GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17702

Polyamide 6 – 15% Glass Fiber Reinforced, Heat Stabilized, Impact Modified, Blow Moldable Grade

1 Scope

1.1 Material Description. This specification covers the properties of 15% by mass glass fiber reinforced, heat stabilized, impact modified, blow moldable polyamide 6.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PA6-I-GF15<.

1.3 Applicability. Typical applications include the following: blow molded air induction system and charge air cooler components.

2 References

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

2.1 External Standards/Specifications.

ISO 75-1	ISO 294	ISO 1874-2	ISO 11469
ISO 75-2	ISO 527-1	ISO 3146	ISO 15512
ISO 179/1eA	ISO 527-2	ISO 3451	SAE J1639
ISO 188	ISO 1183	ISO 3795	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14270	GMW14335
GMW3059	GMW3232		

3 Requirements

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 from ISO 1874-2. Test methods and specimen dimensions are also to be in accordance with ISO 1874-2.

All values indicated herein are based on material considered to be in the dry-as-molded state with moisture content of 0.2% maximum (ISO 15512, Method A or Method B, or GMW14335). Immediately after molding, per ISO 1874-2, specimens shall be sealed in moisture-proof containers and stored at 23 °C ± 2 °C for at least 24 h.

All tests shall be performed on unannealed specimens immediately after their removal from the containers in a controlled atmosphere per GMW3221, Code A 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 values specified in Table 1 shall 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 (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 °C, +140 °C

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- Coefficient of Linear Thermal Expansion (CLTE)
- Mold Shrinkage
- Shear Modulus, SAE J1639, temperature range at 5 °C intervals is -50 °C ± 210 °C

See GMW3013 for all test procedures and parameters.

3.3 Test Procedures. Tests shall be conducted using the latest issue of the test methods indicated. Suitable precautions should be taken to ensure that applicable safe limits are not exceeded when conducting test procedures, processes, and/or handling the materials required by this specification**.**

3.4 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 they contact, such as aliphatic and aromatic hydrocarbons, fuels, lubricants, oils, greases and alcohols, at their places of use.

3.5 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 (Black)

Property [Note 1]	Standard	Units	Values
ISO Symbols	ISO 11469	-	>PA6-I-GF15<
Ash	ISO 3451	%	13 to 17
Density	ISO 1183, Method A	g/cm^3	Target Range 1.20 to 1.26
Moisture Content	ISO 15512 Method A, Method B, or GMW14335	%	≤ 0.2
Tensile Modulus	ISO 527-1 ISO 527-2	MPa	4800 to 6500
Tensile Strength at Break	ISO 527-1 ISO 527-2	MPa	≥ 100
Tensile Elongation at Break	ISO 527-1 ISO 527-2	%	≥ 2.5
Tensile Strength at Break after Heat Aging [Note 2]	ISO188 ISO 527-1 ISO 527-2 1000 h at +140 °C	% Retention	≥ 75
Notched Charpy Impact Strength at: +23 °C -30 °C	ISO 179/1eA	kJ/m²	 ≥ 12 ≥ 4.5

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