



Poly(Methyl Methacrylate) and Acrylonitrile Styrene Acrylate Blends, Weatherable

1 Scope

1.1 Material Description. This specification describes material types of a high gloss (>70) integrally colored Poly(methyl methacrylate) (PMMA) and Acrylonitrile Styrene Acrylate (ASA) blends which are used in injection molded components. Code letter and number, in addition to GMW3013 guidelines that apply to this specification, are listed in Table 1 and Table 2.

1.1.1 Paintability. Plastics used for painted applications are required to meet Paint Performance Requirements for New Plastic Materials per GMW16172. Additionally, painted plastic parts are required to meet Painted Plastic Parts Performance Requirements per GMW14797.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PMMA+ASA<.

1.3 Applicability. Typical applications include exterior high gloss black trim.

2 References

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

2.1 External Standards/Specifications.

ASTM D523	ISO 294-1	ISO 1183	ISO 11469
ASTM D955	ISO 294-3	ISO 3167	SAE J1545
ASTM E831	ISO 294-4	ISO 4892-1	SAE J1976
ISO 75-1	ISO 306	ISO 4892-2	SAE J2527
ISO 75-2	ISO 527	ISO 8257-2	
ISO 179-1/1eU	ISO 1133	ISO 11359-2	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14650	GMW16172
GMW3059	GMW14270	GMW14797	

2.3 Additional References.

- Number 7 Car Wash Concentrate, distributed by Armor All Products, Aliso Viejo, CA 92656.
- Plastic Submission Template available from GM SupplyPower, <https://gmsupplypower.covisint.com/>, "Collaborate", "Document Library".

3 Requirements

3.1 Requirements on Test Specimens. Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-1, with the conditions for injection molding from ISO 8257-2. Test methods and specimen dimensions are also to be in accordance with ISO 8257-2 with the following additions: Use ISO 3167, Type 1A, thickness 4 mm, for tensile properties.

All tests shall be performed on specimens for 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, unless otherwise specified.

The values specified in Table 1 and Table 2 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 Material Requirements. Materials approved to this specification shall meet the requirements of GMW3013.

3.3 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 shall be documented using the latest Certification Template and Certification Statement according to GMW3013. The color shall be specified on drawings, in material specifications and otherwise.

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

3.5 Compound Properties. For compound property requirements refer to Table 1 and Table 2.

Full specification approval also requires general material properties as listed in 3.5.1.

3.5.1 Other Data. See Table 1. The following are also required for full specification approval. The minimum number of lots per test required is one in black:

- Poisson's Ratio.
- Stress Strain Curve at multiple temperatures: -30 °C, +23 °C, +85 °C. See the GM Material Property Database (GMMPD) tab on Plastic Submission Template for test parameters.
- Coefficient of Linear Thermal Expansion (CLTE) data, See GMMPD tab on Plastic Submission Template for test parameters.
- Differential Scanning Calorimetry (DSC) Curve.
- Dynamic Mechanical Analysis (DMA) Curve
- Fourier Transform Infrared Spectroscopy (FTIR) Curve.
- Mold Shrinkage.

See the Acrylic Tab on the Plastic Submission Template for the test procedures.

Reference GMW3013 for all test procedures and parameters.

3.6 Performance Requirements. Performance requirements, e.g., flammability, fogging, resistance to odor, and any other applicable component performance requirements shall be specified on part drawings or in component specifications.

All finished parts for Exterior applications shall meet the requirements according to GMW14650.

3.7 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 Property Requirements (Type Codes)

Property	Standard ^{Note 1}	Unit	T1	T2
Type Assigned Property Designation	-	-	High Heat	Medium Heat
Density	ISO 1183	g/cm ³	1.15 to 1.17	1.14 to 1.16
Tensile Modulus	ISO 527	MPa	2500 to 2700	205 to 2400
Tensile Stress at Yield	ISO 527	MPa	≥ 60	≥ 48
Charpy Unnotched Impact Strength at +23 °C	ISO 179-1/1eU	kJ/m ²	≥ 50	≥ 60
Charpy Unnotched Impact Strength at -30 °C	ISO 179-1/1eU	kJ/m ²	Report	Report
Heat Deflection Temperature (HDT) 1.8 MPa	ISO 75-1, ISO 75-2 Method A Unannealed	°C	≥ 70	≥ 65