GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17624

Mold in Color Metallic Polyoxymethylene (Acetal) Copolymer, Heat Stabilized, UV Stabilized

1 Scope

1.1 Material Description. This standard describes heat stabilized, ultraviolet (UV) stabilized, mold in color metallic polyoxymethylene (acetal) copolymers which are used in injection molded components.

1.2 Symbols. The material abbreviation according to ISO 11469 is >POM<.

1.3 Applicability. Typical applications include interior injection molded parts with metallic pigments.

2 References

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

2.1 External Standards/Specifications.

ASTM E831	ISO 527-1/2	ISO 3167	ISO 11469
ISO 75-1/2	ISO 1133	ISO 3795	
ISO 179/1eA	ISO 1183	ISO 9988-2	
ISO 294	ISO 3146	ISO 11359-2	

2.2 GM Standards/Specifications.

GMW3013	GMW3232	GMW14162	GMW15634
GMW3059	GMW3235	GMW14334	GMW15635
GMW3221	GMW3417	GMW14444	GMW16853

3 Requirements

Materials approved to this specification shall meet the requirements of GMW3013, **General Requirements for Handling of Technical Terms of Delivery for Plastics.**

3.1 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.

Note: For each product, the requirements to Table 1 and Table 2 shall be documented by Certification Statement according to GMW3013. The color shall be specified on drawings, in material specifications, and otherwise.

3.2 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 9988-2. Test methods and specimen dimensions are also to be in accordance with ISO 9988-2 with the following additions:

- Use ISO 3167 Type 1A, thickness 4 mm, for tensile and flexural properties.

3.2.1 All tests shall be performed on specimens 40 h minimum after molding, and immediately following a conditioning period of 24 h minimum in a controlled atmosphere per GMW3221, Code A, unless otherwise specified. All tests shall be performed on unannealed specimens. The values specified in Table 1 and Table 2 shall be met by test specimens.

3.3 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.

3.4 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media they contact at their place of use.

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3.5 Compound Properties. See Table 1 and Table 2. The following are also required for full standard approval.

- The minimum number of lots per test required for the following properties is one (1) in natural.
- Stress Strain Curve at multiple temperatures**,** (for example**:** -30 °C, 23 °C, 85 °C).

See GMW3013 for all test procedures and parameters.

3.6 Performance Requirements. Performance requirement shall be specified on part drawings or in component specifications. 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 1: Compound Properties

Property	Standard [Note 1]	Units	Requirement
Density	ISO 1183, Method A, ≥ 10 mm × ≥ 10 mm × 4 mm	g/cm^3	1.38 to 1.50
Tensile Modulus	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, Test speed 1 mm/minute; between 0.05% to 0.25% strain	MPa	≥ 2300
Tensile Stress at Yield/Break	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, Test speed 50 mm/minute; if tensile strain at yield or break > 10%	MPa	≥ 45
Tensile Elongation at Break	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, Test speed 50 mm/minute; if tensile strain at yield or break >10%	%	10 to 50
Poisson's Ratio	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, Tensile method, Test speed 1 mm/minute	No units	Report one (1) lot value
Notched Charpy 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	≥ 2
Notched Charpy 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	≥ 1
Melt Mass-Flow Rate (MFR) or Melt Volume-Flow Rate (MVR)	ISO 1133, Temperature and load defined in 190 °C and 2.16 kg load	g/10 minutes or cm^3/10 minutes	11 to 17 g/10 minutes 8 to 13 cm^3/10 minutes
Mold Shrink - Longitudinal – 48 h after Molding	ISO 294, plaque size 60 mm × 60 mm ×2 mm Type D2 preferred or larger with maximum thickness of 4 mm	%	Report one (1) lot
Mold Shrink - transverse – 48 h after Molding	ISO 294, Plaque size 60 mm × 60 mm × 2 mm Type D2 preferred or larger with maximum thickness of 4 mm	%	Report one (1) lot
Heat Deflection Temperature (HDT) - 0.45 MPa	ISO 75-1/2, Method B, Specimen 80 mm × 10 mm ×4 mm, test flatwise, unannealed (only if required in specification)	°C	≥ 140 One (1) lot only
HDT - 1.8 MPa	ISO 75-1/2, Method A, Specimen 80 mm × 10 mm ×4 mm, test flatwise, unannealed	°C	≥ 80
Melting Temperature	ISO 3146 Method A, Method B, Method C Differential Scanning Calorimeter (DSC) or Differential Thermal Analyzer (DTA) at 10 °K/minute	°C	≥ 160

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