



Acrylonitrile Butadiene Styrene and Polycarbonate Blend, Unfilled

1 Scope

1.1 Material Description. This specification describes material types of unfilled Acrylonitrile Butadiene Styrene (ABS), and Polycarbonate (PC) blends, which are used in injection molded components.

1.1.1 Paintability. Approved paint systems that can be used on this material are listed, e.g., in the General Motors Approved Paint on Parts Systems (GM APOPS) database.

1.1.2 Types. The classification into groups by varying PC content and chrome plating properties is described in Table 1, Table 2, and Table 3.

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

1.3 Applicability. Typical applications include exterior and interior substrates that require high temperature stability and low temperature ductility.

2 References

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

2.1 External Standards/Specifications.

ASTM D955	ISO 179-1/1eA	ISO 306	ISO 3795
ASTM D3763	ISO 188	ISO 527-1	ISO 11359-2
ASTM E831	ISO 294-1	ISO 527-2	ISO 11469
ISO 75-1	ISO 294-3	ISO 1133	ISO 19062
ISO 75-2	ISO 294-4	ISO 1183-1	

2.2 GM Standards/Specifications.

GMW3013	GMW3232	GMW14270	GMW14668
GMW3059	GMW3235	GMW14334	GMW15634
GMW3205	GMW3417	GMW14444	GMW16193
GMW3221	GMW14162	GMW14650	GMW16853

2.3 Additional References.

- Plastic Submission Template

3 Requirements

3.1 Requirements on Test Specimens. Materials approved to this specification shall meet the requirements of GMW3013.

Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-1 with the conditions for injection molding from ISO 19062. Test methods and specimen dimensions are also to be in accordance with ISO 19062.

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. 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 four typical interior colors (black, gray, tan/neutral, and either red or blue) for approval to the specification and by test specimens in specific colors as required during color development.

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 four typical interior colors (black, gray, tan/neutral, and either red or blue) for approval to the specification and by test specimens in specific colors as required during color development. These test specimens may be produced using generic colorants in the four (4) colors or by specific colors required by a GM program. See the Styrenics tab on the Plastics Submission Template and GMW3013 for test details and parameters.

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. 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.

3.4 Compound Properties (Natural, Black and Integrally Colored). See Table 1 and Table 2. The following are also required for full approval. The minimum number of lots per test required is one unless otherwise specified. See the Styrenics tab on the Plastics Submission Template and GMW3013 for test details and parameters.

- Poisson's Ratio
- Stress/strain data points and curves at the following temperatures:
- -30 °C, +23 °C, +85 °C

Note: See GM Material Property Database (GMMPD) tab on Plastics Submission Template for test details (contact specification owning group named in Section 6 for access).

- Coefficient of Linear Thermal Expansion (CLTE) data

Note: See GM Material Property Database (GMMPD) tab on Plastics Submission Template for test details (contact specification owning group named in Section 6 for access).

- Differential Scanning Calorimetry (DSC) curve
- Fourier Transform Infrared (FTIR) spectroscopy curve
- Mold shrinkage

3.5 Initial Source Approval. No shipments shall be made by any supplier until representative initial production samples have been approved by the appropriate Materials Engineering department(s) as meeting the requirements of this specification.

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

3.6 Performance Requirements.

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

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

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

3.7 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media contacted at their place of use, such as aliphatic and aromatic hydrocarbons, fuels, lubricants, oils, greases and alcohols.

3.8 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 (Natural and Black)

Property	Standard Note 1	Units	T1	T2	T3	T4	T5	T6	T7
Density	ISO 1183-1 method A	g/cm ³	1.13 ± 0.04	1.12 ± 0.04	1.15 ± 0.04	1.11 ± 0.04	1.12 ± 0.04	1.15 ± 0.04	1.11 ± 0.04
Tensile Modulus	ISO 527-1, ISO 527-2	MPa	≥ 1700	≥ 1800	≥ 1900	≥ 1700	≥ 1800	≥ 1800	≥ 1700
Tensile Stress at Yield	ISO 527-1, ISO 527-2	MPa	≥ 40	≥ 45	≥ 45	≥ 40	≥ 45	≥ 49	≥ 40
Tensile Elongation at Yield	ISO 527-1, ISO 527-2	%	Report	Report	Report	Report	Report	Report	Report
Tensile Elongation at Break	ISO 527-1, ISO 527-2	%	Report	Report	Report	Report	Report	Report	Report
Tensile Strength after Heat Aging (report one lot) Note 2	ISO 527-1, ISO 527-2	% Retention	≥ 80						
Tensile Strain at Break after Heat Aging (report one lot) Note 2	ISO 527-1, ISO 527-2	% Retention	≥ 80						
Notched Charpy at +23 °C	ISO 179-1/1eA	kJ/m ²	≥ 20	≥ 30	≥ 35	≥ 20	≥ 25	≥ 30	≥ 20
Poisson's Ratio (one lot)	ISO 527-1, ISO 527-2	NA	Report	Report	Report	Report	Report	Report	Report
Notched Charpy at -30 °C	ISO 179-1/1eA	kJ/m ²	≥ 10	≥ 15	≥ 15	≥ 10	≥ 10	≥ 12	≥ 10
Multiaxial Impact Strength at +23 °C and 6.6 m/s Note 3	ASTM D3763, Specimen C, 6.6 m/s impact velocity	J at maximum force	Report	Report	≥ 30 Must be ductile	Report	Report	> 30 Must be ductile	Report
Multiaxial Impact Strength at -30 °C and 6.6 m/s Note 3	ASTM D3763, Specimen C, 6.6 m/s impact velocity	J at maximum force	Report	Report	≥ 30 Must be 90% ductile	Report	Report	≥ 30 Must be 90% ductile	Report
Melt Mass Flow Rate or Melt Volume Flow Rate 260 °C/5 kg	ISO 1133	cm ³ /10 minutes or g/10 minutes	Report	Report	Report	> 12	> 12	> 12	Report
Mold Shrink: Flow Direction (report one lot)	ISO 294-3, ISO 294-4 or ASTM D955	%	0.6: Reported in specification as nominal target, actual shrink dependent upon wall thickness, flow distance, etc. Exact shrink must be determined on a tool-by-tool basis.						
Mold Shrink: Cross Flow Direction (report one lot)	ISO 294-3, ISO 294-4 or ASTM D955	%	0.6: Reported in specification as nominal target, actual shrink dependent upon wall thickness, flow distance, etc. Exact shrink must be determined on a tool by tool basis.						