



Polyolefin Alloy - 20% Mineral Filled, 1800 MPa Flexural Modulus

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 a 20% nominal mineral filled, 1800 MPa nominal flexural modulus polyolefin alloy, pellet form, injection molding compound. For the purpose of this specification, polyolefin alloy is defined as an alloy of polypropylene plastic and Ethylene Propylene (EP) or Ethylene Propylene Diene Monomer (EPDM) rubber.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PP+EPDM-M20<.

1.3 Applicability. Typical applications include injection molded bumper energy absorbers, and fully painted exterior trim components.

1.4 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

ASTM D3763	ISO 75-3	ISO 527-1	ISO 3451-1
ASTM E228	ISO 178	ISO 527-1/2	ISO 11359
ASTM E831	ISO 179-1	ISO 1133	ISO 11469
ISO 75-1	ISO 294-1/4	ISO 1183-2	ISO 19069-2
ISO 75-2	ISO 306	ISO 3167	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14797	GMW16172
GMW3059	GMW14270		

2.3 Additional References. Not applicable.

3 Requirements

Materials approved to this specification shall meet the requirements of GMW3013. Important physical, mechanical, and thermal properties that characterize the material are summarized in Table 1. The color shall be specified on drawings and otherwise.

3.1 Requirements on Test Specimens. Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-1 with the conditions for injection molding from ISO 19069-2 with the following additions: Use ISO 3167, Type A, thickness 4 mm, for tensile and flexural properties.

All tests shall be performed on specimens for 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 shall be met by test specimens in natural or black. For colored grades where other pigment and additive systems (e.g., stabilizer) are used, the impact values shall not decrease more than 10% from the specified minimum value.

3.2 Requirements on Materials. See Table 1. A minimum of six (6) lots shall be tested to Table 1. The following are also required for full specification approval. The minimum number of lots per test required is one (1).

- Poisson's Ratio
- Stress vs. Strain Curve at +23 °C, -30 °C, and +85 °C
Note: See 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.
- Multiaxial Impact Curves
- Differential Scanning Calorimetry (DSC) curve
- Fourier Transform Infrared (FTIR) spectroscopy curve

3.3 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.

3.4 Performance Requirements. Performance requirements shall be specified on part drawings or in component specifications. All parts manufactured from these materials shall be resistant to the media the parts contact, such as aliphatic and aromatic hydrocarbons, fuels, lubricants, oils, greases and alcohols, at their places of use.

3.5 Paintability. Plastics used for painted applications are required to meet Paint Performance Requirements for New Plastic Materials per GMW16172. Additionally, painted plastic parts are required to meet Painted Plastic Parts Performance Requirements per GMW14797.

3.6 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.

Table 1: Compound Properties (Black or Natural)

Properties	Standard	Unit	Values
Mineral Filler (Ash)	ISO 3451-1, Method A at 600 °C	% by mass	17 to 28
Density	ISO 1183-2, Method A	g/cm ³	1.02 to 1.1
Melt Flow Rate (MFR) 230/2.16	ISO 1133	g/10 minutes	18 to 26
Melt Volume Rate (MVR) 230/2.16	ISO 1133	cm ³ /10 Minutes	24 to 28
Flexural Modulus	ISO 178, 80 mm × 10 mm × 4 mm specimen, 2 mm/minute test speed, 64 mm support span	MPa	1550 to 2050
Tensile Modulus	ISO 527-1/2, specimen 1A, 1 mm/minute test speed	MPa	1950 to 2250
Tensile Stress at Yield	ISO 527-1/2, specimen 1A, 50 mm/minute test speed	MPa	≥ 19