



Polyamide 66 - Glass Fiber Reinforced, Heat Stabilized, Hydrolysis Resistant

1 Scope

1.1 Material Description. This standard covers the properties of glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 (nylon 66), used in injected form for molded components.

1.2 Symbols. The material abbreviations according to ISO 11469 are shown in Table 1.

1.3 Applicability. Typical applications include: Radiator End Caps, Radiator Caps, and Coolant Inlets.

1.4 Remarks. The classification into groups is according to the different ranges of glass fiber content.

2 References

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

2.1 External Standards/Specifications.

ASTM D6869	ISO 188	ISO 960	ISO 3451
ISO 75	ISO 294	ISO 1183	ISO 11357-3
ISO 179/1eA	ISO 527-1	ISO 1874-2	ISO 11469
ISO 179/1eU	ISO 527-2	ISO 3146	ISO 15512

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW15468
GMW3059	GMW14335	

3 Requirements

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

3.1.1 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.

3.1.1.1 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, specimens shall be sealed in moisture proof containers and stored at $+23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for at least 24 h prior to test as specified in ISO 1874-2. 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 $+23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, 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.

3.1.2 Requirements on Parts. Parts of this material type shall have a water content at delivery, when tested per GMW14335 or ISO 960, Method A, 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 this shall be specifically indicated on the part drawings.

3.1.3 Compound Properties (Natural, Black and Integrally Colored). See Table 1. See GMW3013 for the test procedures.

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

Table 1: Compound Properties (Natural and Black)

Glass Fiber Reinforcement Percentage					
			25%	30%	35%
Property	Standard	Units	Value	Value	Value
ISO Symbol	ISO 11469	None	>PA66-GF25<	>PA66-GF30<	>PA66-GF35<
Ash	ISO 3451	%	22 to 28	27 to 33	32 to 38
Density	ISO 1183	g/cm ³	Target Range 1.29 to 1.36	Target Range 1.33 to 1.39	Target Range 1.37 to 1.43
Moisture Content	GMW14335, ISO 15512 Method A or B, or ASTM D6869	%	≤ 0.2	≤ 0.2	≤ 0.2
Tensile Modulus	ISO 527-1 ISO 527-2	MPa	7000 to 10 000	8600 to 11 600	9700 to 13 300
Tensile Stress at Break	ISO 527-1 ISO 527-2	MPa	≥ 160	≥ 175	≥ 190
Tensile Strain at Break	ISO 527-1 ISO 527-2	%	≥ 3.0	≥ 3.0	≥ 3.0
Stress at Break after Heat Aging Note 1	ISO 188 ISO 527-1 ISO 527-2	% Retention	≥ 75	≥ 75	≥ 75
Unnotched Charpy Impact Strength at +23 °C at -30 °C	ISO 179/1eU	kJ/m ²	≥ 40 ≥ 20	≥ 60 ≥ 25	≥ 70 ≥ 30
Notched Charpy Impact Strength at +23 °C at -30 °C	ISO 179/1eA	kJ/m ²	≥ 5 ≥ 4	≥ 6 ≥ 5	≥ 7 ≥ 6
Notched Charpy Impact Strength after Heat Aging Note 1	ISO 188 ISO 179/1eA	% Retention	≥ 75	≥ 75	≥ 75
Melting Temperature	ISO 3146 or ISO 11357-3	°C	Target Range 255 to 265	Target Range 255 to 265	Target Range 255 to 265
Heat Deflection Temperature under Load HDT/A, 1.8 MPa	ISO 75	°C	≥ 230	≥ 230	≥ 235