



Polyoxymethylene Homopolymer

1 Scope

1.1 Material Description. This specification describes material types of unfilled heat stabilized polyoxymethylene homopolymers that are used in injected form for molded components. Additional characteristics will be indicated by code letters according to the respective specification number. Code letters that may apply to this specification are found in Table 1.

Table 1: Code Letters

Properties	Code Letters
Mold Release Agent	R
Polymer (Thermoplastic) Modified	P1
Polymer (Thermoplastic) highly modified	P2
Antistatic Agent	Z

1.2 Symbols. >POM<.

1.3 Applicability. Clips, clamps, sliders, handles, fasteners, etc., various parts requiring lubricity.

1.4 Remarks. The classification into groups is according to the different ranges of viscosity.

2 References

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

2.1 External Standards/Specifications.

ISO 75	ISO 294	ISO 1133	ISO 3167
ISO 179/1eA	ISO 527-1	ISO 1183	ISO 9988-2
ISO 188	ISO 527-2	ISO 3146	

2.2 GM Standards/Specifications.

GMW3059	GMW3013	GMW3221
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3 Requirements

Materials approved to this specification shall meet the standard requirements of GMW3013.

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.

3.2 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 9988-2. Unless otherwise specified, test methods and specimen dimensions are to be in accordance with GMW3013.

All tests shall be performed on unannealed specimens immediately following a conditioning period of 24 h minimum in a controlled atmosphere per GMW3221, Code A, unless otherwise specified. In addition, tests specified at temperatures below or above +23 °C, shall be conditioned at the specified temperature for 4 h minimum and tested at the specified temperature.

3.2.1 Compound Properties (Natural, Black and Integrally Colored). Important physical, mechanical, and thermal properties that characterize the material are summarized in Table 2. 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 (for example: -30 °C, +23 °C, +85 °C)
- Shear Modulus Curve
- Differential Scanning Calorimetry (DSC) Curve
- Infrared Spectroscopy Curve. See GMW3013 for the test procedures.

3.3 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.

Table 2: Compound Properties

Properties	Test	Unit	H1	H2	H3	H4	H5	H3P1	H3P2
Tensile Modulus	ISO 527-1, ISO 527-2, Specimen ISO 3167, 4 mm thick Type A bar, Test Speed 1 mm/minute; between 0.05% to 0.25% Strain	MPa	2400 to 3700	2750 to 3800	2600 to 3900	2800 to 3600	2800 to 3800	1900 to 2900	900 to 1700
Stress at Yield	ISO 527-1, ISO 527-2, Specimen ISO 3167, 4 mm thick Type A bar, Test Speed 50 mm/minute	MPa	≥ 65	≥ 65	≥ 65	≥ 65	≥ 65	≥ 45	≥ 35
Stress at Yield after Heat Aging	ISO 527-1, ISO 527-2, Specimen ISO 3167, 4 mm thick Type A bar, Test Speed 50 mm/minute	MPa	Stress at Yield to ISO 527 after heat aging 1000 h ± 5 h at +110 °C ± 3 °C for groups H1, H2, H3, H4 and H5 or 1000 h ± 5 h at +90 °C ± 3 °C for the polymer modified groups H3P1 and H3P2 according to ISO 188 Method A (air oven method) shall have retention > 75% relative to unaged specimens tested concurrently.						
Strain at Yield	ISO 527-1, ISO 527-2, Specimen ISO 3167, 4 mm thick Type A bar, Test Speed 50 mm/minute	%	≥ 12	≥ 0	≥ 8	≥ 6	≥ 5	≥ 13	≥ 25
Charpy Notched Impact Strength at +23 °C	ISO 179/1eA, Specimen Machined V-notch radius = 0.25 mm, 80 mm × 10 mm × 4 mm	kJ/m ²	≥ 6	≥ 5	≥ 4	≥ 3	≥ 2	≥ 9	≥ 40
Charpy Notched Impact Strength at -30 °C	ISO 179/1eA, Specimen Machined V-notch, radius = 0.25 mm, 80 mm × 10 mm × 4 mm	kJ/m ²	≥ 6	≥ 4	≥ 3	≥ 2	≥ 2	≥ 4	≥ 7