



Polyoxymethylene – Glass Fiber Reinforced, Heat Stabilized, Fuel Resistant, Injection Moldable

1 Scope

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose/Material Description. This specification covers the properties of glass fiber reinforced, heat stabilized, fuel resistant, injection moldable polyoxymethylene (acetal) copolymer.

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

1.3 Applicability. Typical applications include, but are not limited to, the following: fuel pump module components.

Note: The tensile strength of these materials decreases after fuel (gasoline) soak with increased filler content. Not for utilization in fuel applications/components that require high tensile strength with constant exposure to liquid gasoline.

1.4 Remarks. The classification into groups are 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.

ISO 75-1/2	ISO 527-1/2	ISO 3146	ISO 29988-2
ISO 179/1eA	ISO 1133	ISO 3451	SAE J1681
ISO 188	ISO 1183/A	ISO 11357-3	
ISO 294-1	ISO 1817	ISO 11469	

2.2 GM Standards/Specifications.

GMW3013	GMW3059	GMW3221	GMW14270
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2.3 Additional References.

- GM SupplyPower documents, available at GM Supply Power (<https://gmsupplypower.covisint.com/web/portal/home>) under Collaborate and Document Library.

2.3.1 Fuels (Fuel Specifications).

- GMPT-4-15: Gasoline – Fuel C with 15% methanol content, aggressive (CM15A)
- GMPT-5-020: Diesel – 20% SME bio content (B20)
- GMPT-6-025: Gasoline – Fuel C with 10% Ethanol content (CE10)

Note: The fuels are available from Gage Products at <http://www.gageproducts.com/index.html> or Haltermann Solutions at <https://www.haltermannsolutions.com/test-reference-fuels>. Fuel Specifications are limited to internal distribution within General Motors. Contact the GM Lead Engineer for further instructions.

3 Requirements

3.1 Requirements on Test Specimens. Reference GMW3221.

Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-1 with the conditions for injection molding from ISO 29988-2. 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 $(23 \pm 2)^\circ\text{C}$ shall be conducted at the specified temperature using specimens conditioned at the specified temperature for 4 h minimum.

3.2 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.

3.3 Compound Properties (Natural and Black). See Table 1. The following are also required for full approval. The minimum number of lots per test required is one unless otherwise specified. See the Acetal tab on the Plastics Submission Template and GMW3013 for test details and parameters.

- Poisson's Ratio
- Stress/strain data points and curves at the following temperatures:
-30 °C, +23 °C, +85 °C, and after 1000 h fuel soak

Note: See the GM Material Property Data (GMMPD) tab on Plastics Submission Template (located in GM SupplyPower) for test details.

- Coefficient of Linear Thermal Expansion (CLTE) data
Note: See GMMPD tab on Plastics Submission Template (located in GM SupplyPower) for test details.
- Differential Scanning Calorimetry (DSC) curve
- Fourier Transform Infrared (FTIR) spectroscopy curve
- Mold shrinkage

3.4 Swell After Fuel Soak. On a standard tensile bar, measure length, width, and thickness prior to start of test. Measure length, width, and thickness again after 1000 h fuel soak. Calculate percent change in each direction per the following equation:

$$\frac{d_2 - d_1}{d_1}$$

Where:

d_1 is the original measurement, and

d_2 is the measurement after fuel soak

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

3.6 Initial Source Approval. No shipments shall be made by any supplier until representative initial production samples have been approved by the appropriate Materials Engineering department(s) as meeting the requirements of this specification.

3.7 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to obtain a GM-approved International Material Data System (IMDS) submission.