3.3.1 Clearcoat material being tested.

3.3.2 Compatible color specific primer and solid white basecoat system.

3.3.3 Paint Panels. Electrocoated and size of 200 mm x 300 mm (8 in x 12 in). ACT brand or equivalent. Note: Over baked panels may cause yellowing so these electrocoated panels must be prepared at target bake. Plastic substrate plaques may include thermoplastic polyolefin (TPO), carbon fiber and sheet molded compound (SMC).

3.3.4 Tape for masking; approximately 12 mm (½ in).

3.4 Test Time. See 5.3.

3.5 Test Required Information. Reference the lab test procedure(s) in 4 Procedure for timing details.

3.6 Personnel/Skills. Test technician capable of performing test to meet requirements.

4 Procedure

4.1 Preparation. There are three (3) different test panels necessary for the evaluation. A fourth test panel may be required only if the technology specifically allows three (3) "free rides", which is when the test piece is processed through the topcoat process with no paint applied, i.e., baked only.

4.1.1 Panel One (1). Original equipment manufacturer (OEM)/original paint layer reference/control panel.

4.1.1.1 Obtain 200 mm x 300 mm (8" x 12") electrocoated panel baked at target bake.

4.1.1.2 For conventional topcoat technologies spray a layer of primer surfacer at the target film build and bake the panel in the paint oven at the target bake. For Integrated three (3) wet topcoat technologies do not apply primer. Bake the panel at the appropriate target sealer bake, consult the responsible GM paint engineer. Refer to 4.1.1.4 for basecoat primer (BCP) application.

4.1.1.3 Let the panel cool. Apply strips of masking tape according to Figure 1 (see Figure 1a or Figure 1b) for conventional topcoat. For integrated three (3) wet topcoat technologies three (3) strips of masking tape need to be applied to the ELPO surface per Figure 1 (see Figure 1a or Figure 1b).

4.1.1.4 Basecoat Application. For conventional topcoat technologies spray a layer of basecoat at the target film build then ambient flash off or apply a heated flash, refer to the responsible GM paint engineer for details. Remove one (1) of the masking tape strips. For Integrated three (3) wet topcoat technologies apply the BCP to target thickness and flash (heated or not) according to the technology and remove one of the tapes. Apply the basecoat at target thickness and apply a heated flash (remove the next tape).

4.1.1.5 Clearcoat Application (Wet or Powder Material). Apply a layer of clearcoat at the target film build and bake the panel in the paint oven at the target conditions. Remove the final tape.

4.1.1.6 Additional Baking. The panel in Figure 1 (see Figure 1a or Figure 1b) will be cut in half and Figure 1, (see Figure 1a or Figure 1b) Panel 1.2 will be baked again at target bake conditions (this extra bake is known as a "free ride" which is when the test piece is processed through the topcoat process with no paint applied, i.e., baked only). Figure 1, (see Figure 1a or Figure 1b) Panel 1.1 shall be retained as the reference/control panel.

Figure 1: OEM Reference/Control Panels. (See Figure 1a, Panel 1a and Figure 1b, Panel 1b)

