GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW15740

Polyolefin Alloy – 2500 MPa Flexural Modulus, 33% Mineral Filled

1 Scope

1.1 Material Description. This standard covers the properties of a 2500 MPa nominal flexural modulus polyolefin alloy, pellet form, injection molding compound. For the purpose of this specification, polyolefin alloy is defined as an alloy of polypropylene plastic and Ethylene Propylene (EP) or Ethylene Propylene Diene Monomer (EPDM) rubber.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PP+EPDM-M33<.

1.3 Applicability. Typical applications include the following: painted grilles, fascia brackets.

2 References

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

2.1 External Standards/Specifications.

ASTM D3763	ISO 75-3	ISO 527-1	ISO 3451-1
ASTM E228	ISO 178	ISO 527-2	ISO 6603
ASTM E831	ISO 179/1eA	ISO 1133	ISO 11359
ISO 75-1	ISO 294	ISO 1183	ISO 11469
ISO 75-2	ISO 306		

2.2 GM Standards/Specifications.

GMW3013	GMW3059	GMW3221

2.3 Additional References.

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

3 Requirements

Important physical, mechanical and thermal properties that characterize the material are summarized in charts. The color shall be specified on drawings, in material specifications and otherwise.

3.1 Requirements on Test Specimens. Unless otherwise specified, test specimens shall be injection molded according to ISO 294.

3.1.1 Test shall be conducted for 40 h minimum after molding and immediately following a conditioning period of 24 h minimum at conditions per GMW3221, Code A. All tests shall be performed on unannealed specimens.

3.1.2 Test shall be conducted using the latest issue of the test methods indicated. Suitable precautions should be taken to ensure that applicable safe limits are not exceeded when conducting test procedures, processes, and/or handling the materials required by this specification.

3.2 Requirements on Parts.

3.2.1 Compound Properties. See Table 1. A minimum of 6 lots shall be tested to Table 1. The following are also required for full specification approval. The minimum number of lots per test required is one (1):

- Poisson's Ratio
- Stress Strain Curve at +23 °C
- Multiaxial Impact Curve, Shear Modulus Graph

See the Thermal Plastic Olefin (TPO) certification template and GMW3013 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.

© Copyright 2014 General Motors Company All Rights Reserved

Documents Document Sharing Hub

Copyright General Motors Company
Provided by IHS Markit under license with General Motors Company
Reproduction, distribution or publication of these standards is expressly prohib
Licensee=/, User=,
Not for Resale,
Full document details: GMW GMW15740 2014

Table 1: Compound Properties (Black or Natural)

Properties	Standard	Unit	Values
Mineral Filler (Ash)	ISO 3451-1, Method A at 600 °C	% by mass	30 to 37
Density	ISO 1183, Method A	g/cm³	1.12 to 1.19
Melt Flow Rate (MFR) 230/2.16	ISO 1133	g/10 minutes	11 to 18
Melt Volume Flow Rate (MVR) 230/2.16	ISO 1133	cm^3/10 minutes	Report results
Flexural Modulus	ISO 178, 80 mm x 10 mm x 4 mm specimen, 2 mm/minute test speed, 64 mm support span	MPa	2100 to 3050
Tensile Modulus	ISO 527-1/2, specimen 1A, 1 mm/minute test speed	MPa	Report results
Tensile Stress at Yield	ISO 527-1/2, specimen 1A, 50 mm/minute test speed	MPa	≥17
Multiaxial Impact Strength at 23 °C ± 2 °C	ASTM D3763, specimen C, 2.2 m/s impact velocity	J at maximum load	≥15 All failures must be ductile
Multiaxial Impact Strength at -10 °C ± 2 °C	ASTM D3763, specimen C, 2.2 m/s impact velocity	J at maximum load	≥20 All failures must Be ductile
Multiaxial Impact Strength at 23 °C ± 2 °C	ISO 6603-2/40/20/C/4.4. Sample to be either square 60 mm x 60 mm minimum, or circle 60 mm diameter minimum Sample thickness to be 2 mm ± 0.1 mm.	J	Report energy at maximum force and type of failure
Multiaxial Impact Strength at -10 °C ± 2 °C (or lowest temperature at which only type YD or YS failures are observed)	ISO 6603-2/40/20/C/4.4. Sample to be either square 60 mm x 60 mm minimum, or circle 60 mm diameter minimum. Sample thickness to be 2 mm ± 0.1 mm.	J	Report energy at maximum force and type of failure, report test temperature
Notched Charpy Impact at +23 °C	ISO 179/1eA	kJ/m^2	Report results
Notched Charpy Impact at -30 °C	ISO 179/1eA	kJ/m^2	Report results
Vicat Softening Temperature (VST)/A/50	ISO 306	°C	Report results
Heat Deflection Temperature (HDT), Method A	ISO 75-1, ISO 75-2, ISO 75-3	°C	Report results
Shrink, 48 h after molding	ISO 294, plaque size 101.6 mm x 152 mm x 3.2 mm (4 in x 6 in x 0.125 in)	%	0.35 to 0.70
Shrink, After Bake, 1 h at 82 °C	ISO 294, plaque size 101.6 mm x 152 mm x 3.2 mm (4 in x 6 in x 0.125 in)	%	Report results
Shrink, After Bake, 1 h at 121 °C	ISO 294, plaque size 101.6 mm x 152 mm x 3.2 mm (4 in x 6 in x 0.125 in)	%	0.50 to 1.00

© Copyright 2014 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors Company
Provided by IHS Markit under license with General Motors Company
Reproduction, distribution or publication of these standards is expressly prohib
Licensee=/, User=,
Not for Resale,
Full document details: GMW GMW15740 2014