



## Hydrographics/Waterborne Decorative Trim for Interior Applications

### 1 Scope

This specification defines the material requirements for interior hydrographic printing. These requirements include technology construction approval, program color approval and part performance.

**1.1 Material Description.** The hydrographic process consists of a water bath onto which a water soluble decorative film is floated. When activated, the film transfers an ink pattern to the surface of a molded plastic part or plaque dipped into the bath. Parts and plaques may be molded-in-color or paint base coated prior to ink transfer to achieve the target appearance. Parts and plaques are typically clear coated following decoration but films may use UV cure inks requiring no top coat as long as all listed requirements are met. Films are defined by type and grade and construction code and shall be specified on the part drawing. See Section 8.

**1.1.1 Type.** The films are designated based on hydrographic film ink type and presence or absence of clearcoat. If there is no suffix assigned, the assumption will be Type A.

- Type A Non-UV ink hydrographic systems with a clearcoat.
- Type B UV cure ink hydrographic systems with no clearcoat.

**1.1.2 Grade.** Grade will define the anticipated application exposure UV and temperature levels. If no Grade is specified, Grade 1 is assumed. See Table B1 in Appendix B for requirements.

- Grade 1 Standard, lower UV and temperature exposure.
- Grade 2 High, higher UV and temperature exposure applications such as the upper, horizontal instrument panel trim and package shelves.

**1.2 Symbols.** Construction approved materials will be identified in the GM Materials Approved Source List/Appearance Database by construction codes. These GM internal codes identify the decoration by the elements of Technology, Surface, Topcoat chemistry, Backing Layer (i.e. part substrate) and Grade and will be defined by the appropriate GM Materials Engineer during construction and color approvals. See Appendix A, Table A1 for explanation of these codes.

**1.3 Applicability.** Typical applications include, but are not limited to, steering wheel rims, gear shift knobs, door trim, console trim, and instrument panel trim.

**1.4 Remarks.** Production intent materials/process surrogate pattern data must be demonstrated to meet the requirements of this specification, ideally, prior to sourcing and, at the latest, prior to the intended program Integration Vehicle Engineering Release (IVER). Contact the appropriate GM Materials Engineer.

### 2 References

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

#### 2.1 External Standards/Specifications.

ISO 105-A02                      ISO 2808

#### 2.2 GM Standards/Specifications.

|         |          |          |          |
|---------|----------|----------|----------|
| GMW3059 | GMW6992  | GMW14270 | GMW14729 |
| GMW3208 | GMW14093 | GMW14334 | GMW14829 |
| GMW3221 | GMW14124 | GMW14444 | GMW16853 |
| GMW3232 | GMW14125 | GMW14445 |          |
| GMW3417 | GMW14162 | GMW14698 |          |

#### 2.3 Additional References.

- CG4110 Substance List, Waiver Form and GM Contact List

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### 2.3.1 Cleaners.

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

## 3 Requirements

**3.1 Requirements on Test Specimens.** Reference GMW3221. All test specimens shall be conditioned to GMW3221 Code B, for a minimum of 24 h before and after completion of test unless the test method indicates that standard conditioning is not required. Testing shall occur after a minimum aging period of 72 h following the manufacturing process.

**3.2 Construction/Color and Process Documentation Management.** Appendix A, Data Sheet A1 is a Hydrographic Trim Construction Specification Sheet which reports each system's general composition and process criteria. Appendix A, Data Sheet A1 will be completed for all patterns/colors to ensure the definition of the construction code is correct for each pattern/color. In addition to the completion of Appendix A, Data Sheet A1, the supplier shall submit additional supportive documentation. A graphical definition of the hydrographic ink layers shall be submitted for each pattern/color. A process control document detailing environmental controls, filtration, mold release use, surface preparation, hydrographic film activator, wash water, dry time and temp, paint spray method, use of 2K meter mix systems, paint cure type, time and temperatures will be submitted for each approval. A Technical Data Sheet (TDS) for all paints in the system showing recommended film builds and processing temperatures will also be submitted.

**3.2.1** 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.

**3.3 Testing Requirements.** All hydrographic approvals must be performed on production intent samples. The samples shall include decorated, molded plaques or decorated, molded production parts or surrogate parts. Part substrates must be previously approved to existing GMW specifications. All plaque testing must use the production intent plastic resin. There may be additional, unique component testing required by GMW14444 or the Engineering Subsystem Technical Specification that the decorative trim may be required to meet for final Validation or PPAP approval.

**3.3.1 Responsibility.** The supplier producing the molded, decorated production part is responsible for submitting the documentation and testing required by this specification to the appropriate GM Materials Engineer for approval in the GM Materials Approved Source List/Appearance Database.

**3.3.2 Construction/Color Requirements.** Each pattern/color will be considered a new hydrographic film construction and will require all Appendix B, Table B1 requirements. A construction code may apply to more than one pattern/color but each pattern/color must be tested to all requirements and approved. A construction approval may be granted to a new GM supplier on a non-GM pattern to demonstrate compliance capability to this specification for future business development with GM.

**3.3.3 Part Requirements.** Hydrographic decorated parts may have material testing on the production part, tests that are required to be performed on the production process, production part and submitted for Validation or PPAP, and are not part of the approval listing to this specification. These requirements, at a minimum, are defined in Appendix B, Table B1. Review with Validation Engineer is required.

**3.3.4 Test Report.** Use Appendix A, Data Sheet A2 to report all test results. An electronic copy of the laboratory test report must also be submitted. See Data Sheet A3 for items required to be submitted to the appropriate GM Materials Engineer during construction/color approvals for approval in the GM Materials Approved Source List/Appearance Database.

## 4 Manufacturing Process

Not applicable.

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## 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.

## 6 Approved Sources

Materials supplied to this specification must be approved by General Motors.

A list of approved materials can be found in the GM Materials Approved Source List or the Appearance Database. To access this list, reference GMW14270 for latest location. This GM material file is provided to third parties to reduce redundant testing of materials. If an approved material is used, the part supplier can use the GM material file reference for Production Part Approval Process (PPAP) material approval. If the decision is made to use a not yet approved material, contact the Materials Engineering Finishes and Coatings Global Subsystem Leadership Team (GSSLT) for details on the approval process. The material approval process must be completed prior to PPAP start date of the part supplied to General Motors.

## 7 Notes

**7.1 Glossary.** Not applicable.

**7.2 Acronyms, Abbreviations, and Symbols.**

|              |                                                                        |
|--------------|------------------------------------------------------------------------|
| <b>ΔE</b>    | Delta E = Change in Color                                              |
| <b>3D</b>    | 3 Dimensional                                                          |
| <b>ABS</b>   | Acrylonitrile Butadiene Styrene                                        |
| <b>AL</b>    | Aluminum                                                               |
| <b>AR</b>    | Anti-reflective                                                        |
| <b>DOI</b>   | Distinctness of Image                                                  |
| <b>E/E</b>   | Electrical/Electronic                                                  |
| <b>FIM</b>   | Film Insert Molding                                                    |
| <b>GHS</b>   | Globally Harmonized System of Classification and Labeling of Chemicals |
| <b>GSSLT</b> | Global Subsystem Leadership Team                                       |
| <b>IMD</b>   | In Mold Decorating                                                     |
| <b>IMDS</b>  | International Material Data System                                     |
| <b>IML</b>   | In Mold Labeling                                                       |
| <b>IVER</b>  | Integration Vehicle Engineering Release                                |
| <b>MSDS</b>  | Material Safety Data Sheet                                             |
| <b>N/A</b>   | Not Applicable                                                         |
| <b>PC</b>    | Polycarbonate                                                          |

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**Documents**

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|             |                                  |
|-------------|----------------------------------|
| <b>PET</b>  | Polyethylene Terephthalate       |
| <b>PPAP</b> | Production Part Approval Process |
| <b>PUR</b>  | Polyurethane                     |
| <b>PVA</b>  | Polyvinyl Acetate                |
| <b>PVC</b>  | Polyvinyl Chloride               |
| <b>PVDF</b> | Polyvinylidene Fluoride          |
| <b>QC</b>   | Quality Control                  |
| <b>RH</b>   | Relative Humidity                |
| <b>SDS</b>  | Safety Data Sheet                |
| <b>SOR</b>  | Statement of Requirements        |
| <b>SVOC</b> | Semi-Volatile Organic Content    |
| <b>TDS</b>  | Technical Data Sheet             |
| <b>TNR</b>  | Temperature Normal Radiation     |
| <b>TOM</b>  | Three Dimensional Overlay        |
| <b>TPO</b>  | Thermoplastic Olefin             |
| <b>TR</b>   | Transfer Resin                   |
| <b>UV</b>   | Ultraviolet                      |
| <b>VOC</b>  | Volatile Organic Content         |

## 8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Material per GMW17747 Type A, Grade 2, Construction Code WD-123456

### Where:

**GMW** = GM Worldwide

**17747** = Sequential number

**Type** = Type defined in 1.1.1

**Grade** = Grade defined in 1.1.2

**Construction Code** = Code defined in Appendix A Table A1

## 9 Release and Revisions

This standard was originated in December 2016. It was first approved by the Materials - Finishes and Coatings Global Subsystem Leadership Team in March 2017. It was first published in March 2017.

| Issue | Publication Date | Description (Organization) |
|-------|------------------|----------------------------|
| 1     | MAR 2017         | Initial publication.       |

### Cross Reference of Replaced Specifications

| Standard No. | Replaced Specification |
|--------------|------------------------|
| GMW17747     | GMW16717 TYPE D ONLY   |