



Energy Absorbing Impact Foam – Polystyrene Blends

1 Scope

1.1 Material Description. This specification covers the properties of a resilient, energy absorbing black or white expanded blended polystyrene and polyolefin bead foam which is steam chest molded.

1.2 Symbols. The material abbreviation according to ISO 11469 is >PS+PE<.

1.3 Applicability. Typical applications are energy absorbers for safety applications.

1.4 Remarks. The classification is separated into Types according to different ranges of densities and colors. There is a Z Type to be used for a density that is outside the listed ranges. Also, the classification is separated into exterior (EXT) and additional interior (INT) requirements.

2 References

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

2.1 External Standards/Specifications.

FMVSS 302	ISO 845	ISO 1923	ISO 11469
ISO 844	ISO 1856	ISO 1926	

2.2 GM Standards/Specifications.

GMW3013	GMW3232	GMW14444	GMW16853
GMW3059	GMW3235	GMW15634	
GMW3221	GMW14270	GMW15635	

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 Delivery. Important physical, mechanical and thermal properties that characterize the material are summarized in Table 1. The color shall be specified on drawings, in material specifications and otherwise.

3.2 Requirements on Test Specimens. 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 and Table 2 shall be met by test specimens.

3.3 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.

3.4 Chemical Requirements. 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.

3.5 Compound Properties. See Table 1. In addition, approval to this specification requires material source to provide any and all data request to GM.

3.6 Performance Requirements. Performance requirement 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.

Table 1: Compound Properties

Property	Standard ^{Note 1}	Units	T20
Symbol	ISO 11469	Not applicable	>PS+PE<
Density	ISO 845 ^{Note 1}	kg/m ³	18 to 22
Tensile Stress	ISO 1926 500 mm/minute	kPa	≥ 225
Elongation at Break	ISO 1926 500 mm/minute	%	≥ 8
Compression Stress	ISO 844, 23 °C at 50% deflection	kPa	≥ 155
Compression Set	ISO 1856 22 h at 23 °C and 50% compression	%	≤ 50

Note 1: Determination of linear dimensions per ISO 1923, but compression force of foot is 500 kPa ± 5% and 50 mm ± 0.1 mm diameter pressure. All readings should be taken after the pressure foot has been in contact with the material for at least 5 s.

Table 2: Additional Testing for Interior Compartment (One lot Only)

Property	Standard	Units	Requirement
Flammability	GMW3232	mm/minute	Must comply with FMVSS 302 Test to GMW3232
Emission Testing of Interior Materials – Test Initial Color	GMW16853		
Emissions	GMW15634 Volatile Organic Compound (VOC) Value Semi Volatile Organic Compound (SVOC) Value	µg/g µg/g	Requirements, refer to GMW16853
Aldehyde and Ketone Emissions	GMW15635	mg/kg	Requirements, refer to GMW16853
Fogging	GMW3235-B-Y1-T2	mg	Requirements, refer to GMW16853

4 Manufacturing Process

Not applicable.