



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

1 Scope

1.1 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 abbreviation according to ISO 11469 is shown in Table 1.

1.3 Applicability. Typical applications include under hood components.

1.4 Remarks. The classification into groups is according to talc content for blow molding and extrusion.

2 References

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

2.1 External Standards/Specifications.

ASTM D3012	ISO 178	ISO 1133	ISO 4577
ASTM D3763	ISO 179/1eA	ISO 1183	ISO 6603-1/2
ISO 75-1	ISO 188	ISO 1873-2	ISO 11359-1/2
ISO 75-2	ISO 294-4	ISO 3167	ISO 11469
ISO 75-3	ISO 527-1/2	ISO 3451-1	

2.2 GM Standards/Specifications.

GMW3013	GMW3059	GMW3221
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2.3 Additional References.

TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com).

3 Requirements

Materials approved to this specification shall meet the requirements of GMW3013, **General Requirements for Handling of Technical Terms of Delivery for Plastics.**

3.1 Requirements on Test Specimens.

3.1.1 Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-4 with the conditions for injection molding from ISO 1873-2. Test methods and specimen dimensions are also to be in accordance with ISO 1873-2 with the following additions:

- Use ISO 3167, Type A, thickness 4 mm for tensile properties.

3.1.2 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.

3.1.3 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.

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

3.3 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media they contact at their 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 in natural.

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

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

Table 1: Compound Properties (Black or Natural)

Property	Test Method	Units	T1 Requirement	T2 Requirement
ISO Symbol	ISO 11469	-	>PP/PE-TD10<	>PP/PE-TD20<
Melt Flow Rate MFR230/2.16	ISO 1133	g/10 minutes	Target Range 0.3 to 2.0	Target Range 0.3 to 2.5
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
Melt Volume Flow Rate MVR230/2.16	ISO 1133	cm ³ /10 minutes	Target Range 0.3 to 2.0	Report Result 0.3 to 2.6
Flexural Modulus	ISO 178, 2 mm/minimum test speed	MPa	1500 to 2300	1750 to 2450
Tensile Modulus	ISO 527-1/2, specimen 1A, 1 mm/minute test speed	MPa	1600 to 2400	1950 to 2700
Tensile Strength at Yield	ISO 527-1/2, specimen 1A, 5 mm/minute test speed	MPa	≥22	≥19
Tensile Strength at Yield after Heat Aging ^{Note 1}	ISO 527-1/2, specimen 1A, 5 mm/minute test speed	% retention	≥75	
Notched Charpy Impact Strength at +23 °C	ISO 179/1eA	kJ/m ²	≥6	≥4
Notched Charpy Impact Strength at -30 °C	ISO 179/1eA	kJ/m ²	≥3	≥2
Notched Charpy Impact Strength at +23 °C after Heat Aging ^{Note 2}	ISO 179/1eA	% retention	≥75	

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