GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17248

Polycarbonate + Poly(Butylene Terephthalate) - Heat Stabilized, Impact Modified, Alloy

1 Scope

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

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose/Material Description. This specification covers the properties of a heat stabilized, impact modified, Polycarbonate (PC) and Poly(butylene terephthalate) (PBT) alloy, pellet form, injection molded compound.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PC+PBT-I<.

1.3 Applicability. Typical applications include: Bumper beams and fascia support brackets.

1.4 Remarks. This specification is classified by the level of impact modifiers: Currently only T1: Impact modified. Additional impact modifier levels will be added as become necessary.

2 References

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

2.1 External Standards/Specifications.

ISO 75-1/2	ISO 294-1	ISO 1133	ISO 11357-3
ISO 179-1/1eA	ISO 294-3/4	ISO 1183-2	ISO 11469
ISO 188	ISO 527-1/2	ISO 3146	ISO 20028-2

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14444	GMW16853
GMW3059	GMW14270		

2.3 Additional References.

Plastic Submission Template

3 Requirements

Materials approved to this specification shall meet the standard requirements of GMW3013.

3.1 Requirements on Test Specimens. Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-1, with the conditions for injection molding from ISO 20028-2. Test methods and specimen dimensions are also to be in accordance with ISO 20028-2.

All tests shall be performed on specimens for 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 specified.

The minimum values specified in Table 1 shall be met by test specimens in natural or black For colored grades where other pigment and additive systems, e.g., stabilizer, are used, the impact values shall not decrease more than 10% from the specified minimum value.

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.

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3.3 Requirements on Delivery. Important physical, mechanical and thermal properties that characterize the material are summarized in Table 1. The color shall be specified on drawings, in material specifications and otherwise.

3.4 Compound Properties. See Table 1. The following are also required for full specification approval. The minimum number of lots per test required is one in natural or black:

- Poisson's Ratio.
- Stress strain curve at multiple temperatures: -30 °C, +23 °C, +85 °C. See the GMMPD tab on Plastic Submission Template for test parameters (contact specification owning group named in Section 6 for access).
- Coefficient of Thermal Expansion (CLTE) data, See GMMPD tab on Plastic Submission Template for test parameters (contact specification owning group named in Section 6 for access).
- Differential Scanning Calorimetry (DSC) curve.
- Dynamic Mechanical Analysis (DMA) curve
- Fourier Transform Infrared (FTIR) spectroscopy curve.
- Mold shrinkage.

See the Polycarbonate tab on the Plastic Submission Template for the test procedures (contact specification owning group named in Section 6 for access).

Reference GMW3013 for all test procedures and parameters.

3.5 Performance Requirements. Performance requirements shall be specified on part drawings or in component specifications. All parts manufactured from molding compounds shall be resistant to the media contacted, such as aliphatic and aromatic hydrocarbons, fuels, lubricants, oils, greases and alcohols, at the place of use.

3.6 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to obtain a GM-approved International Material Data System (IMDS) submission.

Table 1: Compound Properties (Natural or Black)

Property	Standard	Unit	Impact Grade T1 Value
Density	ISO 1183-2 Method A	g/cm^3	1.18 to1.22
Tensile Modulus	ISO 527-1/2	MPa	1750 to 2400
Tensile Stress at Yield	ISO 527-1/2	MPa	≥ 46
Tensile Stress at Yield after Heat Aging Note 1	ISO 527-1/2 ISO 188	% Retention	≥ 90
Notched Charpy Impact Strength at +23 °C at -30 °C	ISO 179-1/1eA	kJ/m^2	 ≥ 41 ≥ 18
Notched Charpy Impact Strength after Heat Aging Note 1	ISO 179-1/1eA ISO 188	% Retention	≥ 90
Melting Temperature (for reference only)	ISO 3146 or ISO 11357-3	°C	Target Range 220 to 226
Heat Deflection Temperature Under Load, 1.8 MPa	ISO 75-1/2	°C	≥ 70

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