



Thermoplastic Elastomer - Styrenic, General Purpose, Filled

1 Scope

1.1 Material Description. This specification covers the properties of black and natural, heat stabilized, filled thermoplastic elastomers consisting of polypropylene (PP) and styrene/ethylene/butylene/styrene (SEBS) rubber. These materials are not weatherable and are not intended for use in exposed applications.

Material types are delineated by hardness values. The types and corresponding hardnesses are defined in Appendix A, Table A1.

1.2 Symbols. The material abbreviation according to ISO 18064 is >TPS-SEBS<.

1.3 Applicability. Typical applications include active aero shutters.

1.4 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

ISO 34-1	ISO 812	ISO 1431-1	ISO 18064
ISO 37	ISO 868	ISO 3451-1	
ISO 188	ISO 1183	ISO 3795	

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14270	GMW16853
GMW3059	GMW3232	GMW14444	
GMW3205	GMW3235	GMW15634	

2.3 Additional References.

Safety and Industrial Hygiene (S&IH) Technical Standard (TS), S&IH TS 3.4-160-02

3 Requirements

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

3.1 Requirements on Test Specimens.

Tests shall be conducted using the latest issue of the test methods indicated. Suitable precautions should be taken to ensure that applicable safe limits are not exceeded when conducting test procedures, processes, and/or handling the materials required by this specification.

3.1.1 Tests specimens shall be die cut from fan gated injection molded plaques having a nominal thickness of 2.0 mm $\pm$ 0.2 mm. Die cut specimens are to be tested with the long axis of the test specimen perpendicular to the direction of flow. Plaque dimensions must be sufficient to permit this.

Tests shall be conducted 40 h minimum after molding and immediately following a conditioning period of 24 h minimum per GMW3221, Code B, unless otherwise specified. All tests shall be performed on unannealed specimens. In addition, tests specified at temperatures under or over +23 °C $\pm$ 2 °C shall be conducted at the specified temperature using specimens conditioned at the specified temperature for 4 h minimum.

The minimum values specified in the property tables must be met by test specimens in natural, black, or in a standard sampled color if natural or black are not available. 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.

3.2 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 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.

3.4 Requirements on Delivery. Important physical, mechanical, and thermal properties that characterize the material are summarized in Table 1.

Note: For each product, the requirements to Table 1 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. A minimum of six (6) lots shall be tested to Table 1. The following are also required for full specification approval. The minimum number of lots per test required is one (1):

- Young's Modulus
- Poisson's Ratio
- Coefficient of Linear Thermal Expansion (CLTE)
- Stress-Strain Curve at +23 °C

Table 1: Compound Properties (Black and Natural)

Property	Test Method	Unit	Type					
			1	2	3	4	5	6
Shore A Hardness	ISO 868, 15 s delay	Shore A	40 ± 5	50 ± 5	60 ± 5	70 ± 5	82 ± 5	90 ± 5
Density	ISO 1183		1.08 to 1.22					
Ash Content	ISO 3451-1, Method A at +600 °C, specify filler type exclusive of carbon black.	%	Report Filler type and content for each material/grade to be documented in certification package at material approval					
Tensile Stress at Break	ISO 37, Type 1 dumbbell, 500 mm/minute	MPa	4.0 minimum	5.0 minimum	6.0 minimum	8.0 minimum	9.0 minimum	12.0 minimum
Elongation at Break	ISO 37, Type 1 dumbbell, 500 mm/minute	%	600 minimum	600 minimum	600 minimum	600 minimum	550 minimum	500 minimum
Tensile Stress at 100% Elongation	ISO 37, Type 1 dumbbell, 500 mm/minute	MPa	0.5 minimum	1.0 minimum	1.5 minimum	2.0 minimum	3.0 minimum	4.0 minimum
Tear Strength	ISO 34-1, Method B angle die, 500 mm/minute	kN/m	10 minimum	12 minimum	16 minimum	20 minimum	27 minimum	33 minimum
Low Temperature Brittleness	ISO 812, Type B	°C	-40 maximum					
Properties After Long Term Heat Aging	ISO 188, 1000 h at +110 °C in an air-circulating oven followed by indicated	Change in Property						

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