GM WORLDWIDE ENGINEERING STANDARDS	General Specification	GMW14797

Painted Plastic Parts Performance Requirements

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 organic surface coatings on plastic parts and components used for automotive exterior and interior applications on motor vehicles, for painted components within the engine compartment, and for exterior lighting hardcoat and anticondensation coating.

1.2 Applicability. This specification details the performance requirements for applied paints on plastic parts used for either exterior, interior, exterior lighting, or engine compartment applications on motor vehicles. This includes the laboratory test requirements for GM Approved Paint on Parts (APOPS), Validation Testing Complete (VTC), Production Part Approval Process (PPAP) approval, and processing conditions, for exterior and interior plastic painted automobile components.

1.2.1 APOPS Approval vs. PPAP Approval. Refer to Figure 1. Prior to producing parts in the production setting, a GM approved substrate and a GM approved paint is specified by GM on part drawings or otherwise to use in making the part. APOPS is intended as detailed review of a new combination of GM approved substrate, GM approved paint, and production paint process for a specific molder/painter. This is accomplished by the GM Materials Engineer with the supplier. An APOPS approval is documented with either:

1. Entry into the GM Materials Approved Source List, reference Section 7.
2. Approval document from GM to supplier.

Typically, the molder/painter may re-use the APOPS approval for an additional new part that has the same substrate/paint/paint process, however, the GM Materials Engineer may request an APOPS submission or additional testing at their discretion.

For new combinations of substrate/paint/painter, the APOPS data is often used for part (e.g., for exterior parts) or all (e.g., interior parts) of the VTC or PPAP submission. For exterior applications, the APOPS approval documentation is required prior to VTC. In all other cases, the APOPS approval documentation is required with the PPAP package. Reference PPAP Checklist, Appendix A, Table A12. APOPS approval is required to be completed by the VDC program milestone for interior applications, and prior to VTC for exterior applications.

1.2.2 Raw Material Approvals. This specification applies only to substrate and paint related materials that have been qualified and approved to the appropriate GM specifications.

1.2.2.1 Substrates. The substrate must be approved to the appropriate GM material specification. For previously unpainted substrates, substrate paintability may be demonstrated per GMW16172 (plaques or parts), or via APOPS testing to the appropriate table:

- Appendix A, Table A1 for exterior applications (including weathering of parts per Appendix A, Table A1).
- Appendix A, Table A2 for engine compartment applications.
- Appendix A, Table A3 for interior trim applications (including paint over chrome).

This plaque testing applies only to the demonstration of the ability of the substrate resin to be painted not the qualification of production parts for paint performance requirements.

1.2.2.2 Paints. Paints shall be approved to the appropriate GM specification. For exterior topcoat applications, GMW3005 requirements must be met for approval to the appropriate, e.g., 998XXXX paint specification. GMW17434 must be met for all new paint colors when applicable, as specified. For interior paints, the requirements of the applicable GMWXXXXX paint specification must be met.

© Copyright 2020 General Motors Company All Rights Reserved

Documents Document Sharing Hub

Copyright General Motors

Full document details: GMW GMW14797 2020

1.2.2.2.1 Paints Without GM Approval. In situations or regions where the paint approval process is new, GMW14797 requirements can be followed for APOPS testing on the part, and then the approval for the paint must be completed. The GM engineer shall work with the paint supplier to fulfill the requirements of GMW3005 for exterior topcoats, GMW17105 for primers for plastics, and the applicable GMWXXXXX for interior paints. The paint would then be approved by GM Engineering and listed in the GM Materials Approved Source List under the appropriate GM 998XXXX or GMWXXXXX specification. Additionally, in the APOPS approval for the part, it must be noted that the GM paint approval is in progress, and estimated date of completion must be included.

1.2.2.3 Processes/Combinations for Interior. If an APOPS with the specific paint, process (e.g., infrared (IR) cure vs. conventional cure), pre-treat (e.g., flame vs. adhesion promoter), and substrate by supplier and brand has never been documented (by any painter), then a representative plaque test set to Appendix A, Table A3 shall be executed prior to APOPS as soon as representative processes are available at the painter unless Materials Engineering determines it unnecessary. Visual evaluation of heat and humidity age testing shall be completed minimum 1 week after test to account for migratory additives.

1.3 Remarks. None.

2 References

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

2.1 External Standards/Specifications.

ASTM D3763	ISO 2808	SAE J1976	SAE J2527
IATF 16949	ISO/IEC 17025		

2.2 GM Standards/Specifications.

9984808	GMW3005	GMW14729	GMW17138
9984810	GMW3059	GMW14829	GMW17206
9984815	GMW14124	GMW15520	GMW17405
9984818	GMW14270	GMW15891	GMW17407
9984824	GMW14333	GMW15919	GMW17434
9984836	GMW14444	GMW16133	GMW17835
9984861	GMW14445	GMW16172	GMW17889
9984862	GMW14698	GMW16508	GMW17977
9984901	GMW14700	GMW16745	
9984904	GMW14701	GMW16746	
9984905	GMW14704	GMW17105	

2.3 Additional References.

- Datapaq systems available at; https://www.flukeprocessinstruments.com/en-us/products/thermal-profiling-systems/datapaq-oven-tracker-systems
- GM 1927 16b Painted Plastic Parts Process Worksheet available via GM SupplyPower portal; https://gmsupplypower.covisint.com/web/portal/home
- GM Approved Paint on Parts (APOPS) forms available via GM SupplyPower portal; https://gmsupplypower.covisint.com/web/portal/home
- Mitutoyo products available at; https://ecatalog.mitutoyo.com/Thickness-Gages-Series-7-Flat-Anvil-Type-Dial-Type-C1726.aspx

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 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.

© Copyright 2020 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors
Full document details: GMW GMW14797 2020

3.1.1.3 For APOPS Testing. All APOPS testing shall be performed in an accredited laboratory. Laboratory accreditations to ISO/IEC 17025 are acceptable.

3.1.1.4 For PPAP and VTC Testing. Tests performed outside of GM are to use a lab from an organization that is either third party registered to IATF 16949 or has laboratory accreditations to ISO/IEC 17025.

3.1.1.5 All testing is the responsibility of the GM supplier who applies paint to the parts in question.

3.1.2 Equipment. Not applicable.

3.1.3 Test Vehicle/Test Piece. Not applicable.

3.1.4 Test Time. Refer to applicable test methods.

3.1.5 Test Required Information. Not applicable.

3.1.6 Personnel/Skills. Refer to applicable test methods.

3.2 Preparation.

3.2.1 Bake. All bakes must comply with GM Paint approved bake charts for each specific product. GM Paint approved bake charts are those that have an approval signature of the responsible engineer at the bottom. These bake charts may be obtained from the paint suppliers.

3.2.1.1 For Exterior Grade Parts. All Thermoplastic Polyolefin (TPO) substrates must be processed using any of the following three options:

- **Option 1:** High-bake adhesion promoter + topcoat systems. The adhesion promoter (e.g., 9984808, 9984810, 9984818) is applied wet on wet and co-baked with an approved topcoat high bake system (e.g., 9984836, 9984861, 9984862) in accordance with the GM Paint approved bake chart.
- **Option 2:** Low-bake adhesion promoter + topcoat systems. The adhesion promoter (e.g., 9984905) is applied wet on wet and co-baked with an approved topcoat low bake system (e.g., 9984901, 9984904) in accordance with the GM Paint approved bake chart.
- **Option 3:** Flame treated + topcoat systems, low bake or flame treated + primer + topcoat systems, low bake. Flame treated (GMW16133) and bake with an approved topcoat (e.g., 9984836, 9984861, 9984862, 9984901, 9984904) or with an approved primer (e.g., 9984815, 9984824) plus topcoat (e.g., 9984836, 9984861, 9984862, 9984901, 9984904).

Deviations to any of the preceding must be agreed upon by GM Engineering.

3.2.1.2 Interior paint bake charts are stored in the GM Materials Approved Source List or held by the regional (GM Korea, GM China) Materials Engineer responsible for interior paint raw material approval.

3.2.1.3 Exterior Lighting: Ultraviolet (UV) Cure hardcoats for lenses must follow coating supplier recommended cure conditions and document cure wattage in submission package.

3.2.2 Additional Requirements for Exterior.

3.2.2.1 Reprocessing. Defined as running a previously finished part through the Original Equipment Manufacturer (OEM) process. The reprocessing must agree with the Material Data Sheet and recommendation from the Paint Material Supplier. The following must be followed at a minimum for all part reprocesses.

3.2.2.1.1 All reprocessed parts must meet all the requirements stated in this specification and all other specifications and requirements listed on the engineering drawing.

3.2.2.1.2 Sanding to substrate is not allowed for any substrates except for a sheet molding compound (SMC) and Carbon Fiber. Sanding is allowed on the topcoat system to remove surface imperfections or defects. Documentation of sanding process is required.

3.2.2.1.3 Clearcoat over Clearcoat and Adhesion Promoter over Adhesion Promoter is not permitted. Clearcoat may be applied over clearcoat only on components made with carbon fiber exposed weave.

3.2.2.1.4 Topcoats and color keyed or color specific primers are to be repaired with the same OEM or two-tone color only, specified by the GM color code number, for example WA6502 (i.e., white over white, red over red, etc.)

3.2.2.1.5 The maximum number of reprocess applications is two for primer and two for topcoat as given in Table 1.

© Copyright 2020 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors
Full document details: GMW GMW14797 2020

Table 1: Reprocessing Requirements

Paint Layer	Number of OEM Applications	Maximum Reprocess Applications	Maximum Number of Bakes	Maximum Total Film Build (of Given Paint Layer)
Primer	1	2	3	100 µm (4 mil)
Topcoat	1	2	3	225 µm (9 mil)
Total	2	4	6	325 µm (13 mil)

Note: µm = micrometer, mil = thousandth of an inch.

3.2.2.1.6 A part may see a total of six heat cycles in paint and a total of seven heat cycles including post-cure.

3.2.2.1.7 All film builds must meet the minimum requirements specified on the engineering drawing and the maximum requirements given in Table 2 unless otherwise specified.

Table 2: Maximum Film Builds

Layer	Maximum Film Build
Primer	100 µm (4 mil)
Topcoat	225 µm (9 mil)

3.2.2.2 Spot repair is not a GM approved process for painted parts (except for SMC and Carbon Fiber components).

3.2.2.2.1 Unless otherwise agreed, SMC must be repaired to meet the requirements in GMW17835. The repair process for Carbon Fiber components needs to be reviewed and approved by GM Materials Engineering.

3.2.3 For Interior Reprocessing. Defined as running a previously finished part through the OEM process. The reprocessing must agree with the Material Data Sheet and recommendation from the paint material supplier.

The following must be followed at a minimum for all part reprocesses:

3.2.3.1 The maximum number of reprocess applications is one for primer and one for topcoat.

3.2.3.2 All reprocessed parts must meet all the requirements stated in this specification and all other specifications and requirements listed on the engineering drawing.

3.2.3.3 Sanding to substrate is not allowed. Sanding is allowed on the topcoat system to remove surface imperfections or defects. Documentation of sanding process is required.

3.2.4 Exterior Lighting: Reprocess of lenses is not permitted.

3.2.5 For Exterior Components with Paint Over Chrome. Components that are chrome plated and subsequently painted must meet the requirements of GMW17206.

3.2.6 For Interior Components with Paint Over Chrome. Components that are chrome plated and subsequently painted must be painted with a topcoat that is approved to GMW17889. Paint over chrome parts require Appendix A, Table A3 testing for APOPS. A paint over chrome APOPS approval may be re-used for an additional new part that has the same substrate/chrome plate color/chrome plate process/paint/paint process, however, the GM Materials Engineer may request an APOPS submission or additional testing at their discretion. A change of chrome color requires a new APOPS.

3.2.7 Exterior Processing Requirements. Supplier to meet paint processing requirements per GMW17407. If there are any GMW17407 deviation forms for the paint process, forms must be included with the APOPS submission. Specification requirements and forms can be obtained through GM Supplier Quality Engineering. GM 1927 16b Painted Plastic Parts Process Worksheet can be obtained through GM SupplyPower.

3.2.8 Interior Processing Requirements. Supplier to meet paint processing requirements per GMW17977. Supplier must have equipment to mix at the nozzle for 2K system paints. Hot potting is not allowed. If there are any GMW17977 deviation forms for the paint process, forms must be included with the APOPS submission. Specification requirements and forms can be obtained through GM Supplier Quality Engineering. GM 1927 16b Painted Plastic Parts Process Worksheet can be obtained through GM SupplyPower.

© Copyright 2020 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors
Full document details: GMW GMW14797 2020

3.2.9 Part Mapping for Film Build (Interior and Exterior Applications). Prior to APOPS and following successful painted part audit with GM Supplier Quality, for each new painted part geometry, a detailed part mapping shall be completed. Part mapping will include paint thickness measurements of all significant locations over the entire surface of the painted part. The part mapping and paint thickness measurements shall be reviewed with Materials Engineering. Upon review, a minimum of four p-points shall be selected. For small parts that are < 10 cm × 10 cm, less than four p-points may be acceptable upon review with Materials Engineering. Ensure that paint thickness is measured in areas of concern, including edges with a sharp radius, recessed areas of the part, and areas on the part which would interface with other components.

3.3 Conditions.

3.3.1 Environmental Conditions. Not applicable.

3.3.2 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.

- Tests shall be conducted using the latest issue of the test procedures indicated.
- Unless otherwise specified, painted samples shall be subjected to the testing after a minimum aging period of 72 h following the baking or drying cycle. A shorter aging period may be used, provided it is recognized that this represents a more severe condition of test and that results obtained at different aging times under 72 h are not a good basis for comparing the relative performance characteristics of paint finishes.

3.4 Instructions. Figure 1 depicts the APOPS approval process. Parts furnished for APOPS approval shall meet the test requirements as shown in the appropriate table for the component application.

3.4.1 Component Testing/APOPS - for Painted Exterior, Painted Interior, Painted Engine Compartment Components, and Coated Lighting Components. Component testing is to be performed for the production part per Appendix A, Table A1 for exterior, Appendix A, Table A2 for engine compartment components, Appendix A, Table A3 for interior trim components (including paint over chrome) and Appendix A, Table A4 and A5 for lighting components. This testing is required for APOPS approval. Each molder/painter must have APOPS approval for each combination of substrate/paint/paint process. Once the molder/painter has APOPS approval for a given combination of substrate/paint/paint process, this approval may also be used for other components that use the same combination of substrate/paint/paint process. If any changes are made in the substrate, paint, or paint process, APOPS testing on components must be repeated and reviewed with the appropriate GM Engineer. Additionally, VTC test requirements and PPAP test requirements must be completed for each unique part.

Note: These requirements as well as testing of new colors for annual color changes with existing approved APOPS are reviewed by the GM Supplier Quality Engineer not the GM Materials Engineer.

3.4.1.1 All specimens for testing must be obtained from parts that have been molded, painted and processed using the same equipment, tools, materials, processing conditions and manufacturing locations that will be used to manufacture production parts for vehicle assembly. If production part has a grained surface, then parts tested for APOPS must also be grained. If regrind is allowed, all specimens for testing must be obtained from production parts that are made from the maximum allowable regrind as stated on the drawing.

3.4.1.2 Each test must be completed on a minimum of three samples, each obtained from separate parts (except fascia systems, SMC body panels, and Carbon Fiber components, see 3.4.1.3). For interior, the intent is that the entire painted part meets the requirements of Appendix A, Table A3 including unique features in a larger integral part (e.g., HVAC vanes in an instrument panel (IP) topper). Consult materials engineer for areas that do not meet minimum size and shape requirements for adhesion testing.

3.4.1.3 For fascia systems, SMC body panels, and carbon fiber components, triplicate samples need not be obtained from three separate parts due to the size and cost of the parts. In this case, three samples may be taken from different locations on the same part. See Figure 2 for example of testing locations. Since parts vary in design, see responsible GM Materials Engineer if assistance is needed in choosing the locations.

3.4.1.4 For Exterior, testing shall be performed in two colors: White and Light Metallic for original non-repaired parts. If the color palette contains a Tricoat (such as Bright White Diamond), that color must be tested in addition to the two standard colors. If the two standard colors are not contained in the color palette, the GM Materials Engineer may approve substitutions.

3.4.1.4.1 Testing to Appendix A, Table A1 must also be performed on a reprocessed part in White only. For General Motors North America (GMNA), test on a part that has seen two primer reprocesses and two topcoat

© Copyright 2020 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors
Full document details: GMW GMW14797 2020

reprocesses. (Example: primer-bake, topcoat-bake, primer-bake, topcoat-bake, primer-bake, topcoat-bake; six paint layers). If white is not contained in the color palette, use the color with the highest film build.

3.4.1.5 For Interior, testing shall be performed in each production color for the application.

3.4.1.6 All bakes are to be those of the production system and must fall within the GM Paint approved bake charts for each layer.

3.4.1.7 All coating thicknesses must be in accordance to material requirements as specified on the part drawing notes or in the math file. All coating thicknesses must be measured and reported. For Interior, film thickness testing must be conducted first. If results do not meet specified limits, do not proceed with further testing. New parts must be painted that meet film thickness requirements.

3.4.1.8 Exterior parts which are source primed and subsequently top coated at assembly plants, shall be capable of accepting the topcoat paint system and meeting the requirements specified with both prime only and with both topcoat and prime. See responsible GM Materials Engineer to confirm test requirements for APOPS on primed parts and to determine the number of parts to be top coated and to coordinate the top coating of the parts in the assembly plant.

3.4.1.9 When this testing is completed, the tested specimens cut from the parts and test report will be reviewed by the responsible GM Materials Engineer and entered into the APOPS database.

Note: Full APOPS approval may be given at this time depending on test results.

3.5 Data. Not applicable.

3.6 Safety.

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

3.6.1 Suitable precautions should be taken to ensure that applicable safe limits are not exceeded when conducting test procedures, processes and/or handling the materials required by this specification.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to other product/process, and to apply for a new release.

Unless otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Changes in Processing. After the initial APOPS has been established, any change in processing parameters as recorded on Appendix A, Table A6 or A7, requires evaluation with the responsible GM Materials Engineer. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release and/or APOPS approval.

3.7.2 Test Results. Test reports shall be written per the Requirements for Test Report in ISO/IEC 17025. Additionally, a test report that contains all of the requirements listed in 3.7.2.1 thru 3.7.2.17 shall be submitted to the GM Materials Engineer (reference Appendix A, Table A13).

Note: Electronic versions of APOPS forms can be found through GM SupplyPower.

3.7.2.1 Appendix A, Table A11A, A11B or A12 APOPS Request Form(s).

3.7.2.2 A copy of the Registration or Scope of Accreditation for each test facility that provided data.

3.7.2.3 Appendix A, Table A6 or A7, completed and signed by paint facility management. Enlarge as required or download form from GM SupplyPower.

3.7.2.4 Appendix A, Table A8, A9 or A10, completed (Appendix A, Table A8 for Exterior, Appendix A, Table A9 for Interior or Appendix A, Table A10 for Underhood). Enlarge as required or download form from GM SupplyPower. A subset of the tests on this form may be used to report VTC and/or PPAP data.

© Copyright 2020 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors
Full document details: GMW GMW14797 2020

3.7.2.5 Copy of material requirements as listed in part drawing notes from the latest print or math file.

3.7.2.6 Signed documentation of the percent regrind on parts tested.

3.7.2.7 Datapaq systems or equivalent indicating part surface temperature versus time for all paint bakes including post-cure.

3.7.2.8 Schematic indicating the location of part where Film Build was taken. This includes reprocessed parts.

3.7.2.9 Paint film thickness per ISO 2808.

3.7.2.9.1 Paint Film Thickness for Exterior Components. Measure a minimum of four areas on each part and report each measurement, in accordance with p-points as agreed to with GM Materials Engineering (see 3.2.9). Report the thickness of each paint layer (i.e., primer, basecoat, clearcoat). More than four areas may be required due to part design.

3.7.2.9.2 Paint Film Thickness for Interior Components. Measure a minimum of three areas on each part and report each measurement, in accordance with p-points as agreed to with GM Materials Engineering (see 3.2.9). Report the thickness of each paint layer (i.e., primer, basecoat, clearcoat). More than three areas may be required due to part design. See Appendix A, Table A3, Note 8 for details on how to measure film build.

3.7.2.9.3 Paint Film Thickness for Underhood Components. A minimum of three parts in a minimum of three locations per part, dependent upon part size, shall be measured (if not using a shim). Individual measurement locations will be indicated with a schematic as well as individual readings and the average of the measurements shall be reported. See Appendix A, Table A2, Note 3 for details on how to measure film build.

3.7.2.10 GMW17434 film build chart for each coating (if applicable, in accordance with part drawing notes or math file). Not applicable for Interior coatings.

3.7.2.11 A GM approved and signed bake chart for each coating.

3.7.2.12 Schematic indicating the location on the part from which the test plaques were obtained. See Figure 2 for example of a fascia system/schematic. See Figure 3 for example of exterior surface crosshatch.

3.7.2.13 White parts reprocess twice for reprocess validation. Not applicable for interior coatings.

3.7.2.14 Signed documentation of the reprocess procedure used by the painted part supplier.

3.7.2.15 Signed documentation of the sanding process procedure used by the painted part supplier.

3.7.2.16 Tested parts, adhesion tapes, and cure cloths for review by the responsible GM Materials Engineer (see 3.3). Additionally, for interior applications, film build mylars are also required.

3.7.2.17 All tested samples shall be retained by the supplier for review by the appropriate GM Materials Engineer at least until APOPS approval is obtained.

4 Requirements and Procedure

4.1 Component Testing/APOPS. See 3.4.1. Perform testing on components as indicated in the appropriate table.

4.2 PPAP. Reference PPAP Checklist, Appendix A, Table A14.

4.2.1 Exterior Components. A printout of the APOPS approval will be required for VTC. If a new part has the same substrate, paint, paint process, molder and painter as a previous part that is already APOPS approved (i.e., only geometry is unique), then only VTC testing per Appendix A, Table A1 is required, and a printout of the previous part's APOPS approval will be required for VTC.

4.2.2 Interior Components. Perform testing on all program colors as indicated in Appendix A, Table A3 for components unless otherwise noted by the GM Materials Engineer (additional testing may be required). A printout of the APOPS approval will be required with the PPAP package. If a new part has all the same colors, substrate, paint, paint process, molder and painter as a previous part that is already APOPS approved (i.e., only geometry is unique), see GM Materials Engineer for direction as to whether Appendix A, Table A3 or Quality Control testing per GMW17977 is required for PPAP with a printout of the previous part's APOPS approval. All new colors on an existing geometry not previously APOPS reviewed require Appendix A, Table A3.

Note: Testing for Appendix A, Table A3 or Quality Control testing per GMW17977 for new colors and new geometries with existing approved APOPS are reviewed by the GM Supplier Quality Engineer not the GM Materials Engineer.

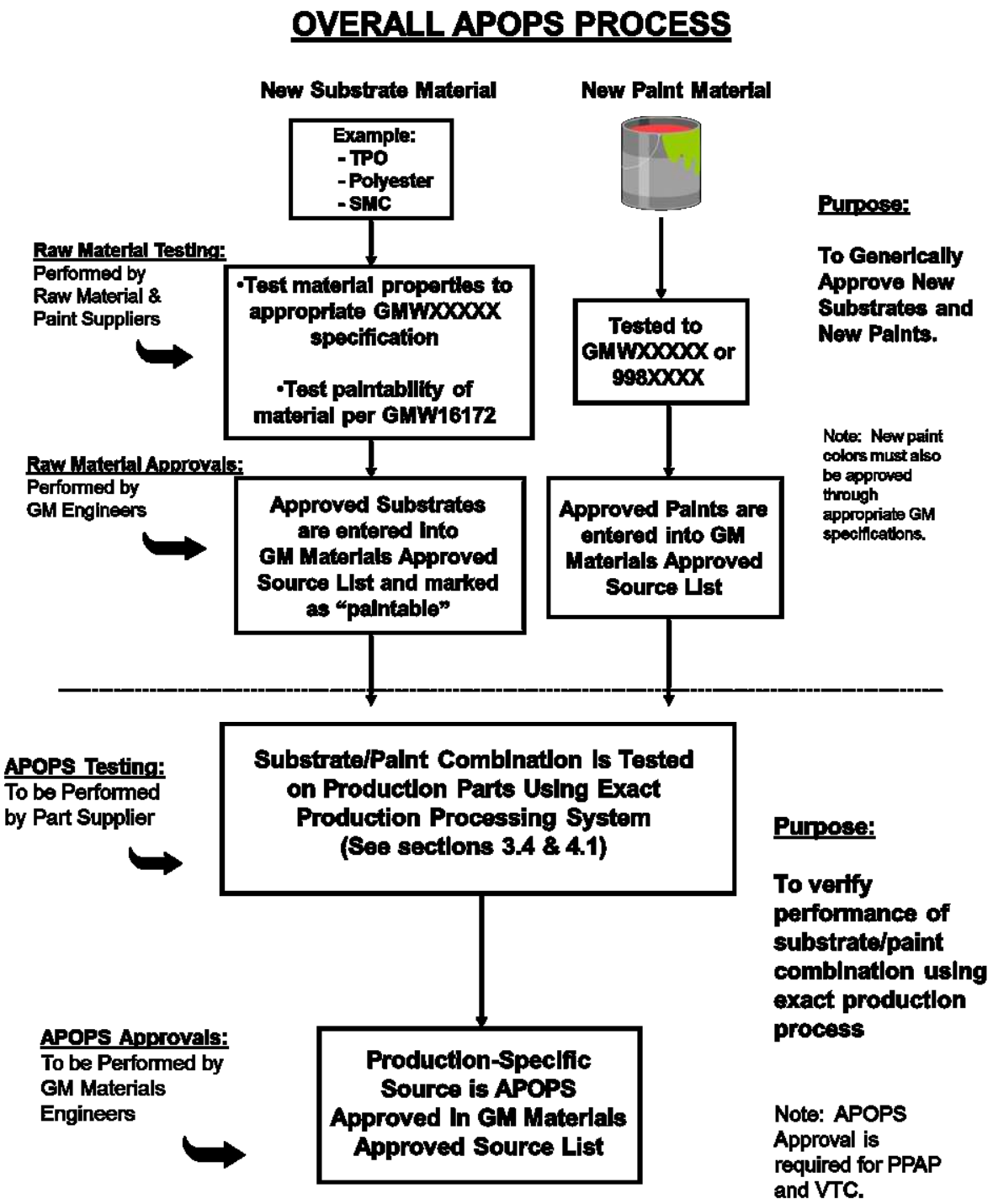
© Copyright 2020 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors
Full document details: GMW GMW14797 2020

4.2.3 Engine Compartment Components. Perform testing on all program colors as indicated in Appendix A, Table A2, unless otherwise noted by the GM Materials Engineer (additional testing may be required). A printout of the APOPS approval will be required with the PPAP package.

4.3 Quality Control Testing. Reference GMW17407 for quality control requirements for painted exterior applications. Reference GMW17977 for quality control requirements for painted interior applications.

Figure 1: Overall APOPS Process



© Copyright 2020 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors
Full document details: GMW GMW14797 2020

Figure 2: Fascia System Example – Testing Locations

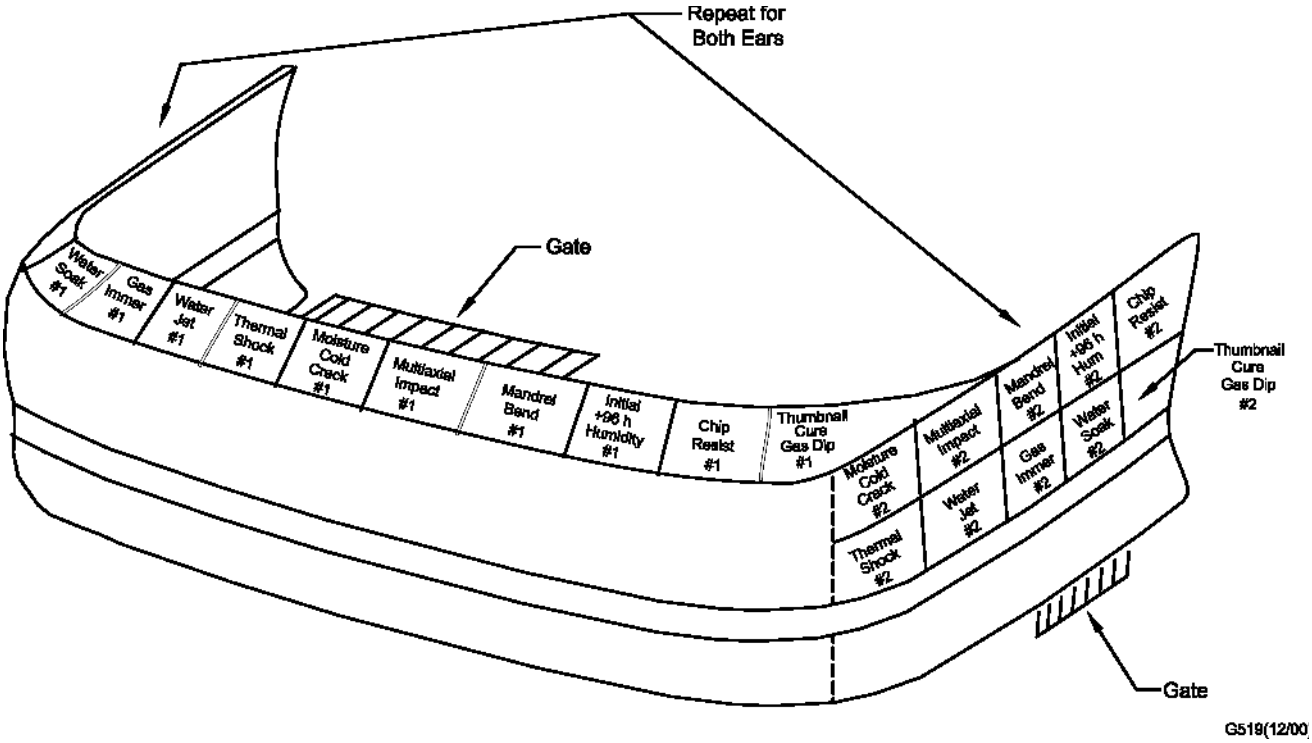
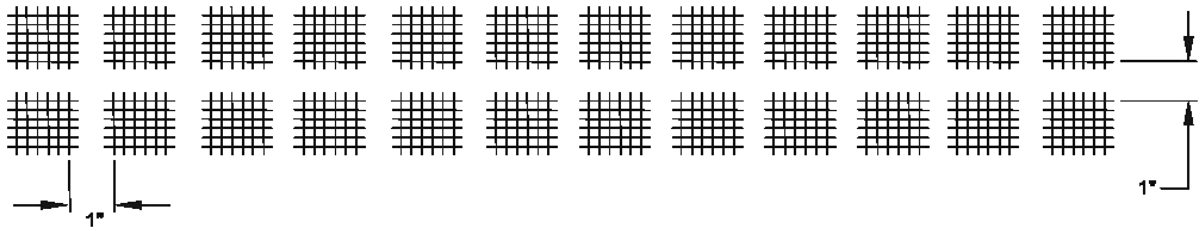
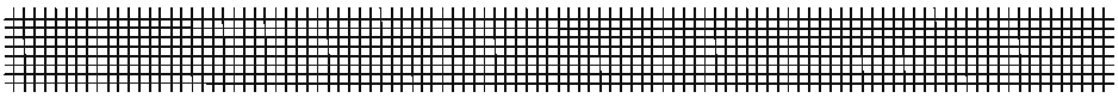


Figure 3: Initial Adhesion Entire Surface Crosshatch (Exterior)



Not more than 1 inch between the last vertical/horizontal line of one cross-hatch block and the first vertical/horizontal line of the next cross-hatch block.

Or



5 Provisions for Shipping

5.1 Source Shipment Responsibility. It will be the responsibility of the supplier to ensure that the material is not exposed to temperatures during shipment which would cause the material to fail to meet any of the requirements of this specification.

© Copyright 2020 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors
Full document details: GMW GMW14797 2020