



Blend from Polypropylene and EPR, UV Stable

1 Scope

1.1 Material Description. This specification covers the properties of UV stabilized blends of polypropylene and EPR and blends of polypropylene and EPR filled with glass fibers. It covers injection molding types for manufacturing of technical parts requiring a specific surface feel, e.g. soft touch applications.

Note: Additional characteristics will be indicated by code letters according to the respective specification number. Code letters that may apply to this specification are defined in GMW3013.

1.1.1 Additional Characteristics. Materials certified to this material specification may have additional characteristics, e.g. paintable, etc. Possible additional characteristics are defined in GMW3013.

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

1.3 Typical Applications. Typical applications include the following: interior trim.

The differences between the Types are based on the different Tensile Modulus (stiffness) ranges as defined in Table 1.

2 References

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

2.1 External Standards/Specifications.

ASTM D3012	ISO 179	ISO 1133	ISO 6603-2
ASTM E831	ISO 188	ISO 1183-1	ISO 11469
ISO 75-1	ISO 294-3	ISO 1873-2	ISO 11359-2
ISO 75-2	ISO 294-4	ISO 3167	
ISO 75-3	ISO 527-1	ISO 3451-1	
ISO 105-G02	ISO 527-2	ISO 4577	

2.2 GM Standards/Specifications.

GMW3001	GMW3205	GMW3235	GMW14688
GMW3013	GMW3221	GMW14162	GMW16853
GMW3059	GMW3232	GMW14444	

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 Delivery. Important physical, mechanical and thermal properties that characterize the material are summarized in Table 1 and Table 2.

Note: For each product the requirements to Table 1 and Table 2 shall be documented by Certification Statement according to GMW3013. The color shall be specified on drawings, in material specifications and otherwise.

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

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

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, black or in a standard sampled color if natural or black are not available. The values specified in Table 2 shall be met by a typical exterior color for approval to the specification and/or by test specimens in specific colors as required during color development. 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.

3.1.2 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media they contact at their place of use.

3.2 Compound Properties. See Table 1 and Table 2. The following are also required for full specification approval. The minimum number of lots per test required is one in natural: Tensile Modulus, Poissons Ratio, Stress Strain Curve at +23 °C, +85 °C, -30 °C; Multiaxial Impact Curve, Test Report according to GMW16853. See the TPO certification template for the test procedures.

3.3 Performance Requirements. Performance requirements e.g., flammability, fogging or resistance to odor, shall be specified on part drawings or in component specifications.

All finished parts for Interior applications shall meet the requirements according to GMW14444.

Table 1: Compound Properties (Black or Natural)

Properties	Standard	Unit	Type A	Type B	Type C	Type D	Type E
Material Abbreviation	ISO 11469		>PP+EPR<	>PP+EPR-GF6<	>PP+EPR-GF22<	>PP+EPR-GF25<	>PP+EPR-GF27<
Tensile Modulus	ISO 527-1 ISO 527-2	MPa	30 to 120	400 to 800	1200 to 1900	2100 to 2900	3800 to 5200
Tensile Stress at Yield	ISO 527-1 ISO 527-2	MPa	≥ 3	≥ 10	≥ 22	≥ 24	≥ 40
Tensile Stress at Yield after heat aging (Note 1)	ISO 527-1 ISO 527-2	MPa	(Note 2)				
Ash	ISO 3451-1 (at +600 °C)	% by mass	≤ 2	4 to 8	18 to 25	22 to 28	24 to 30
Density	ISO 1183-1, Method A	g/cm ³	0.90 to 0.94	0.97 to 1.03	1.02 to 1.08	1.05 to 1.11	1.05 to 1.13
Melt Flow Volume Rate MVR 230/2.16	ISO 1133	cm ³ /10 min	4 to 9	5 to 10	5 to 10	5 to 10	14 to 21
Multiaxial Impact Strength at +23 °C	ISO 6603-2	J	Report value (Energy at Maximum Force)				
Multiaxial Impact Strength at -30 °C	ISO 6603-2	J	Report value (Energy at Maximum Force)				
Notched Charpy Impact Strength at +23 °C	ISO 179/1eA	kJ/m ²	≥ 45	≥ 35	≥ 30	≥ 20	≥ 7
Notched Charpy Impact Strength, +23 °C after heat aging (Note 1)	ISO 179/1eA	kJ/m ²	(Note 2)				