



PBT+PET – Glass and Mineral Filled, Heat Stabilized

1 Scope

1.1 Material Description. This standard covers the properties of glass and mineral filled, heat stabilized, injection moldable polybutylene terephthalate (PBT) + polyethylene terephthalate (PET). Not for interior applications.

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

1.3 Applicability. Typical applications include the following: housings, brackets, and supports.

1.4 Remarks. The classification into groups is according to different ranges and types of mineral filler content.

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

2.2 GM Standards/Specifications.

GMW3013	GMW3059	GMW3221
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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 $+23\text{ °C} \pm 3\text{ °C}$ 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 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.
- Stress Strain Curve at multiple temperatures, (for example, -30 °C , $+23\text{ °C}$, $+85\text{ °C}$).
- Coefficient of Linear Thermal Expansion (CLTE), and Mold Shrinkage.

See GMW3013 for the test procedures.

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

Table 1: Compound Properties (Natural and Black)

Property	Standard	Units	20% GF +10% Mineral	15% GF +15% Mineral
ISO Symbol	ISO 11469	-	>PBT+PET-(GF20+M10)<	>PBT+PET-(GF15+M15)<
Density	ISO 1183	g/cm ³	1.44 to 1.5	1.46 to 1.56
Ash	ISO 3451	% by Mass	26 to 34	28 to 32
Tensile Modulus	ISO 527-1/2	MPa	6000 to 9700	8000 to 9300
Stress at Break	ISO 527-1/2	MPa	≥ 73	≥ 75
Notched Charpy Impact Strength - At +23 °C - At -30 °C	ISO 179/1eA	kJ/m ²	≥ 4.0 Report Value	≥ 4.0 Report Value
Tensile Strength at Break after Heat Aging	ISO 527-1/2 1000 h 140 °C	% Retention	75	75
Notched Charpy Impact Strength after Heat Aging	ISO 179/1eA 1000 h at 140 °C	% Retention	75	75
Melting Temperature	ISO 3146 or ISO 11357-3	°C	205 to 229	205 to 230
Heat Deflection Temperature (HDT-A) under Load at 1.82 MPa	ISO 75-2	°C	≥ 190	≥ 150
Coefficient of Linear Thermal Expansion (for reference only) Parallel to Flow Perpendicular to Flow	ASTM E831 or ISO 11359-2, Thermomechanical Analysis (TMA) mean secant value over the temperature range -30 °C to +160 °C	10 ⁻⁶ mm/mm/°C	Report	Report
Mold Shrinkage after 48 h at 23 °C (for information only) Parallel to Flow Perpendicular to Flow	ISO 294-3/4	%	Report Report	Report Report

GF = Glass Fiber

4 Manufacturing Process

Not applicable.

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.