GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW17021

Polypropylene Copolymer - Talc Filled, Heat Stabilized, Blow Moldable and Extrusion Grade

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 and talc filled polypropylene copolymer. It covers blow molding and extrusion types.

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

1.3 Applicability. Typical applications include the following: Under hood components.

1.4 Remarks. The classification into groups is according to talc content.

2 References

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

2.1 External Standards/Specifications.

ASTM D3012	ISO 75-3	ISO 527-1/2	ISO 3795
ASTM D3763	ISO 179-1/1eA	ISO 1133	ISO 11359-1/2
ISO 75-1	ISO 188	ISO 1183	ISO 11469
ISO 75-2	ISO 294-4	ISO 3451-1	ISO 19069-2

2.2 GM Standards/Specifications.

GMW3013	GMW3232	GMW14650	GMW16853
GMW3059	GMW3235	GMW15634	
GMW3205	GMW14270	GMW15725	
GMW3221	GMW14444	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 Requirements on Delivery. Important physical, mechanical, and thermal properties that characterize the material are summarized in Table 1.

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

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

3.4 Compound Properties. See Table 1. 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 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.
- Multiaxial Impact 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).

3.5 Performance Requirements. Performance requirements 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

3.6 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 or Black)

Properties	Standard	Unit	Requirements	
			T1	T2
International Organization for Standardization (ISO) Symbol	ISO 11469	-	>PP/PE-TD10<	>PP/PE-TD20<
Melt Flow Rate (MFR) 230 °C/2.16 kg	ISO 1133	g/10 minutes	Target Range 0.3 to 2.0	Target Range 0.3 to 2.0
Ash	ISO 3451-1, Method A at 600 °C	% by Mass	Target Range 8 to 12	Target Range 18 to 22
Density	ISO 1183, Method A	g/cm^3	Target Range 0.99 ± 0.02	Target Range 1.04 ± 0.02
Tensile Modulus	ISO 527-1/2	MPa	1600 to 2400	1950 to 2700
Tensile Strength at Yield	ISO 527-1/2	MPa	≥ 22	≥ 19

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