



Polybutylene Terephthalate with 20% Glass Fiber and 20% Glass Bead Reinforcement

1 Scope

1.1 Material Description. This specification covers the properties of a 20% by mass glass fiber, 20% by mass glass bead reinforced, Polybutylene Terephthalate (PBT), pellet form injection molding compound.

1.2 Symbols. The material abbreviation according to ISO 11469 is > PBT-(GF20 + GB20) <.

1.3 Applicability. Typical applications include throttle body components for operating temperatures up to +125 °C.

2 References

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

2.1 External Standards/Specifications.

IEC 60695	ISO 188	ISO 1183	ISO 11469
IEC 62631	ISO 294	ISO 3451	
ISO 75	ISO 527-1/2	ISO 7792	
ISO 179-1	ISO 1133	ISO 11359	

2.2 GM Standards/Specifications.

GMW3013	GMW3059	GMW14270
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3 Requirements

3.1 Requirements on Delivery. Important physical, mechanical, and thermal properties which characterize the material are summarized in charts. The color shall be specified on drawings, in material specifications, and otherwise.

3.1.1 Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294 with the conditions for injection molding from ISO 7792. Before processing, the moisture content of the sample shall not exceed 0.02%. Test specimens shall be conditioned in a controlled atmosphere of +23 °C ± 2 °C and 50% ± 6% Relative Humidity (RH) for at least 24 h prior to test. All tests shall be performed on unannealed specimens in a controlled atmosphere of +23 °C ± 2 °C and 50% RH ± 5% RH, unless otherwise specified. In addition, tests specified at temperatures below or above +23 °C ± 2 °C shall be conducted at the specified temperature using specimens conditioned at the specified temperature for 4 h minimum. The minimum values detailed 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.

3.1.2 Compound Properties (Natural, Black and Integrally Colored). 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 (for example -30 °C, +23 °C, +85 °C, +140 °C). See GMW3013 for the test procedures.

3.1.3 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media they contact, such as aliphatic and aromatic hydrocarbons, fuels, lubricants, oils, greases and alcohols, at their places of use.

3.1.4 Properties Requirements. See Table 1.

Table 1: Property Requirements

Property	Standard	Units	Value
Ash	ISO 3451 at +950 °C	%	38 to 42
Density	ISO 1183	g/cm ³	Target Range 1.55 to 1.75
Tensile Modulus	ISO 527-1/2	MPa	8200 to 10 200
Stress at Break	ISO 527-1/2	MPa	≥ 90
Stress at Break after Heat Aging ^{Note 1}	ISO 188 ISO 527-1/2	% Retention	≥ 75
Strain at Break	ISO 527-1/2	%	2.0
Notched Charpy Impact Strength At +23 °C	ISO 179-1	kJ/m ²	≥ 4.5
Notched Charpy Impact Strength after Heat Aging ^{Note 1}	ISO 188 ISO 179-1	% Retention	≥ 75
Heat Deflection Temperature under Load 1.8 MPa	ISO 75	°C	≥ 190
Burning Behavior at 0.8 thickness	IEC 60695-11-10	Rating	Horizontal Burn (HB)
Volume Resistivity	IEC62631	Ohm*m	≥ 10 ¹³
Surface Resistivity	IEC 62631	Ohm	≥ 10 ¹⁵
Melt Flow Rate (MFR) 250 °C/2.16 kg	ISO 1133	g/10 minute	Target Range 10 to 20
Mold Shrink – Longitudinal 48 h after Molding	ISO 294	%	Target Range 0.2 to 0.6
Mold Shrink – Transverse 48 h after Molding	ISO 294	%	Target Range 0.8 to 1.2
Mold Shrink – Longitudinal 48 h at 80 °C after Molding	ISO 294	%	Target Range 0.02 to 0.08
Mold Shrink – Transverse 48 h at 80 °C after Molding	ISO 294	%	Target Range 0.1 to 0.15
CLTE	ISO 11359	10 ⁻⁶ × 1/K	Flow: ≤ 60 x-flow: ≤ 180

Note 1: Specimens tested for stress at break to ISO 527-1/2 after heat aging 1000 h ± 5 h at +140 °C ± 5 °C, according to ISO 188 Method A (air oven method), shall have a minimum of 75% retention relative to unaged specimens tested concurrently.