GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17548

Polyetherimide + Polycarbonate Ester – Amorphous Blends

1 Scope

1.1 Material Description. This specification covers the properties of an engineering thermoplastic, natural or black, glass fiber reinforced, injection molding grade, pellet form, amorphous polyetherimide blended with a polycarbonate ester.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PEI-PCE<.

1.3 Applicability. Typical applications include vacuum metalized lamp reflectors.

1.4 Remarks. This specification is broken into Types base upon heat deflection temperature (HDT).

- **Type 1** – HDT ≥ 170 °C
- **Type 2** – HDT ≥ 143 °C

2 References

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

2.1 External Standards/Specifications.

ASTM E228	ISO 179/1eA	ISO 527-1	ISO 11359-2
ASTM E831	ISO 188	ISO 527-2	ISO 11469
ISO 75	ISO 294-3	ISO 1133	UL 94
ISO 75-1	ISO 294-4	ISO 1183/A	
ISO 75-2	ISO 527	ISO 3167	

2.2 GM Standards/Specifications.

GMW3013	GMW14270	GMW14650
GMW3059	GMW14444	

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 with the conditions for injection molding per the resin manufacturer**.**

All tests shall be performed on unannealed specimens in a controlled atmosphere of 22 °C ± 3 °C and 50% relative humidity (RH) ± 5% RH unless otherwise specified. In addition, tests specified at temperatures below or above 22 °C ± 3 °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.

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

3.2 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.

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3.3 Requirements on Materials. See Table 1.

3.4 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. All finished parts for Exterior applications shall meet the requirements according to GMW14650.

3.5 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, 125 °C, 150 °C and 200 °C.
- Shear Modulus Curve
- Differential Scanning Calorimetry (DSC) Curve
- Infrared Spectroscopy Curve

See GMW3013 for the test procedures.

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 or Black)

Property	Standard	Units	Range	
Type			**1**	**2**
Melt Flow	ISO 1133 6.7 kg load, 295 °C	g/10 minute	20 to 34	3.5 to 11.5
Density	ISO 1183/A	g/cm^3	Target Range 1.25 to 1.35	Target Range 1.19 to1.30
Tensile Modulus	ISO 527-1, ISO 527-2 1 mm/minute, between 0.05% to 0.25% strain. ISO 3167, 4 mm thick Type A bar	MPa	≥ 2800	≥ 2000
Tensile Stress at Yield	ISO 527-1, ISO 527-2, 50 mm/minute, ISO 3167, 4 mm thick Type A bar	MPa	90	≥ 50
Tensile Strain at Yield	ISO 527-1, ISO 527-2, 50 mm/minute, ISO 3167, 4 mm thick Type A bar	%	≥ 6.5	≥ 7
Stress at Yield after Heat Aging	ISO 188 ISO 527 1000 h at X °C	% Retention	≥ 90 X=180	≥ 90 X=120
Notched Charpy Impact Strength At +23 °C At -30 °C	ISO 179/1eA, Machined V-Notch, radius = 0.25 mm, 80 mm × 10 mm × 4 mm	kJ/m^2	≥ 4 ≥ 3.5	≥ 8.9 ≥ 4.9

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