GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17577

Polyamide 6 – Impact Modified, Heat Stabilized, Extrusion Grade

1 Scope

1.1 Material Description. This specification covers the properties of impact modified, heat stabilized, extrusion grade polyamide 6. This material contains added caprolactam. This material shall not be used in drain tubes or windshield washer tubes. For these applications, use low caprolactam per GMW16942.

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

1.3 Applicability. Typical applications include: cable jacketing.

1.4 Remarks. The specification is classified by level of impact modifiers:

- **T1:** Impact Modified (no identified materials at this time).
- **T2:** High Impact Modified.

2 References

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

2.1 External Standards/Specifications.

ASTM D6869	ISO 294	ISO 1874-2	ISO 11469
ISO 75	ISO 527-1	ISO 3146	ISO 15512
ISO 179/1eA	ISO 527-2	ISO 3795	
ISO 188	ISO 1183/A	ISO 11357-3	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14270	GMW16853
GMW3059	GMW3232	GMW14335	GMW16942
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 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.

3.2 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 (ASTM D6869, 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.

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3.2.1 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.

3.3 Compound Properties. See Table 1. The following are also required for full standard approval. The minimum number of lots per test required for the following properties 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, +110 °C, +23 °C/50% relative humidity (RH)).

See GMW3013 for all test procedures and parameters.

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 (Natural and Black)

			High Impact Grade, T2
Property	**Standard**	**Units**	**Value**
Density	ISO 1183/A	g/cm^3	Target Range 1.04 to 1.08
Caprolactam Content	-	%	Report
Moisture Content	GMW14335 or ISO 15512, Method A or Method B	%	≤ 0.2
Tensile Modulus	ISO 527-1, ISO 527-2	MPa	500 to 1300
Tensile Strength at Break	ISO 527-1, ISO 527-2	MPa	≥ 30
Tensile Strength at Break after Heat Aging	ISO 188 ISO 527-1, ISO 527-2 1000 h at +110 °C	% Retention	≥ 80
Notched Charpy Impact Strength	ISO 179/1eA	kJ/m^2	
at +23 °C			≥ 50
at -30 °C			≥ 10
Notched Charpy Impact Strength after Heat Aging	ISO 188 ISO 179/1eA 1000 h at +110 °C	% Retention	≥ 45
Melting Temperature	ISO 3146 or ISO 11357-3	°C	Target Range 210 to 225

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