GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17178

Polypropylene Copolymer - Heat Stabilized, Impact Modified, Blow Moldable and Extrusion Grades

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 impact modified, heat stabilized, unfilled polypropylene copolymer. It covers blow moldable and extrusion types.

1.2 Symbols. The material abbreviation according to ISO 11469 is shown in Table 1.

1.3 Applicability. Typical applications include the following: Interior and under hood components.

1.4 Remarks. Types are classified based on the level of impact modifier.

2 References

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

2.1 External Standards/Specifications.

ASTM D3012	ISO 188	ISO 1133	ISO 11469
ASTM D3763	ISO 294-4	ISO 1183	ISO 19069-2
ISO 75	ISO 527	ISO 3795	
ISO 179-1/1eA	ISO 527-1/2	ISO 11359-1/2	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14270	GMW15634
GMW3059	GMW3232	GMW14444	GMW15725
GMW3205	GMW3235	GMW14650	GMW16853

2.3 Additional References.

Plastic Submission Template

3 Requirements

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

3.1 Requirements on Test Specimens. Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-4 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 addition:

- 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 or black. For integrally colored grades where other additive systems, e.g., stabilizer, are used, the impact values shall not decrease more than 10% from the specified minimum value.

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.

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

3.4 Chemical Requirements. All parts manufactured from these materials shall be resistant to the media contacted at the place of use.

3.5 Compound Properties. See Table 1. The following are also required for full specification approval. The minimum number of lots per test required is one 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 GMMPD tab on Plastic Submission Template for test parameters (contact specification owning group named in Section 6 for access).
- Coefficient of Linear Thermal Expansion (CLTE) data. See GMMPD tab on Plastic Submission Template for test parameters (contact specification owning group named in Section 6 for access).
- Differential Scanning Calorimetry (DSC) Curve.
- Fourier Transform Infrared (FTIR) Spectroscopy Curve.
- Mold Shrinkage.

See the Polypropylene tab on the Plastic Submission Template for the test procedures (contact specification owning group named in Section 6 for access).

3.6 Performance Requirements. Performance requirements, e.g., flammability, shall be specified on part drawings or in component specifications.

- All finished parts for interior applications shall meet the requirements according to GMW14444.
- All finished parts for exterior applications shall meet the requirements according to GMW14650.
- All finished parts for underhood applications shall meet the requirements according to GMW15725.

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.

Table 1: Compound Properties (Natural or Black)

Properties	Standard	Unit	Requirements
			T1
International Organization for Standardization (ISO) Symbol	ISO 11469	-	>PP/PE<
Melt Flow Rate (MFR) 230 °C/2.16 kg	ISO 1133	g/10 minutes	Target Range 0.3 to 2.4
Density	ISO 1183, Method A	g/cm^3	Target Range 0.99 ± 0.01
Tensile Modulus	ISO 527-1/2	MPa	900 to 1600
Tensile Strength at Yield	ISO 527-1/2	MPa	≥ 21
Tensile Strain at Yield	ISO 527-1/2	%	Report Value
Tensile Strength at Break After Heat Aging Note 1	ISO 527-1/2	% Retention	≥ 80

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