



Polybutylene Terephthalate – Glass Filled Hydrolysis Resistant to Water Only

1 Scope

1.1 Material Description. This specification covers the properties of injection moldable, hydrolysis resistant; glass reinforced Polybutylene Terephthalate (PBT).

1.2 Symbols. The material abbreviations according to ISO 11469 are shown in Table 1.

1.3 Applicability. Typical applications include electrical connectors and modules requiring increased hydrolysis resistance.

2 References

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

2.1 External Standards/Specifications.

ASTM E831	ISO 294-3/4	ISO 3451	ISO 11359-2
ISO 75	ISO 527-1/2	ISO 3795	ISO 11469
ISO 179/1eA	ISO 1183	ISO 7792-2	
ISO 294-1	ISO 3146	ISO 11357-3	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14270	GMW16853
GMW3059	GMW3232	GMW14444	
GMW3205	GMW3235	GMW15634	

3 Requirements

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

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 7792-2. All tests shall be performed on unannealed specimens in a controlled atmosphere per GMW3221 Code A, unless otherwise specified. In addition, tests specified at temperatures below or above $+22\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ shall be conducted at the specified temperature using specimens conditioned at the specified temperature for 4 h minimum.

The minimum values specified in the property tables must be met by test specimens in natural, black, or in a standard sampled color if natural or black are not available.

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.

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 (Natural and Black). See Table 1. The following are also required for full standard approval. The minimum number of lots per test required is one (1) in natural:

- Poisson's Ratio
- Coefficient of Linear Thermal Expansion (CLTE)

- Mold shrinkage, stress strain curve at multiple temperatures (-30 °C, +23 °C, +85 °C, +125 °C)

See GMW3013 for the test procedures.

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 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 Properties (Natural and Black)

			Glass Fiber Percentage	
			Value	Value
Property	Standard	Units	15%	30%
ISO Symbol	ISO 11469		>PBT-GF15<	>PBT-GF30<
Ash	ISO 3451	% by mass	13 to 17	28 to 32
Density	ISO 1183	g/cm ³	Target Range 1.37 ± 0.03	Target Range 1.52 ± 0.05
Tensile Modulus	ISO 527-1/2	MPa	≥ 4600	≥ 7500
Stress at Break	ISO 527-1/2	MPa	≥ 89	≥ 110
Notched Charpy Impact Strength At +23 °C At -30 °C	ISO 179/1eA	kJ/m ²	≥ 7 ≥ 3.5	≥ 6 ≥ 6
Hydrolytic Resistance-Tensile Strength at break after 1000 h +85 °C/85% Relative Humidity	ISO 527-1/2	% Retention	≥ 75	
Tensile Strength at Break After 1000 h at +140 °C	ISO 527-1/2	% Retention	≥ 75	
Notched Charpy Impact Strength After 1000 h at 140 °C	ISO 179/1eA 1000 h at 140 °C	% Retention	≥ 75	
Melting Temperature	ISO 3146 or ISO 11357-3	°C	215 to 225	211 to 233
Heat Deflection Temperature under Load 1.8 MPa	ISO 75	°C	≥ 195	≥ 198
Coefficient of Linear Thermal Expansion (for reference only) Parallel to Flow Perpendicular to Flow	ASTM E831 or ISO 11359-2, Thermomechanical Analyst (TMA), Mean secant value over the temperature range -30 to +160 °C	10 ⁻⁶ mm/mm/°C	Report	Report
Mold Shrinkage (for reference only) after 48 h at +23 °C Parallel to Flow Perpendicular to Flow	ISO 294-3/4	%	0.50 to 0.70 1.0 to 1.2	0.3 to 0.5 0.7 to 0.9