



Polyolefin Alloy - 1600 MPa Flexural Modulus, Weather Resistant, 12% Glass Fiber Reinforcement, Low CLTE

1 Scope

1.1 Material Description. This standard covers the properties of a nominal 1600 MPa nominal flexural modulus polyolefin alloy, weather resistant, 12% glass fiber reinforced, low Coefficient of Linear Thermal Expansion (CLTE), 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-GF12<.

1.3 Applicability. Typical applications include molded-in-color truck bed rails.

1.4 Remarks. 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.

2 References

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

2.1 External Standards/Specifications.

ASTM D3012	ISO 294	ISO 527-1/2	ISO 11469
ASTM D3763	ISO 294-1	ISO 1133	ISO 19069-2
ISO 75-1	ISO 294-2	ISO 1183	SAE J1545
ISO 75-2	ISO 294-3	ISO 3167	SAE J1976
ISO 75-3	ISO 294-4	ISO 3451-1	SAE J2527
ISO 178	ISO 306	ISO 4892-1/2	
ISO 179-1/1eA	ISO 527-1A	ISO 11359	

2.2 GM Standards/Specifications.

GMW3013	GMW14270	GMW14698	GMW16853
GMW3059	GMW14444	GMW14797	
GMW3221	GMW14650	GMW16172	
GMW14162	GMW14688	GMW16847	

2.3 Additional References.

- Color and Trim Design Appearance Release (CTDAR) Sheet (ID)
- GM Exterior Color Submission Plaque (ID)
- Number 7 Car Wash Concentrate, Armor All Products, Aliso Viejo, CA 92656

(ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Design Responsible Engineer for further instructions.

3 Requirements

3.1 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 19069-2. Test methods and specimen dimensions are also to be in accordance with ISO 19069-2 with the following additions: use ISO 3167, Type 1A, thickness 4 mm, for tensile and flexural properties.

All tests shall be performed on specimen 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. The values specified in Table 2 shall be met by integrally colored test specimens. 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.

3.1.1 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media contacted at the place of use.

3.1.2 Requirements on Materials. See Table 1 and Table 2. A minimum of six lots shall be tested to Table 1. A minimum of one lot shall be tested to Table 2. The following are also required for full specification approval (the minimum number of lots per test required is one):

- Poisson's Ratio
- Stress vs. Strain Curve at 23 °C, -30 °C, and +85 °C
- Multiaxial Impact Curves

3.2 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.

3.3 Requirements on Delivery. Important physical, mechanical and thermal properties that characterize the material are summarized in Table 1 and Table 2. The color shall be specified on drawings, in material specifications and otherwise.

Note: The requirements to Table 1 and Table 2 shall be documented for self-certification of the product according to GMW3013.

3.4 Performance Requirements. Performance requirements, e.g., flammability, fogging or resistance to odor shall be specified on part drawings or in component specifications.

All finished parts for exterior applications shall meet the requirements according to GMW14650.

3.5 Additional Testing Requirements. Materials approved to this specification will be required to have basic material properties generated so warp analysis modeling can be conducted. See the GM Engineer for details.

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
Glass Fiber Filler (Ash)	ISO 3451-1, Method A at 600 °C	% by mass	9 to 15
Density	ISO 1183, Method A	g/cm ³	0.95 to 1.01
Melt Flow Rate (MFR) 230/2.16	ISO 1133	g/10 minutes	12 to 21
Melt Volume Flow Rate (MVR) 230/2.16	ISO 1133	cm ³ /10 minutes	13 to 25
Flexural Modulus	ISO 178, 2 mm/minute test speed	MPa	1400 to 2300
Tensile Modulus	ISO 527-1/2, Specimen 1A, 1 mm/minute test speed	MPa	1400 to 1800
Tensile Stress at Yield	ISO 527-1/2, Specimen 1A, 50 mm/minute test speed	MPa	≥ 15
Multiaxial Impact Strength at 23 °C ± 2 °C	ASTM D3763 Specimen to be either square 100 mm × 100 mm, or circle 100 mm diameter minimum. Sample	J at maximum load	≥ 7 All failures must be ductile