



Polycarbonate – General Purpose

1 Scope

1.1 Material Description. This specification describes materials types of unfilled general purpose polycarbonate applications. This specification is based on GMW3013 per ISO 7391-1/2 recommendations.

1.1.1 Paintability. Plastics used for painted applications are required to meet Paint Performance Requirements for New Plastic Materials per GMW16172. Additionally, painted plastic parts are required to meet Painted Plastic Parts Performance Requirements per GMW14797.

1.1.2 Types. The classification into type codes is according to the properties as described in Table 1.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PC<.

1.3 Applicability. Typical applications include interior and exterior substrates that require high temperature stability and low temperature ductility. Applications shall not be exposed to sunlight. For interior exposed applications requiring ultraviolet (UV) protection use GMW16728. For optical lens applications use GMW16729.

2 References

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

2.1 External Standards/Specifications.

ASTM D955	ISO 75-2	ISO 306	ISO 1183
ASTM D1003	ISO 179/1eA	ISO 527	ISO 7391-1
ASTM D3763	ISO 294-1	ISO 527-1	ISO 7391-2
ASTM E831	ISO 294-3	ISO 527-2	ISO 11359-2
ISO 75-1	ISO 294-4	ISO 1133	ISO 11469

2.2 GM Standards/Specifications.

GMW3013	GMW14270	GMW16172	GMW16853
GMW3059	GMW14444	GMW16728	
GMW3221	GMW14797	GMW16729	

2.3 Additional References.

- Certification Template, available from GM SupplyPower <https://gmsupplypower.covisint.com>

3 Requirements

3.1 Requirements on Test Specimens. Reference GMW3221.

3.1.1 All tests shall be performed on specimens 40 h minimum after molding and immediately following a conditioning period of 24 h minimum in a controlled atmosphere per GMW3221, Code A, unless otherwise specified. All tests shall be performed on unannealed specimens unless otherwise noted. The values specified in Table 1 shall be met by test specimens in natural and/or black. For integrally colored grades where other additive systems (e.g., heat stabilizer, lubricants, or colorants) are used, the impact values shall not decrease more than 10% from the specified minimum value. UV stabilizers shall not be added to these grades. For UV stabilized grades use GMW16728.

All types may be formulated with internal mold release, provided the physical properties of the compound remain within the specified limits, and the mold release does not interfere with the appearance or function of the part to be molded including any post-molding decorative process.

3.2 Emissions Testing of Interior Materials and Parts. For all Code E designated parts per GMW14444, reference GMW16853 for emissions testing of interior materials and parts.

Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-1 with the conditions for injection molding from ISO 7391-2. Test methods and specimen dimensions are also to be in accordance with ISO 7391-2 unless otherwise specified:

3.3 Material Requirements. Materials approved to this specification shall meet the requirements of GMW3013, General Requirements for Handling of Technical Terms of Delivery for Plastics.

3.4 Requirements on Delivery. Important physical, mechanical and thermal properties that characterize the material are summarized in Table 1.

Note: For each product, the requirements shall be documented using the latest Certification Template and Certification Statement according to GMW3013. The color shall be specified on drawings.

3.5 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media they contact at their place of use.

3.6 Compound Properties. For compound property requirements, see Table 1. Table 1 defines the properties by code numbers which will be used within the specification. The values listed in the compound property tables shall represent the minimum three (3) sigma calculated values unless otherwise noted.

3.6.1 Other Data. The minimum number of lots per test required is one (1) in natural/crystal for:

- Poisson's Ratio
- Stress Strain Curve at -30 °C, +23 °C, +85 °C, +120 °C
- Differential Scanning Calorimeter (DSC) Curve
- Dynamic Mechanical Analysis (DMA) Curve
- Multiaxial Impact Curves
- Infrared Spectroscopy Curve

3.7 Performance Requirements. Performance requirements, e.g., flammability, fogging or resistance to odor, shall be specified on part drawings or in component specifications.

All finished parts for interior applications shall meet the requirements according to GMW14444

3.8 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.

Table 1: Compound Property Requirements - Type Code (Natural/Crystal or Black)

Type			T1	T2	T3	T4	T5
Type Description			High Viscosity	Medium Viscosity	Low/Medium Viscosity	Low Viscosity	Very Low Viscosity
Property	Standard ^{Note 1}	Units					
Melt Flow Rate (MFR) ^{Note 2} +300 °C/1.2 kg	ISO 1133	g/10 minutes	< 8.0	10 ± 2	14 ± 2	18 ± 3	> 25
Melt Volume Rate (MVR) ^{Note 2} +300 °C/1.2 kg	ISO 1133	cm ³ /10 minutes	Report	Report	Report	Report	Report
Charpy Notched Impact	ISO 179/1eA ISO 7391-2 3 mm	kJ/m ²	Report	Report	Report	Report	Report