



Polypropylene Copolymer - Mineral Filled, Weatherable, Injection Molding

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 standard covers the properties of mineral filled, weatherable, injection moldable grade polypropylene copolymer.

1.1.1 The material abbreviations according to ISO 11469 are shown in Table 1 following 3.6.

1.2 Symbols. Not applicable.

1.3 Applicability. Typical applications include the following:

- Air Inlet Panel

1.4 Remarks. None.

2 References

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

2.1 External Standards/Specifications.

ASTM D3012	ISO 294	ISO 3167	ISO 11469
ASTM E831	ISO 527-1/2	ISO 3451-1	ISO 19069-2
ISO 75	ISO 1133	ISO 3795	SAE J1686
ISO 179-1/1eA	ISO 1183	ISO 11359-1/2	SAE J1976

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14270	GMW15634
GMW3059	GMW3232	GMW14444	GMW16847
GMW3205	GMW3235	GMW14650	GMW16853

2.3 Additional References. Not applicable.

3 Requirements

3.1 Material Requirements. Materials approved to this specification shall meet the requirements of GMW3013.

3.1.1 Requirements on Test Specimens. Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294, using the injection molding conditions specified in 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 properties.
- 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 shall be met by test specimens in natural, 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.

3.1.2 Requirements on Delivery. Important physical, mechanical and thermal properties that characterize the material are summarized in Table 1 and Table 2.

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

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

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 Compound Properties. See Table 1 and Table 2. The following are also required for full specification approval. The minimum number of lots per test required is one (1) in natural:

- Interior Emissions report per GMW16853.
- Poisson's Ratio.
- Stress Strain Curve at multiple temperatures: -30 °C, +23 °C, +85 °C, +110 °C (see GM Material Property Database (GMMPD) tab for test parameters).
- Coefficient of Linear Thermal Expansion (CLTE) data (see GMMPD tab for test parameters).
- Differential Scanning Calorimetry (DSC) Curve.
- Fourier Transform Infrared Spectroscopy (FTIR) Curve.
- Mold Shrinkage.
- See the polypropylene tab on the Plastic Submission Template for the test procedures.

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

All finished parts for exterior applications shall meet the requirements specified in GMW14650.

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 (Natural and Black)

Property	Standard	Units	Nominal Percentage of Talc Filler	
			10%	20%
ISO Symbol	ISO 11469	-	>PP/PE-M10<	>PP/PE-M20<
Mineral Filler	ISO 3451-1, Method A	% by mass	8 to 12	18 to 22
Density	ISO 1183, Method A	g/cm ³	0.96 to 1.0	1.02 to 1.05
Tensile Strength at Yield	ISO 527-1/2	MPa	≥ 24	≥ 26
Tensile Modulus	ISO 527-1/2	MPa	1700 to 2200	2000 to 2800
Notched Charpy Impact at +23 °C	ISO 179-1/1eA	kJ/m ²	≥ 5	≥ 4
Notched Charpy Impact at -30 °C	ISO 179-1/1eA	kJ/m ²	≥ 2	≥ 2
Deflection Temperature Under Load, 1.8 MPa	ISO 75, Method A (reference SAE J1686), flatwise	°C	≥ 50	≥ 55