



Quality and Chrome Plater Approval Process

1 Scope

This specification describes the General Motors approval process for decorative chrome plating. The plater must obtain an approval for each substrate material, chemical source, finish, and facility combination.

Note: Nothing in this standard supercedes applicable laws and regulations.

1.1 Material Description. The entire Class A part surface is to meet all requirements.

1.2 Symbols. Not applicable.

1.3 Applicability. Chrome plated exterior and interior applications.

1.4 Remarks. Finish suppliers (platers) should be approved before Tier 1 sourcing. The Tier 1 should select approved platers from their respective regions, otherwise contact GM Materials Engineering prior to finalizing plating source selection.

If a new plater is to be developed, the Tier 1 is responsible for (a) determining the plater's ability to meet all pre-production part submission dates utilizing production processes, (b) consulting with GM Materials Engineering, and (c) ensuring that the plater is approved before Integration Vehicle Engineering Release, typically Start of Production (SOP) – week 74. The Tier 1 should identify an approved backup plating source in these cases.

Once a plater has successfully completed the approval process, their approval record (trim transmittal) will be available on the GM Supply Power web site. The trim transmittal will support the Tier 1 - GM Production Part Approval Process (PPAP). One approval may be applicable for future parts with the same combination. Any substrate, solution chemistry, supplier, process, or facility change is subject to re-qualification (including a new trim transmittal).

Note: An approval is based on single part geometry. Subsequent parts must be tested to meet GM PPAP requirements (GM Materials Engineering reserves the right to require an additional approval if part complexity warrants).

2 References

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

2.1 External Standards/Specifications.

AIAG CQI-11	ISO/IEC 17025	ISO/TS 16949
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2.2 GM Standards/Specifications.

GMW3059	GMW14668	GMW15572	GMW15613
GMW3221	GMW14672	GMW15581	

2.3 Additional References.

- 30 through 90 day production data: Plating thickness, Simultaneous Thickness and Electrochemical Potential (STEP), and pore count.
- Automotive Industry Action Group (AIAG) CQI-11 Plating System Evaluation.
- Detailed downtime procedures (work instructions) in the event of a current interruption or mechanical failure.
- General Process Failure Mode Effects Analysis (PFMEA) for Molding and Plating.
- GM1927-16 Chrome Plating Plastic Process Audit.
- Maintenance schedule for plating processes if not in Process Control Plan.
- Process Control Plans for Molding and Plating.
- Thierry Corporation web site: www.thierry-corp.com.

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3 Requirements

3.1 Requirements on Test Specimens. Test specimens must be conditioned per GMW3221 Code A or as stated in the material specifications listed in Table 1.

Table 1: Specifications for Chrome Plating

General Motors Worldwide Number	Application
GMW14668	Decorative chrome plating on plastic parts
GMW14672	Decorative chrome plating on metallic parts
GMW15613	Decorative chrome plating on stainless steel

3.2 Lab Accreditation (ISO/IEC 17025). All testing shall be performed in a laboratory accredited to ISO/IEC 17025. The required tests (according to the applicable chrome plating specification) must be in the scope of accreditation. If a non-accredited laboratory is used, testing must be performed in two different laboratories, whereby one lab must be independent. In this case, both laboratories must be certified to ISO/TS 16949.

3.3 Approval Process

3.3.1 Construction Documentation. Tier 1 (or plater) shall provide the following information about the plating source to the appropriate GM Materials Engineer by electronic transmission or at technical review.

- Appendix A, Data Sheet A1, Supplier Assessment Form.
- Automotive Industry Action Group (AIAG) CQI-11 Plating System Evaluation or GM1927-16 Chrome Plating Plastic Process Audit.
- General Process Failure Mode Effects Analysis (PFMEA) for Molding and Plating.
- Process Control Plans for Molding and Plating.
- Detailed downtime procedures (work instructions) in the event of a current interruption or mechanical failure.
- 30 to 90 day production data: Plating thickness, Simultaneous Thickness and Electrochemical Potential (STEP), and pore count.
- Maintenance schedule for plating processes if not in Process Control Plan.

A construction transmittal or GM Material Specification Database (MATSPC) entry will be initiated to track plater development. Platers must provide a detailed timeline for completion of all requirements as directed by GM Materials Engineer.

3.3.2 Development Request. The Tier 1 shall submit Appendix A, Data Sheet A2, GM Bright Metal Finish Requirements Form, to the responsible GM Appearance Engineer after the construction transmittal or MATSPC entry is recorded.

Plastic substrates must be listed in the MATSPC as approved to GMW15572P-T5/T6 or GMW15581P-T7. Specify the manufacturer, product name, and product code (i.e., Vendor Materials ID). Nylon-6 (PA6), Nylon-66 (PA66), and metals shall be reported as indicated.

3.3.3 Appearance Evaluation. Appearance standards can be ordered from Thierry Corporation, www.thierry-corp.com.

Three low current density (LCD) parts and three high current density (HCD) parts shall be submitted to the responsible GM Design Appearance Quality (DAQ) Engineer for appearance evaluation. Parts must represent production tooling, plating racks, and plating process.

Parts must be labeled according to their rack position. A rack image showing low and high current density areas must be submitted to the GM Materials Engineer. Low and high current density rack locations must be defined by mapping plating thickness distribution throughout a rack.

Plating thickness shall be confirmed by the plater prior to their visual submission. Part and International Material Data System (IMDS) numbers shall be submitted with the visual submission.

If the appearance is rejected, the new plater must make adjustments to produce an acceptable match. When the plater resubmits for approval, control plan must be updated to reflect the process adjustments.

Once approved, the plater can proceed to the Performance Evaluation.

3.3.4 Performance Evaluation. Parts shall be tested to GMW14668, GMW14672, or GMW15613. Each test must be completed on six (6) parts representing three (3) low and three (3) high current density rack locations. Parts must be labeled with respect to their rack location. Tested parts shall be submitted to a GM Materials Engineer for approval. Appendix A, Data Sheet A3 includes a checklist containing all documents required for GM approval.

Tier 1 (or plater) shall provide the following by electronic transmission:

- Test Data Form according to GMW14668, GMW14672 or GMW15613.
- Part drawing notes or math data indicating all of the material specifications.
- Part schematic indicating plating thickness, STEP, and discontinuous chromium measurement points.
- Plating Thickness Map.
- Orientation of parts during Copper Accelerated Acetic Acid Salt Spray (CASS).
- 100x photomicrographs of Active sites.
- Six (6) STEP Charts.

3.4 Additional Requirement. A new approval is required when any of the following changes occur:

- Material supplier (i.e., Supplier X to Supplier Y).
- Material Type (i.e., Acrylonitrile Butadiene Styrene (ABS) to ABS + Polycarbonate (PC)).
- Material ID (i.e., PA 727 to MG37EP).
- Plating Facility/Location (Data Universal Numbering System (DUNS) No.).
- Finish (i.e., 150Z to 756S).
- Chemical Source (plating process chemicals).
- Appendix A, Figure A1 shows the process flow for a new plater approval.

4 Manufacturing Process

Not applicable.

5 Rules and Regulations

5.1 Legal Regulations. All materials must satisfy applicable laws, rules, regulations and recommendations valid in the country of usage.

5.2 Language. In the event of conflict between the English and domestic language, the English language shall take precedence.

5.3 Inspection and Rejection. Samples of components or materials released to a GM material specification shall be tested for conformity with the requirements of this material specification and approved by the responsible Engineering department prior to commencement of delivery of bulk supplies.

A new approval must be received for any changes, e.g., properties, manufacturing process, location of manufacture, etc. If not otherwise agreed, all testing and documentation normally required for initial release must be completed.

It is the responsibility of the supplier to inform the customer in a timely manner, without solicitation, and to include documentation of all modifications of materials and/or processes and to apply for a new release.

5.4 Material Safety Data Sheets/Safety Data Sheets (MSDS/SDS). For new product submissions, or when a change in chemical composition of an existing product has occurred, a complete copy of the Material Safety Data Sheet/Safety Data Sheet must be submitted in compliance with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) requirements or other country-specific MSDS/SDS requirements.

5.5 All materials supplied to this standard must comply with the requirements of the International Material Data System (IMDS) and GMW3059, **Restricted and Reportable Substances**.

6 Approved Sources

Engineering qualifications of an approved source are required for this standard. Only sources listed in the GM Materials File (i.e., GM Supply Power) under this standard number have been qualified by Engineering as meeting the requirements of this standard.

For other GM locations, the responsible Engineering group should be contacted to obtain the approved source in that individual country.

7 Notes

7.1 Glossary.

MATSPC: Global repository of GM approved materials for corresponding GM Engineering Standards.

7.2 Acronyms, Abbreviations, and Symbols.

ABS	Acrylonitrile Butadiene Styrene
Acc.	According to
AIAG	Automotive Industry Action Group
CASS	Copper Accelerated Acetic Acid Salt Spray
CSIDS	Corporate Supplier Identification Source
DAQ	Design Appearance Quality
DI	Deionized
DUNS	Data Universal Numbering System
Eng.	Engineer
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
GME	General Motors Europe
GSSLT	Global Subsystem Leadership Team
HCD	High Current Density
HS	High Sulfur Nickel Strike
IMDS	International Material Data System
LCD	Low Current Density
mc	Microcracked
Mfg.	Manufacturing
MSDS	Material Safety Data Sheet
mV	Millivolts
No.	Number
NOK	Not OK
PA6	Nylon-6
PA66	Nylon-66
PC	Polycarbonate
PFMEA	Process Failure Mode Effects Analysis
PPAP	Part Production Approval Process
REQ	Required
SDS	Safety Data Sheet
SOP	Start of Production
SOR	Statement of Requirement
SPEC	Specification
SQ	Supplier Quality
SQE	Supplier Quality Engineer
STEP	Simultaneous Thickness and Electrochemical Potential
VAR	Variation