



Extrusion Grade Acrylonitrile Butadiene Styrene

1 Scope

1.1 Material Description. This standard describes extrusion grade, unfilled, heat stabilized, acrylonitrile butadiene styrene (ABS) terpolymer.

1.2 Symbols. The material abbreviation according to ISO 11469 is >ABS<.

1.3 Applicability. Typical applications include thermoforming for emblems and simple thermoforming parts.

2 References

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

2.1 External Standards/Specifications.

ASTM E831	ISO 294	ISO 1183	ISO 11469
ISO 75-1/2	ISO 294-3/4	ISO 2580-2	SAE J2412
ISO 178	ISO 306	ISO 3167	
ISO 179/1eA	ISO 527-1/2	ISO 3795	
ISO 188	ISO 1133-1	ISO 11359-2	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW3417	GMW14334
GMW3059	GMW3232	GMW14162	GMW15634
GMW3205	GMW3235	GMW14270	GMW16853

2.3 Additional References.

- Certification Template, available from GM SupplyPower <https://gmsupplypower.covisint.com>

3 Requirements

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 with the conditions for injection molding from ISO 2580-2. Test methods and specimen dimensions are also to be in accordance with ISO 2580-2 with the following additions: use ISO 3167, Type 1A, 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 or black, the values specified in Table 2 shall be met by integrally colored test specimens. 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 and Table 2. The color shall be specified on drawings, in material specifications and otherwise.

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.

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

3.4 Compound Properties. See Tables 1 and 2. The following are also required for full standard approval. The minimum number of lots per test required for the following properties is one in natural: Stress Strain Curve at multiple temperatures (for example -30 °C, +23 °C, +85 °C). See GMW3013 for all test procedures and parameters.

3.5 Performance Requirements. Performance requirements shall be specified on part drawings or in component specifications. All parts manufactured from molding compounds shall be resistant to the media they contact, such as aliphatic and aromatic hydrocarbons, fuels, lubricants, oils, greases and alcohols, at their places of use.

3.6 Process Requirements. Not applicable.

Table 1: Compound Properties (Natural and Black)

Property	Standard ^{Note 1}	Units	Requirement
Density	ISO 1183, Method A, $\geq 10 \text{ mm} \times \geq 10 \text{ mm} \times 4 \text{ mm}$	g/cm ³	1.03 to 1.07
Tensile Modulus	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, Test speed 1 mm/minute; between 0.05% to 0.25% strain	MPa	≥ 2000
Tensile Stress at Yield	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, test speed 50 mm/minute	MPa	≥ 40
Tensile Elongation at Break	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, test speed 50 mm/minute	%	Report
Poisson's Ratio	ISO 527-1/2 Specimen ISO 3167, 4 mm thick Type A bar, tensile method, test speed 1 mm/minute	No units	Report
Flexural Modulus @ +22 °C	ISO 178, Specimen 80 mm $\times$ 10 mm $\times$ 4 mm, 2 mm/minute, 64 mm span, chord (0.05% to 0.25% strain)	MPa	≥ 2000
Notched Charpy Impact Strength at +22 °C	ISO 179/1eA, Specimen Machined V-notch, r = 0.25 mm, 80 mm $\times$ 10 mm $\times$ 4 mm	kJ/m ²	≥ 20
Notched Charpy Impact Strength at -30 °C	ISO 179/1eA, Specimen Machined V-notch, r = 0.25 mm, 80 mm $\times$ 10 mm $\times$ 4 mm	kJ/m ²	≥ 10
Melt Mass-Flow Rate (MFR) or Melt Volume-Flow Rate (MVR)	ISO 1133-1, 10 kg load at +220 °C temperature	g/10 minute or cm ³ /10 minute	Report
Mold Shrink – longitudinal: 48 h after Molding	ISO 294-3/4, plaque size 60 mm $\times$ 60 mm $\times$ 2 mm type D2 preferred or larger with maximum thickness 4 mm	%	Report
Mold Shrink – transverse: 48 h after Molding	ISO 294-3/4, plaque size 60 mm $\times$ 60 mm $\times$ 2 mm type D2 preferred or larger with maximum thickness 4 mm	%	Report
Heat Deflection Temperature (HDT): 0.45 MPa	ISO 75-1/2, Method B, Specimen 80 mm $\times$ 10 mm $\times$ 4 mm, test flatwise, unannealed (only if required in specification)	°C	≥ 80
HDT: 1.8 MPa	ISO 75-1/2, Method A, Specimen 80 mm $\times$ 10 mm $\times$ 4 mm, test flatwise, unannealed	°C	≥ 90
Vicat Softening Temperature	ISO 306, Specimen 10 mm $\times$ 10 mm $\times$ 4 mm, heating rate 50 K/h, load 50 N	°C	≥ 90