GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17889

Interior Trim Paint on Chrome

1 Scope

This standard contains requirements of coatings that are intended to be used for painting over chrome plated surfaces for interior automotive trim components. This includes paints that are transparent or tinted, as well as opaque (non-transparent). This standard also details the requirements for approval of the entire combination of chrome plating process, pretreat, paint, and painting process in the production setting. This includes testing for paint system approval and for applicator approval.

1.1 Material Description. Paint systems used to paint on chrome are typically two-component (2K) monocoat or two-component base tint color clear coat paint systems. These paint systems can also use primers or other pretreatments to improve adhesion to chrome as necessary to meet stated performance requirements. Paints in other chemical classes may also apply to this specification. This specification does not cover painting with resist coats used on chrome plated parts as black out or other decorative schemes. For resist painting on chrome plated parts, refer to specification 9984255.

1.1.1 This specification can apply to painting on chrome for any base substrate. Examples are plastics and various metals used to make chrome plated decorative parts. Refer to specifications for decorative chrome plating to specific substrate specifications (e.g., GMW14668 for chrome plated plastics).

1.2 Symbols. Not applicable.

1.3 Applicability. This type of coating is used to enhance the appearance of chrome plating. Typical applications include emblems and bright trim for integrated center stacks, steering wheels, and shifters.

1.4 Remarks. Each combination of specific electroplate, pretreatment, and paint must be tested and approved to this specification as a system. The individual components are not interchangeable. In addition, the paint system is part of the total painted product system and must meet qualifications set forth in this specification and those shown on engineering drawings.

2 References

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

2.1 External Standards/Specifications.

ISO 105-A02	ISO 2813	ISO 20433
ISO 2808	ISO 17025	

2.2 GM Standards/Specifications.

GMW3005	GMW6992	GMW14668	GMW15572
GMW3059	GMW14162	GMW14698	GMW15581
GMW3208	GMW14270	GMW14729	GMW15777
GMW3221	GMW14334	GMW14829	GMW15891
GMW3417	GMW14445	GMW14873	GMW16853

3 Requirements

Tint coats and paint on chrome shall meet the following requirements for engineering approval.

3.1 Sample Conditioning. All samples are to be conditioned prior to each requirement test as specified in GMW3221, Code D.

© Copyright 2017 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 GMW17889 2017

3.2 Requirements on Delivery.

3.2.1 Test Samples. In the case of paint on chrome with plastic substrates, test samples shall be parts or panels injection molded from plating grade GM-approved plastics. Examples as follows:

- Acrylonitrile Butadiene Styrene (ABS) per GMW15572 (ABS T5 or T6), or
- Acrylonitrile Butadiene Styrene and Polycarbonate (ABS+PC) per GMW15581 (ABS+PC T7).

Parts are plated accordingly to meet the performance requirements of GMW14668. GMW14668 Interior Code A, Type 1 or 2 (as specified on the part drawing) performance must be maintained for any paint on chrome application. Any final submission parts for applicator approval of any type of paint on chrome will be prepared using the GM approved paint system, plating and prospective painting line of intended use. Approved paint systems are contained in the GM Materials Approved Source List. Effort should be made to select parts that are consistent with the size and complexity of the chrome plated parts that will be manufactured for GM. All samples shall be painted in the timeframe consistent with this specification after chrome-plating. Sample painting shall be in a manner consistent with and employ the chrome-plating process being used and on the paint line intended for usage for any approval submissions. No laboratory or pilot plating or painted samples will be accepted for applicator approval.

3.2.2 Surface Preparation. Chrome is a particularly difficult surface to adhere to. Paints can be formulated specifically to adhere to chrome. The surface of the chrome must be free of any dirt, oil, or other foreign matter prior to painting. Chrome plated parts are also subject to adverse forms of oxidation relative to paint adherence. If oxidation occurs, the paint adhesion can be adversely affected. Any deviations to these requirements must be approved by GM Materials Engineering, and noted in the final approval as meeting the requirements of this specification. Additionally, any pretreatment processes used to prepare chrome for painting must be approved by GM Materials Engineering. Final certified submission approval data shall be to any agreed upon deviations for time lapse between plating and painting or other circumstances noted. Any loss of adhesion or other properties associated to the chrome surface in accelerated testing associated to any field warranty issue will be considered a violation to the requirements of this specification.

3.2.3 Paint Thickness. Topcoats must meet all specified appearance and durability requirements at a minimum film of 25 µm (1.0 mil). Individual basecoat colors or monocoats may have higher minimum film builds than the technology minimum, due to hiding, color match capability, ultraviolet opacity, or other performance characteristics. The acceptable paint thickness range for each color will be established during color approval and documented on the trim transmittal.

3.2.4 Appearance Criteria.

3.2.4.1 Appearance for visual approvals for paint on chrome or tint coated parts for color, pattern, aesthetics and other related qualities shall be approved by the appropriate Design Appearance Quality department as an acceptable match to the standard when viewed under the conditions set forth in GMW6992.

3.2.4.2 Visual approvals for limited and final approved trim transmittals are controlled by GM Global Design Quality. For new part launch approvals, an Appearance Approval Report (AAR) from the Design Quality Launch Lead is also required.

3.2.4.3 Appearance boundary determinations must be established for each new part per GMW6992.

3.2.4.4 Visual evaluation of the tested part by the responsible GM Appearance Engineer shall override measured values in the case of disagreement.

3.2.4.5 Visual evaluations for color and other appearance criteria of parts for paint on chrome or tint coated is required to initiate any applicator approval. A limited approval for painting on chrome can be granted based upon surrogate parts of lesser complexity than the intended application types. Final approval is based upon submission of parts to the anticipated part types and complexity for the applicator. For tint coat applications, due to the chrome surface under tint coated parts, defects such as dirt, color gradients and orange peel in the painted surface are significantly magnified and are considered relevant in the final appearance quality determinations. Contact Design Appearance Quality (DAQ) for further information regarding minimum acceptable appearance quality for paint on chrome or tint coated parts. If no other direction is given by DAQ, appearance requirements for all visible surface shall default to those listed in GMW15777 Zone A.

3.2.5 Bake. For GM approved paint systems, all bakes must comply with the GM approved cure latitude chart for each specific paint product. Record and report surface temperature during baking using systems such as a Datapaq system or equivalent.

© Copyright 2017 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 GMW17889 2017

For new coatings, cure latitude charts must be developed as specified in GMW3005 to define technology limits for each product. Once developed and approved, the bake chart is signed by GM Materials Engineering and is the only acceptable document for defining cure.

It is then the responsibility of the applicator to follow these GM approved cure latitude charts for bake and cure time requirements. The applicator is also responsible for conditioned holding of any parts until acceptable performance has been achieved before shipping.

3.3 Performance Requirements.

3.3.1 Appendix A, Table A1 describes the data required for approval. Table A1 lists requirements for initial paint system approval, applicator approval, and new color development (using an approved paint system). This data must be provided using an ISO 17025 certified laboratory with full scope for each test described. The full construction for any new paint systems must provide full and detailed information of any required primers, pretreatments and full construction of the paint system so as to be classified as to type of paint on chrome applications it is applicable for.

3.3.2 For new paint line approvals, plaque data will be accepted only if the samples were prepared in the plating and painting line to be considered for usage. Laboratory or pilot prepared samples will not be acceptable for any listings within GM Appearance Database. This is so a determination of the paint system's robustness can be assessed within a production setting. Part submissions are then required for any limited or final approvals from the applicator. Effort will be made to take plaque data provided into consideration for any limited or final applicator approvals as it pertains to new paint systems' use. This will serve to accelerate weathering test requirements. However, final applicator approval will only be awarded once they have demonstrated capability to paint on chrome for the particular class of parts being requested.

3.4 Quality Control Testing. Quality control testing during production shall conform to the requirements in Appendix A, Table A2.

3.5 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to submit a full material composition disclosure to GM via the International Material Data System (IMDS) or via a completed GMW3059 report form.

4 Manufacturing Process

4.1 Painting on chrome requires high standards of process control to the manufacturing process. Adverse changes in chrome surface conditions due to the plating process, chemistry changes, plant environment, and duration of time between chrome and paint need to be avoided. Any change to the chrome-plating process must be evaluated for its effects on the painting process and performance.

4.2 Paint on chrome is intended to be a concurrent operation to minimize timeframes associated with oxidation of the chrome and plant environmental effects on adhesion. Production facilities are expected to schedule plating and painting to meet this requirement. The chrome-plating source is required to be the painting source as well for process and manufacturing control. Each applicator approval must include a study of the maximum time between plating and painting at which requirements are met. Chrome parts that exceed the established required timeframe, if not painted, are to be considered quarantine or scrap. Prior to painting, no attempts at post-treatment for the purpose of extending the allowed timeframe are allowed unless approved by Materials Engineering.

4.3 Masking operations for painting on chrome shall be designed in such a fashion as to avoid overspray and an unsightly unfinished edge to paint. Refer to engineering drawings for specific mask line requirements.

4.4 Cleanliness is required of the chrome surface prior to painting. The surface shall be free of any oil, dirt, minerals, salts, or other foreign substances.

4.5 Crack or micropore density in chrome plating must be maintained as consistent with good chrome-to-paint adhesion.

4.6 Excessive exposure to air, heat, or moisture prior to painting is to be avoided. Parts are required to be completely dry prior to painting.

4.7 It is highly recommended that, for applications involving paint over chrome, dedicated paint lines and ovens be used. Contaminants found in general use paint lines and ovens can affect the tint coat quality and yields. No extensive rework is permitted.

4.8 Additional requirements specific to a supplier's process may be required, according to direction from GM Materials Engineering and GM Supplier Quality, based upon the supplier's process. This is to be established

© Copyright 2017 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 GMW17889 2017