



Polypropylene Copolymer – Electrically Conductive, Heat Stabilized

1 Scope

1.1 Material Description. This specification covers the properties of carbon powder filled, electrically conductive, heat stabilized, injection moldable polypropylene copolymer.

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

1.3 Applicability. Typical applications include the following: fuel line fasteners, fuel filler pockets.

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	ISO 3167
IEC 62631-3-2	ISO 179/1eA	ISO 1133	ISO 4577
ISO 75-1	ISO 188	ISO 1183	ISO 11469
ISO 75-2	ISO 294-4	ISO 1873-2	

2.2 GM Standards/Specifications.

GMW3013	GMW3059	GMW3221	GMW14270
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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. Reference GMW3221.

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 1A and 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 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to submit a full material composition disclosure to GM via the International Material Data System (IMDS) or via a completed GMW3059 report form.

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.

- Stress Strain Curve at -30 °C, +23 °C, +85 °C, Differential Scanning Calorimeter (DSC), Thermal Gravimetric Analysis (TGA), and Fourier Transform Infra-Red (FTIR) spectra. See GMW3013.

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

Table 1: Compound Properties

Property	Test Method	Units	Requirement
ISO Symbol	ISO 11469	N/A	>PP/PE-CD15<
Density	ISO 1183 Method A	g/cm ³	Target Range 0.98 ± 0.02
Melt Flow Rate (MFR), 230 °C/2.26 kg	ISO 1133,	g/10 minutes	Target Range 4 to 12
Tensile Modulus	ISO 527-1/2	MPa	600 to 1700
Tensile Strength at Yield	ISO 527-1/2	MPa	≥ 18
Tensile Strength at Yield After heat aging Note 1	ISO 527-1/2	% retention	≥ 85
Notched Charpy Impact Strength at +23 °C	ISO 179/1eA	kJ/m ²	≥ 40
Notched Charpy Impact Strength at +23 °C after heat aging Note 2	ISO 179/1eA	% retention	≥ 85
Multiaxial Impact Test at +23 °C	ASTM D 3763, 2.2 m/s speed	J, minimum at maximum Load	≥ 30
Heat Deflection Temperature, 0.45 MPa Method B	ISO 75-1, ISO 75-2, ISO 75-3 flatwise	°C	≥ 75