GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW16314

Polyolefin Alloy – Weather Resistant, Shore A 95

1 Scope

1.1 Material Description. This standard covers the properties of a weather resistant, Shore A 95 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<.

1.3 Applicability. Typical applications include front air deflectors.

2 References

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

2.1 External Standards/Specifications.

ASTM D3763	ISO 294	ISO 812	ISO 11469
ISO 34-1	ISO 527	ISO 1133	ISO 19069-2
ISO 75-2	ISO 527-1	ISO 1183	SAE J1545
ISO 179-1/1eA	ISO 527-2	ISO 3167	SAE J1976
ISO 188	ISO 868	ISO 4892-1/2	SAE J2527

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14444	GMW16847
GMW3059	GMW14270	GMW14650	GMW16853

2.3 Additional References.

Number 7 Car Wash Concentrate, Armor All Products, Aliso Viejo, CA 92656

3 Requirements

3.1 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 19069-2. Test methods and specimen dimensions are also to be in accordance with ISO 19069-2 with the following additions: use ISO 3167, Type 1A, thickness 4 mm, for tensile and flexural properties.

All tests shall be performed on specimen 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 or black. For colored grades where other pigment and additive systems, e.g., stabilizer, are used, the impact values shall not decrease more than 10% from the specified minimum value.

3.1.1 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media contacted at the place of use.

3.1.2 Requirements on Materials. See Table 1 and Table 2. A minimum of six lots shall be tested to Table 1. A minimum of one lot shall be tested to Table 2. The following are also required for full specification approval (the minimum number of lots per test required is one):

- Poisson's Ratio

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- Stress vs. Strain Curve at 23 °C, -30 °C, and +85 °C
- Multiaxial Impact Curves

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 and Table 2.

Note: The requirements to Table 1 and Table 2 shall be documented for self-certification of the product according to GMW3013.

3.4 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. This shall be noted on the Certification Statement with Code Letter U.

All finished parts for exterior applications shall meet the requirements according to GMW14650. This shall be noted on the Certification Statement with Code Letter L.

3.5 Additional Testing Requirements. Materials approved to this specification will be required to have basic material properties generated so warp analysis modeling can be conducted. See the GM Engineer for details.

3.6 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to obtain a GM-approved International Material Data System (IMDS) submission.

Table 1: Compound Properties (Black or Natural)

Properties	Standard	Unit	Values
Shore A Hardness	ISO 868, 15 s delay	Shore A	95 ± 5
Density	ISO 1183	g/cm^3	0.85 to 0.92
Tensile Modulus	ISO 527, Type 1A, 500 mm/minute	MPa	95 to 210
Tensile Stress at Break Note 1	ISO 527, Type 1A, 500 mm/minute	MPa	4 Minimum
Elongation at Break Note 1	ISO 527, Type 1A, 500 mm/minute	MPa	160 Minimum
Tensile Stress at 100% Elongation Note 1	ISO 527, Type 1A, 500 mm/minute	MPa	6 Minimum
Tear Strength	ISO 34-1, Method B, angle die, 500 mm/minute	kN/m	65 Minimum
Notched Charpy Impact at +23 °C Impact at -30 °C	ISO 179-1/1eA	kJ/m^2 kJ/m^2	No break No break
Multiaxial Impact Strength at 23 °C ± 2 °C	ASTM D3763 Specimen to be either square 100 mm × 100 mm, or circle 100 mm diameter minimum. Sample thickness to be 3.2 mm. 2.2 m/s impact velocity	J at maximum load	≥ 8 All failures must be ductile
Multiaxial Impact Strength at -30 °C ± 2 °C	ASTM D3763 Specimen to be either square 100 mm × 100 mm, or circle 100 mm diameter minimum. Sample thickness to be 3.2 mm. 2.2 m/s impact velocity	J at maximum load	≥ 13 All failures must be ductile
Heat Deflection Temperature (HDT), Method B	ISO 75-2, Method B	°C	30 to 50

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