GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17349

Polyamide 66 – Heat Stabilized, Extrusion Grade

1 Scope

1.1 Material Description. This specification covers the properties of a heat stabilized, extrusion grade Polyamide 66 compound.

1.2 Symbols. The material abbreviation according to ISO 11469 is shown in Table 1.

1.3 Applicability. Typical applications includes fasteners.

2 References

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

2.1 External Standards/Specifications.

ASTM D6869	ISO 188	ISO 1874-2	ISO 11357
ASTM E831	ISO 294-1	ISO 3146	ISO 11359-2
ISO 75	ISO 527-1/2	ISO 3167	ISO 11469
ISO 179/1eA	ISO 1183	ISO 3795	ISO 15512

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14335
GMW3059	GMW3232	

3 Requirements

Materials approved to this standard 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 1874-2. Test methods and specimen dimensions are also to be in accordance with ISO 1874-2 with the following additions:

- Use ISO 3167, Type A, thickness 4 mm, for tensile and flexural properties.

3.1.1 Test values indicated in Table 1 are based on material with moisture content of 0.2% maximum (dry as molded) as tested per ASTM D6869, GMW14335, or ISO 15512, Method A or Method B. Immediately after molding per ISO 1874-2, specimens shall be sealed in moisture-proof containers and stored at +22 °C ± 3 °C for 24 h minimum. All tests shall be performed on un-annealed 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 +22 °C ± 3 °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 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 Parts. Parts of this material type shall have a water content, when tested per GMW14335 at delivery of at least:

- 1.5% by mass for material types reinforced up to 20% by mass.
- 1.0% by mass for material types reinforced over 20% by mass.

Deviations from the requirements in 3.3 shall be specifically indicated on the part drawings.

3.4 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.

3.5 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 °C, +110 °C.) See GMW3013 for all test procedures and parameters.

3.6 Performance Requirements. Performance requirements shall be specified on part drawings or in component specifications.

Table 1: Compound Properties (Natural and Black)

Properties	Standard	Unit	Values
ISO Symbol	ISO 11469	-	>PA66<
Moisture Content as Received	ISO 15512, Method A or Method B	%	≤ 0.20
Density	ISO 1183, Method A	g/cm^3	1.13 to 1.15
Tensile Modulus	ISO 527-1/2; 1 mm/minute, Specimen ISO 3167, 4 mm thick Type A bar	MPa	≥ 2540
Tensile Elongation at Yield	ISO 527-1/2; 50 mm/minute	MPa	≥ 2.8
Tensile Stress at Yield	ISO 527-1/2; 50 mm/minute	MPa	≥ 75
Tensile Stress at Yield after Heat Aging	ISO 527-1/2, Conditioning temperature defined by GMW3013	% Retention	≥ 75
Notched Charpy Impact Strength at +23 °C ± 2 °C at -30 °C ± 2 °C	ISO 179/1eA	 kJ/m^2 kJ/m^2	 ≥ 3.5 ≥ 3.0
Notched Charpy Impact Strength after Heat Aging	ISO 179/1eA, ISO 188, Conditioning temperature defined by GMW3013	% Retention	≥ 75
Flammability	GMW3232 or ISO 3795 Report per GMW3232	mm/minute	Self-Extinguishing (SE) or ≤ 100

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