



Polyamide 66 - Heat Stabilized, Impact Modified

1 Scope

1.1 Material Description. This standard covers properties of various types of heat stabilized, impact modified polyamide 66 (nylon 66) which are used in injected form for molded components.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PA66-I<.

1.3 Applicability. Typical applications include the following: fasteners, clips, retainers, electrical components, vapor canisters.

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

- **T1:** Impact modified.
- **T2:** High impact modified.
- **T3:** Very high impact modified.

2 References

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

2.1 External Standards/Specifications.

ASTM D3763	ISO 188	ISO 1874-2	ISO 11357-3
ASTM D6869	ISO 294	ISO 3146	ISO 11469
ISO 75	ISO 527	ISO 3795	ISO 15512
ISO 179/1eA	ISO 1183	ISO 6603-1/2	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14335	GMW15634
GMW3059	GMW3232	GMW14444	GMW16853
GMW3205	GMW3235		

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.

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 B, or GMW14335). Immediately after molding, specimens shall be sealed in moisture-proof containers and stored at 22 °C ± 3 °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 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.

3.2 Emissions Testing of Interior Materials and Parts. For all Code E designated parts per GMW14444, reference GMW16853 for emissions testing of interior materials and parts.

3.3 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.

3.4 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 in natural: Poisson's Ratio, Coefficient of Linear Thermal Expansion (CLTE), Mold Shrinkage, Stress Strain Curve at multiple temperatures (for example 23 °C, 85 °C, -30 °C), Shear Modulus Curve; and Multiaxial Impact Curve. See GMW3013 for the test procedures.

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

Table 1: Compound Properties (Natural and Black)

			Impact Grade, T1	High Impact Grade, T2	Very High Impact Grade, T3
Property	Standard	Units	Range	Range	Range
Density	ISO 1183	g/cm ³	Target Range 1.09 to 1.13	Target Range 1.07 to 1.13	Target Range 1.04 to 1.13
Moisture Content	GMW14335 or ISO 15512, Method A or B	%	≤0.2		
Tensile Modulus	ISO 527	MPa	2000 to 2600	1800 to 2900	1600 to 2400
Tensile Stress at Break	ISO 527	MPa	≥55	≥50	≥40
Tensile Stress at Break after Heat Aging	ISO 188, ISO 527 1000 h at 110 °C	% Retention	≥75		
Notched Charpy Impact Strength at +23 °C at -30 °C	ISO 179/1eA	kJ/m ²	Report	Report	Report
Notched Charpy Impact Strength after Heat Aging	ISO 188, ISO 179/1eA 1000 h at 110 °C	% Retention	≥75		
Multiaxial Impact – Exterior at +23 °C at Low Temperature	ASTM D3763 2.2 m/s	J at Maximum Load 30/30 Ductile at RT 24/30 Ductile at LT	≥30 -	≥35 ≥30 (0 °C)	≥30 ≥40 (-30 °C)
Multiaxial Impact - Interior at +23 °C at Low Temperature	ASTM D3763 6.6 m/s	J at Maximum Load 30/30 Ductile at RT 24/30 Ductile at LT	≥30 -	≥40 ≥50 (0 °C)	≥35 ≥40 (-30 °C)
Multiaxial Impact - Interior or Exterior at +23 °C at Low Temperature	ISO 6603-1/2 4.4 m/s	J at Maximum Load 30/30 Ductile at RT 24/30 Ductile at LT	Report Report	Report Report	Report Report
Melting Temperature	ISO 3146 or ISO 11357-3	°C	Target Range 250 to 270	Target Range 250 to 270	Target Range 250 to 270