



Plastic Molding Compounds

1 Scope

This standard provides a system for specifying significant properties of commonly used plastics, including unpigmented and pigmented, unfilled and filled products. It is intended to apply to resins (not parts) primarily as used in the automotive and related industries. It is also intended to be used either as the sole descriptor of a material or within the body of a specification covering the common standard characteristics required, whereas additional specialized requirements are detailed.

Note: The resin supplier must provide a certification statement meeting the resin requirements per the callout of this standard. This certification must be loaded into the GM Material Specification File (MATSPC).

1.1 Material Description.

1.1.1 The material description is based on the principle that plastics should be described, insofar as is possible, in terms of specific performance characteristics desired in the resin, and that an infinite number of such descriptions can be formulated by the use of one or more standard statements (based on standard tests), each designating a quality level of a property or characteristic.

1.1.2 Users of plastic resin can, by selecting different combinations of performance characteristics, specify different combinations of properties desired in various resins.

1.1.3 Possible standard statements are defined in 8.1.

1.1.4 To permit line callout (e.g., designation on a part drawing, in the math data or in a component specification) of the material descriptions mentioned, the system includes a symbol for the general type of plastic resin to be used and a letter-number symbol for each quality level of each property or characteristic.

Example: The complete GMW15702 for an automotive resin might be specified as follows: GMW15702-120014 >ABS< (A2, A64, BJ730, D113, EM230/216/20, RT3.4, SS52). The callout that is referenced on a part drawing in math data or in a component specification would be GMW15702-120014 or GMW15702-120014 >ABS<

Note: While this cell type format provides the means for close characterization and specification of each property and combination of properties for a broad range of materials, it is subject to possible misapplications since impossible property combinations can be coded if the user is not familiar with available commercial materials.

To prevent this kind of misapplication for plastic resin, it is required that the actual certification data relevant to the specified call out be uploaded to GM MATSPC.

1.2 Symbols. The symbol of the plastic resin shall be indicated per ISO 11469, ISO 1043, ISO 18064 and SAE J1344 on the part drawing and/or in the math data file.

1.3 Typical Applications. Plastic resins used in the automotive and related industries.

2 References

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

2.1 External Standards/Specifications.

ASTM D747	ISO 178	ISO 868	ISO 4892-2
ASTM D789	ISO 179/1eA	ISO 1043	ISO 6603-1/2
ASTM D792	ISO 179/1eU	ISO 1133	ISO 11357-3
ASTM D1203	ISO 180/1eA	ISO 1183	ISO 11469
ASTM D3012	ISO 188	ISO 3146	ISO 15512
ASTM D3763	ISO 294-1	ISO 3167	ISO 18064

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ISO 37	ISO 306	ISO 3451-1	SAE J1344
ISO 75-1	ISO 307	ISO 3451-4	SAE J2412
ISO 75-2	ISO 527	ISO 4577	SAE J2527
ISO 176	ISO 604	ISO 4892-1	UL 94

2.2 GM Standards/Specifications.

GMW3013	GMW6992	GMW14444	GMW15725
GMW3059	GMW14162	GMW14650	GMW16853
GMW3417			

2.3 Additional References.

- Template Certification Data Sheet
- TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com)

3 Requirements

3.1 Material Specification.

3.1.1 The material specification for the selected resin is defined by a line callout per Section 8 of this standard.

3.1.1.1 This line callout is used on the part drawing, in the part math data file and/or in the component specification.

3.1.1.2 It shall consist of a material designation per this GMW15702 (see Section 8) followed by a symbol per 1.2.

3.1.1.3 Resins described by this line callout shall conform to additional requirements outlined in Section 6, that is, the resin used under this line callout must be listed as approved source in GM MATSPC under this line callout.

3.1.2 A template Certification Data Sheet (test sampling plan) can be found in GM SupplyPower, Engineering Library, Global, Product Design, and Materials Engineering.

3.2 Compound Requirements.

3.2.1 The compound shall conform to the requirements of GMW3013.

3.2.2 Compounds furnished to a specification based on this standard shall be carefully processed virgin resins of uniform composition and physical properties, suitable for use in plastic parts for automotive and related applications.

3.2.3 Particle size shall be as specified on the purchase order.

3.3 Finished Part Performance.

3.3.1 Unless otherwise specified, all finished parts for Interior applications shall meet the requirements according to GMW14444.

3.3.2 Unless otherwise specified, all finished parts for Exterior applications shall meet the requirements according to GMW14650.

3.3.3 Unless otherwise specified, all finished parts for applications in the engine compartment or near the exhaust system shall meet the requirements according to GMW15725.

3.4 Test Requirements.

3.4.1 The test methods to be used shall comply with the named test methods of GMW3013.

3.4.2 The requirements stated by the line callout shall be determined by the latest issue of the test methods indicated.

3.4.3 If not indicated otherwise in the test procedure, tests shall be conducted 40 h minimum after molding and immediately following a conditioning period of 24 h at 22 °C ± 3 °C and 50% ± 5% relative humidity (RH).

3.4.4 For nylon materials, all tests shall be conducted on dry, as-molded test specimens which have been sealed in water vapor impermeable containers immediately after molding and not exposed to ambient humidity until immediately prior to testing.

3.4.5 Specimens for the ISO tests specified herein shall be injection molded in accordance with ISO 294-1, unless otherwise specified.

3.5 Quality Requirements.

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3.5.1 The certification data to the line callout is stored in GM MATSPC in conjunction with the approved product name (approved source) under the line callout.

3.5.2 This certification data is the agreed quality between the resin supplier and GM Material Engineering under this line callout.

3.5.3 If quality control appears, this certification data is the specification for the quality control.

3.5.4 It is the responsibility of the resin supplier to inform GM Materials Engineering of any update required to this certification data.

4 Manufacturing Process

The manufacturing process shall comply with the requirements per GMW3013.

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.

If not otherwise agreed, all release tests shall be repeated and documented by the supplier prior to commencement of delivery of non-conforming bulk supplies. In individual cases, a shorter test can be agreed to between the responsible Engineering department and the supplier.

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. In addition, product MSDS/SDS submissions must be in compliance with specific country General Motors TMC003 Material Safety Data Sheet/Safety Data Sheet guidance documents where available.

5.5 All materials supplied to this standard must comply with the requirements of GMW3059, **Restricted and Reportable Substances for Parts**.

6 Approved Sources

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

A list of approved materials can be found in MATSPC. This GM Material File is provided to third parties to reduce redundant testing of materials. If approved material already listed is used, the part supplier can use 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 GM Materials Engineering 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.

6.1 Certification Data Sheet (Test Sampling Plan). See GM SupplyPower, Engineering Library, Global, Product Design, and Materials Engineering for applicable templates.

6.2 Certification Process. Refer to GMW3013.

6.3 Required Properties.

6.3.1 The Certification Data Sheet (Test Sampling Plan) includes two tables, **values for documentation** and **values for information**.

6.3.2 The table **values for documentation** must include statistics and, at minimum, the following properties:

6.3.2.1 Density.

6.3.2.2 If filled/reinforced: Ash.

6.3.2.3 Melt Volume-Flow Rate (preferred), Melt Mass-Flow Rate or Viscosity Number.

6.3.2.4 Tensile Modulus (preferred) or Flexural Modulus.

6.3.2.5 A second property from the **Mechanical Requirements** list per GMW3013, Yield Stress preferred.

6.3.2.6 An impact property, Charpy Impact or Multiaxial Impact.

6.3.2.7 Heat Deflection Temperature (HDT A or B) (preferred), Vicat Softening Temperature, Melting Temperature, or Low Temperature Brittleness Point.

6.3.3 Additional required data may be typical to the specified material and is listed on the relevant Certification Data Sheet (Test Sampling Plan) template (posted in GM SupplyPower). The table **values for information** are optional data.

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
E/P	Polyethylene/Polypropylene Copolymer
EEBC	Polyether Ester Block Copolymer
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
HDT	Heat Deflection Temperature
MSDS	Material Safety Data Sheet
PA6	Polyamide 6
PA66	Polyamide 6,6
PBTP	Polybutylene terephthalate
PC	Polycarbonate
PE	Polyethylene
POM	Polyoxymethylene
PP	Polypropylene
PPAP	Production Part Approval Process
PUR	Polyurethane
PVC	Polyvinyl chloride
RH	Relative Humidity
SDS	Safety Data Sheet
SSLT	Subsystem Leadership Team
TES	Thermoplastic elastomer – Styrenic
TPE	Thermoplastic elastomer (includes EEBC, TES and TPO)
TPO	Thermoplastic olefin
TPU	Thermoplastic polyurethane

8 Coding System

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

Material per GMW15702 - 6 digit code >Symbol< (Coded Properties)

Example:

GMW15702-000001 >PA46-GF30< (A2, A64, BJ730, D113, EM230/216/20, RT3.4, SS52).

Where:

GMW15702 = Engineering Standard

6 digit code = Provided by responsible Material Specialist

>Symbol< = Symbol according to paragraph 1.2

(Coded Properties) = Properties are coded per Section 8.1. This part of the callout is optional on the part drawing/in the math data. It is required in the remarks field of the GM Materials File.

Note: The addition of symbols following the 6-digit code is optional and at the discretion of the responsible Material Specialist.

8.1 System for Specifying Significant Properties of Commonly Used Plastics.**8.1.1 Material Description.**

8.1.1.1 The material description is based on the principle that plastics should be described, insofar as is possible, in terms of specific performance characteristics desired in the resin, and that an infinite number of such descriptions can be formulated by the use of one or more standard statements (based on standard tests), each designating a quality level of a property or characteristic.

8.1.1.2 Users of plastic resin can, by selecting different combinations of performance characteristic, specify different combinations of properties desired in various resins.

- Suffix Symbols A through H are normally applicable to the resin as received.
- Suffix Symbols J through U are normally applicable to test specimens molded from the resin as received.
- Suffix Symbols V through Z covering environmental performance requirements are also normally applicable to test specimens molded from the resin as received.

8.1.1.3 For a summary of all designated codes for compound properties, see Table 1. See 8.1.2 for the details of each designation.