Interior Paint for Rigid Olefins

1 Scope

1.1 Material Description. The requirements listed in this specification must be met by all interior paint systems used in all GM vehicle interiors. Paint systems must follow the steps in Figure 1 to complete the paint approval process of a part.

Figure 1: Paint Approval Process of a Part

Note: APOPS = Approved Paint on Parts.

1.2 Symbols.

1.2.1 Paint Types. For a paint material approval, the paint system is required to be listed as approved in the GM Materials Approved Source List system. Paint systems approved to this specification shall be required to carry a type suffix to indicate the classification and the haptic feel that it has to the human skin. The suffix system shall be:

- Type C: Non-Haptic Paint, PGF Gloss Capable
- Type C(BC): Basecoat/Clearcoat
- Type D: Non-Haptic Paint, PGC Gloss Capable
- Type F: Satin Touch per GMHM012 Master, PGC Gloss Capable
- Type M: Metallic
- Type M(BC): Metallic Basecoat/Clearcoat

Type F haptic feel must be approved by the GM Design Quality Paint Development Lead prior to evaluating the paint system performance. Paint types with an assigned GM haptic master shall have all paint system performance testing (Table 1, Column 1A) reviewed by the region that originated the haptic master prior to GM Materials Approved Source List approval. After the system approval, color approvals are approved by any GM region.

1.3 Applicability. This specification covers requirements for an interior, waterborne or solventborne, one (1) or two (2) component paint system for use on parts made of paintable olefins including rigid thermoplastic polyolefins (TPO) and polypropylenes (PP). All substrates must be tested per GMW16172 to confirm paintability.

1.4 Remarks. TPO and PP substrates can be pretreated by priming, fluorination, chlorination, plasma, flame, etc. A single pretreatment is required to achieve initial paint approval. The initial paint approval shall be linked to the specific pretreatment as listed in the GM Materials Approved Source List. Additional pretreatments using the specific approved paint must be evaluated per Table 1, Column 1B and added to the comments section of the initial approval in the GM Materials Approved Source List. All new colors must be evaluated per Table 1, Column 2.

© Copyright 2016 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors Company
Provided by IHS Markit under license with General Motors Company
Reproduction, distribution or publication of these standards is expressly prohib
Licensee=/, User=,
Not for Resale,
Full document details: GMW GMW15520 2016

2 References

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

2.1 External Standards/Specifications.

ASTM D523	ISO 105-A02	ISO 2813	ISO 20433
ASTM D3763	ISO 2808	ISO 6603-2	

2.2 GM Standards/Specifications.

GMW3059	GMW14162	GMW14729	GMW15891
GMW3208	GMW14270	GMW14797	GMW16172
GMW3221	GMW14334	GMW14829	GMW16727
GMW3417	GMW14445	GMW15340	GMW16853
GMW14125	GMW14698	GMW15548	

2.3 Additional References.

- GMGA001 Darwin grain (available at www.thierry-corp.com)
- GMHM012 Master Plaque (available at www.thierry-corp.com)

2.3.1 Cleaners.

- Ammoniated Window Cleaner (North America)
- Armor-All (North America)
- Armor-All Protectant (North America)
- Fantastik (North America)
- Formula 409 (North America)
- Sonax Interior Cleaner 321200 (Europe)
- Sonax Stain Remover 653200 (Europe)
- Sonax Window Cleaner 338241 (Europe)

3 Requirements

3.1 Sample Conditioning. All samples are to be conditioned prior to each requirement test to GMW3221, Code B. Painted samples shall be subjected to all testing after a minimum aging period of 72 h following the baking or drying cycle.

3.2 Paint System Requirements. The paint system tested on the panels must be identical to the production intent paint system.

3.3 Sample Preparation and Identification. The plastic substrates and paint system shall be identified per 3.3.1 and 3.3.2.

3.3.1 Plastic Substrates. Use only substrates as defined in Table 1.

- Vendor
- Compound number

3.3.2 Paint System.

- Vendor
- Pretreatment type, primer name, or adhesion promoter name
- Paint formulation
- Processing conditions, including all reduction parameters, surface preparation, flash and cure times and temperatures and dry film thickness for each film of paint applied

3.4 Testing. Perform all testing as indicated in Table 1 and Table 2.

3.4.1 GM Confirmation Testing. For all Table 1, Column 1A Material Approvals (in addition to 3.4), three (3) panels per combination listed in Table 1 must be submitted for sunscreen and insect repellent resistance and resistance to fine scratching testing to be performed by GM Materials Engineering.

© Copyright 2016 General Motors Company All Rights Reserved

Documents
Document Sharing Hub

Copyright General Motors Company
Provided by IHS Markit under license with General Motors Company
Reproduction, distribution or publication of these standards is expressly prohib
Licensee=/, User=,
Not for Resale,
Full document details: GMW GMW15520 2016

3.4.2 Test Report. Use the appropriate table in Appendix A, Tables A1, A2, A3 and/or A4, to record all test results.

All testing to be completed on flat plaques unless noted as **Grain** in Table 2. Grained plaque testing to be done over GMGA001 Darwin grain. If GMGA001 is not available, consult with GM Materials Engineering for a similar regional animal grain with similar grain depth and a random pattern. Grained plaque testing is not required for Type M approvals.

Table 1: Required Testing Combinations

	Purpose:	Combinations to Test:	
Column 1A	Paint System Approval	Substrate: GMW15548 If Type C/D/M: Select 1 Resin If Type F: Select 3 Resins	Substrate: GMW15340 If Type C/D/M: Select 1 Resin If Type F: Select 3 Resins
		Colors: If Type D/F: Red and Blue Paint at Primary Gloss C (PGC) Gloss. If Type C: Red and Blue Paint at Primary Gloss F (PGF) Gloss If Type M: Nova Silver or Similar Bright Metallic Note: For Resistance to Fine Scratch, must also test Black Paint	
Column 1B	Additional Pretreatment Approval	GMW15548 Agreed Upon Color	
Column 2	Color Approval	Requested Color and Substrate	

Table 2: Testing Requirements

Test	Standard	Requirement	1A	1B	2
			Number Samples		
Film Thickness	ISO 2808	Paint supplier specify range Note 1. Report actual values of samples.	1 Note 2	1	1
Appearance	Visual check	No objectionable defects, must match standard	1 Note 2	1	1
Gloss	ISO 2813 or ASTM D523	Report 60° value	1 Note 2	1	1
Cure	GMW15891, 92% minimum denatured ethyl alcohol	Rating ≤ 1 for monocoats, Rating = 0 for base/clear	1 Note 2	1	1
Initial Adhesion	GMW14829, Method A	Rating ≤ 1	3 Note 2 Flat and Grain	3	3
Humidity	Perform the following cycle: 144 h per GMW14729, Recover 1 h at room temperature, perform GMW14829, Method A	Rating ≤ 1, No objectionable defects	3 Note 2 Flat and Grain	3	3
Oven Age + Humidity	Perform the following cycle: 168 h in Oven Note 3, Recover 1 h at room temperature, 24 h per GMW14729, Recover 1 h at room temperature, perform GMW14829, Method A	Rating ≤ 1, No objectionable defects	3 Note 2 Flat and Grain	3	3

© Copyright 2016 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors Company
Provided by IHS Markit under license with General Motors Company
Reproduction, distribution or publication of these standards is expressly prohib
Licensee=/, User=,
Not for Resale,
Full document details: GMW GMW15520 2016

Test	Standard	Requirement	1A	1B	2
			Number Samples		
Effects of Cleaners and Lotions	For each cleaner Note 4, apply ten (10) drops for 1 minute to paint at room temperature. Per ISO 20433, perform ten (10) double strokes of approximately 50 mm in length. Evaluate color transfer to the crock cloth and color change on the test plaque.	Rating ≥ 4 per ISO 105-A02	1 Note 2	N/A	1
Sunscreen and Insect Repellent Resistance	GMW14445 followed by GMW14698, 1 mm hemispherical tip, 8 N load **Type M Only**: 30 minutes after removal from oven, run 50 double strokes of **Color Crock** per ISO 20433 over exposed sunscreen exposed area	Rating ≤ 2 Note 5 For Scratch and **Color Crock** (Type M), no penetration of surface when evaluated with and without 10x magnification	3 Note 2 Flat and Grain	3	3
Color Crock	ISO 20433 Dry Rubbing Method, 10 double strokes	Rating ≥ 4 per ISO 105-A02	1 Note 2	N/A	1
Wear Resistance	GMW3208, CS-10 wheel, 500 g load, 1000 cycles per nominal 25 µm dry film build	No wear through to substrate or adverse effects. If primer used, no wear through to primer	1 Note 2	N/A	1
Scratch and Mar Resistance – Initial	GMW14698, 1 mm hemispherical tip, 13 N load	No penetration of surface when evaluated with and without 10x magnification. No obvious visually apparent marring	1 Note 2	1	1
Scratch and Mar Resistance - After Oven Age	168 h in Oven Note 3, Recover 1 h at room temperature followed by GMW14698, 1 mm hemispherical tip, 13 N load	No penetration of surface when evaluated with and without 10x magnification. No obvious visually apparent marring	1 Note 2	1	1
Resistance to Fine Scratching	For Types C/D/F Only: GMW14125, Appendix K, Record Gloss at 60° and 85°	Initial Gloss at 60°: ≤ 1.8 Gloss Units for Types D/F ≤ 4.0 Gloss Units for Type C Gloss Change at 85° ≤ 1.5 Gloss Units	3 Note 6	3	3
Perspiration Resistance	GMW14334, Method C followed by GMW14698, 1 mm hemispherical tip, 8 N load	Rating ≥ 4 to 5 per ISO 105-A02 No objectionable defects No penetration of surface when evaluated with and without 10x magnification	1 Note 2	N/A	N/A
Odor	GMW16853	See GMW16853	1	1 Note 7	N/A
Fogging	GMW16853	See GMW16853	1	1 Note 7	N/A
Emissions	GMW16853	See GMW16853	1	1 Note 7	N/A
Colorfastness to Artificial Light	GMW14162, Method D, 1240 kJ/m^2 or GME Only: GMW14162, Method B, 44 MJ/m^2	Delta E ≤ 3.0 No objectionable defects Rating ≥ 4 per ISO 105-A02 or GME Only: No objectionable defects Rating ≥ 4 to 5 per ISO 105-A02	3 Note 2	1	1

© Copyright 2016 General Motors Company All Rights Reserved

Documents Document Sharing Hub
Copyright General Motors Company
Provided by IHS Markit under license with General Motors Company
Reproduction, distribution or publication of these standards is expressly prohib
Licensee=/, User=,
Not for Resale,
Full document details: GMW GMW15520 2016