



Polyamide 612 - Impact Modified, Heat Stabilized, Hydrolysis Resistant, Extrusion Grade

1 Scope

1.1 Material Description. This standard covers the properties of an extrusion grade, heat stabilized, hydrolysis resistant, impact modified, polyamide 612 (nylon 612).

1.2 Symbols. The material abbreviation according to ISO 11469 is >PA612-I<.

1.3 Applicability. Typical applications include flexible coolant lines.

1.4 Remarks. This material is non-plasticized.

2 References

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

2.1 External Standards/Specifications.

ASTM E831	ISO 188	ISO 1183	ISO 11469
ASTM D6869	ISO 294	ISO 3146	ISO 15512
ISO 75-2	ISO 527	ISO 11357-3	ISO 1874-2
ISO 179/1eA	ISO 527-1/2	ISO 11359-2	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14335	GMW15468
GMW3059			

3 Requirements

3.1 Requirements on Test Specimens. Reference GMW3221. 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, specimens shall be sealed in moisture-proof containers and stored at 23 °C ± 2 °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 °C ± 2 °C, shall be conducted at the specified temperature using specimens conditioned at the specified temperature for 4 h minimum.

3.2 Requirements on Delivery. The color shall be specified on drawings, in material specifications and otherwise.

3.3 Compound Properties (Natural and Black). See Table 1. 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. 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, Coefficient of Linear Thermal Expansion (CLTE)
- Mold Shrinkage, Stress Strain Curve at multiple temperatures (-30 °C, 23 °C, +130 °C), Shear Modulus Curve. See GMW3013 for the test procedures.

Table 1: Compound Properties (Natural and Black)

Property	Standard	Units	Value
ISO Symbol:	ISO 11469		>PA612-I<
Density	ISO 1183	g/cm ³	Target Range 0.98 to 1.02
Moisture Content	ISO 15512 Method A or Method B	%	≤ 0.2
Tensile Modulus	ISO 527	MPa	900 to 1300
Tensile Stress at Yield	ISO 527	MPa	≥ 28
Tensile Strain at Yield	ISO 527	%	≥ 5
Stress at Yield after Heat Aging	ISO 188 ISO 527 1000 h at 130 °C	% Retention	≥ 90
Notched Charpy Impact Strength at +23 °C at -30 °C	ISO 179/1eA	kJ/m ²	≥ 23 ≥ 6.5
Notched Charpy Impact Strength after Heat Aging	ISO 188 ISO 179/1eA 1000 h at 130 °C	% Retention	≥ 90
Melting Temperature	ISO 3146 or ISO 11357-3	°C	Target Range 210 to 225
Heat Deflection Temperature under Load 1.8 MPa	ISO 75-2	°C	≥ 30
Coefficient of Linear Thermal Expansion (CLTE): Parallel to Flow Perpendicular to Flow	ASTM E831 or ISO 11359-2, Thermal Mechanical Analysis (TMA), Mean secant value over the temperature range -30 °C to +160 °C	10 ⁻⁶ mm/mm/°C	≤ 150 ≤ 100
Tensile Stress at Yield after Engine Coolant Exposure, 130 °C, 504 h	GMW15468, ISO 527-1/2	MPa	≥ 25
Tensile Stress at Yield after Engine Coolant Exposure, 130 °C, 1008 h	GMW15468, ISO 527-1/2	MPa	≥ 25
Tensile Strain after Engine Coolant Exposure, 130 °C, 504 h	GMW15468, ISO 527-1/2	%	≥ 25