



Acrylonitrile Butadiene Styrene - Unfilled

1 Scope

1.1 Material Description. This standard describes material types of unfilled, heat stabilized, acrylonitrile butadiene styrene (ABS) terpolymer which are used in injection or blow molded components.

1.1.1 Additional Characteristics. Materials certified to this standard may have additional characteristics, e.g., paintable, elastomer modified, etc. Possible additional characteristics are defined in GMW3013.

1.1.2 Types. The classification into groups is according to the different properties as described in Table 1, Table 2, and Table 3.

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

1.3 Applicability. Typical applications include mold in color, painted, or chrome plated interior trim, and painted or chrome plated exterior trim.

1.4 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

ASTM D955	ISO 294	ISO 1133	ISO 6603
ASTM D3763	ISO 294-3/4	ISO 1183	ISO 11359-2
ASTM E831	ISO 306	ISO 2580-2	ISO 11469
ISO 75-1/2	ISO 527	ISO 3167	SAE J1885
ISO 179/1eA	ISO 527-1/2	ISO 3795	

2.2 GM Standards/Specifications.

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

2.3 Additional References.

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

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 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 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 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.

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

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 Materials approved to this standard shall meet the requirements of GMW3013, General Requirements for Handling of Technical Terms of Delivery for Plastics.

3.4 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 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.

3.5 Compound Properties. See Table 1 and Table 2. The following are also required for full standard approval.

- The minimum number of lots per test required is one in natural.
- Stress Strain Curve at multiple temperatures at 23 °C, 85 °C, and -30 °C.

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

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

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

3.7 Compound Properties. See Table 1 and Table 2.

Table 1: Compound Properties (Natural and Black)

Property	Standard Note 1	Units	T1	T2	T3	T4	T5	T6	T7	T8
Density	ISO 1183, Method A	g/cm ³	1.05 ± 0.03	1.05 ± 0.03	1.07 ± 0.04	1.07 ± 0.03	1.05 ± 0.03	1.05 ± 0.03	1.05 ± 0.03	1.05 ± 0.03
Mold Shrink (report one lot)	ISO 294-3/4 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.							
Coefficient of Linear Thermal Expansion (CLTE)	ASTM E831 or ISO 11359-2	1/K	≤ 90 x 10 ⁻⁶ - target value - report one lot in flow and one lot cross flow directions.							
Tensile Yield	ISO 527-1/2	MPa	≥ 30	≥ 35	≥ 40	≥ 40	≥ 30	≥ 45	≥ 40	≥ 30
Tensile Modulus	ISO 527-1/2	MPa	≥ 1700	≥ 1900	≥ 2200	≥ 1900	≥ 1800	≥ 2200	≥ 1900	≥ 1500
Tensile Strain at Break	ISO 527-1/2	%	Report one lot.							
Poisson's Ratio	ISO 527-1/2	MPa	Report one lot.							
Notched Charpy at +22 °C	ISO 179/1eA	kJ/m ²	≥ 8	≥ 8	≥ 10	≥ 20	≥ 8	≥ 8	≥ 15	≥ 15
Notched Charpy at -30 °C	ISO 179/1eA	kJ/m ²	≥ 4	≥ 4	≥ 6	≥ 8	≥ 4	≥ 4	≥ 15	≥ 10

Property	Standard Note 1	Units	T1	T2	T3	T4	T5	T6	T7	T8
Multiaxial Impact at +22 °C (target value report one lot)	ASTM D3763, specimen C, 6.6 m/s impact velocity or ISO 6603-2/40/20/C/4.4 Note 2. 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 at maximum force	Report one lot.							
Vicat Softening Temperature	ISO 306	°C	≥ 88	≥ 92	≥ 105	≥ 100	≥ 90	≥ 100	≥ 100	≥ 100
Heat Deflection Temperature (HDT) B - 0.45 MPa	ISO 75-1/2	°C	≥ 80	≥ 90	≥ 100	≥ 100	≥ 80	≥ 90	≥ 100	≥ 90
HDT A - 1.8 MPa	ISO 75-1/2	°C	≥ 70	≥ 80	≥ 90	≥ 90	≥ 70	≥ 80	≥ 85	≥ 80
Melt Mass - Flow Rate or Melt Volume - Flow Rate	ISO 1133 (220 °C/10 kg)	g/10 minutes or cm ³ /10 minutes	Report one lot							
Emission Testing of Interior Materials: For initial approval, test one lot in black.	GMW16853									
Odor	GMW3205	Rating	See requirements of GMW16853, not required for T7 or T8							
Fogging (one lot only)	GMW3235-B-Y1-T2	mg	See requirements of GMW16853, not required for T7 or T8							
Emissions	GMW15634 VOC value SVOC value	µg/g	See requirements of GMW16853, not required for T7 or T8							
Chemical Resistance	GMW14334, Code A	No units	≥ Rating 1, not required for T7 or T8							
Tensile Strength after Heat Aging	ISO 527	MPa	Must be 75% retention of original values, age 1000 h at 80 °C.							
Tensile Strain at Break after Heat Aging	ISO 527	%	Report - target 75% retention of original values, age 1000 h at 80 °C.							