



Polypropylene Copolymer - Heat Stabilized, Blow Molding and Extrusion Grade

1 Scope

1.1 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 interior and underhood components.

2 References

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

2.1 External Standards/Specifications.

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

2.2 GM Standards/Specifications.

GMW3013	GMW3205	GMW3235	GMW15634
GMW3059	GMW3221	GMW14444	GMW16853

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 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.

3.4 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media they contact at their 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: Poisson's Ratio, Stress Strain Curve at +23 °C, +85 °C, and -30 °C. Test Report according to GMW16853.

3.6 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
ISO Symbol	ISO 11469	-	>PP/PE<
Melt Flow Rate MFR230/2.16	ISO 1133	g/10 minutes	Target Range 0.3 to 2.4
Density	ISO 1183, Method A	g/cm ³	Target Range 0.90 ± 0.01
Melt Volume Flow Rate MVR230/2.16	ISO 1133	cm ³ /10 minutes	Target Range 0.35 to 2.6
Tensile Modulus	ISO 527-1/2, specimen 1A, 1 mm/minute test speed	MPa	900 to 1600
Tensile Strength at Yield	ISO 527-1/2, specimen 1A, 50 mm/minute test speed	MPa	≥ 21
Tensile Strength at Yield After Heat Aging ^{Note 1}	ISO 527-1/2, specimen 1A, 50 mm/minute test speed	% Retention	≥ 80
Notched Charpy Impact Strength at +23 °C	ISO 179/1eA	kJ/m ²	≥ 60
Notched Charpy Impact Strength at -30 °C	ISO 179/1eA	kJ/m ²	Report Results
Notched Charpy Impact Strength at +23 °C After Heat Aging ^{Note 1, Note 2}	ISO 179/1eA	% Retention	≥ 80
Multiaxial Impact at 23 °C	ASTM D3763, Specimen 100 mm x 100 mm x 3.2 mm plaque, speed 2.2 mm/s	J	≥ 15
Multiaxial Impact at 23 °C	ISO 6603-1/2 Specimen 60 mm diameter x 2 mm or 60 mm x 60 mm x 2 mm Speed 4.4 mm/s	J	≥ 10