



Polyurethane Foam for Seal, Gasket, and Vibration Decoupler Applications

1 Scope

This specification defines the requirements of continuous cast and slab (or bun) stock cellular polyurethane materials based on polyether or polyester chemistry to be used as air, dust, light, and water seals or gaskets. These materials may also be used as isolators, rattle protection, covers for gaps and other suitable applications. These materials are typically die cut or slit to width from sheet stock or skived from bun stock, and may have pressure sensitive adhesive applied to one or both sides.

For molded, cast, and slab polyurethane foam for sound absorbing applications refer to GMW14196: Polyurethane Foams for Acoustic Applications. For elastomer polyurethane foams for sealing and vibration handling applications having a minimum of 15% bio-renewable and a minimum of 25% post automotive shredder residue, refer to GMW16515: Flexible Expanded Material for Air, Dust, Water Sealing and Noise Vibration Handling Applications. For slab/sheet polyurethane foam for Engine Compartment Sound Absorber (ESCA), refer to GMW16869.

1.1 Material Description. All types of foams described in this specification are polyurethane open cell foam based on polyether or polyester chemistry.

1.2 Symbols. Not applicable.

1.3 Applicability. The polyurethane material specified in this standard is recommended for use as follows.

- Gasket for vibration damping and vibration and shock insulation.
- Air, dust, water seal and/or light seals.
- Squeak and rattle applications.
- Seal and gasket applications.
- Energy absorber and interior trim applications.

This specification segments these polyurethane materials into three types. The three (3) types are based on material performance and product application, and the types do not address the actual part design. These standards are to be considered minimum compliance.

1.4 Remarks.

1.4.1 Recycled or Alternate Materials. Recycled polyurethane materials or bio-based materials may be used for parts under this specification.

2 References

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

2.1 External Standards/Specifications.

ASTM D737	ISO 1856	ISO 7231	ISO 23529
ISO 845	ISO 3386-1	ISO 8067	ISO/IEC 17025
ISO 1798			

2.2 GM Standards/Specifications.

GMW3059	GMW3259	GMW14358	GMW16853
GMW3205	GMW14196	GMW14444	GMW16869
GMW3232	GMW14270	GMW15634	GMW17650
GMW3235	GMW14357	GMW16515	

2.3 Additional References.

- Foam Certification Template (available on GM SupplyPower or your local GM Materials Engineering contact).
- Safety and Industrial Hygiene (S&IH) Technical Standard (TS), S&IH TS 3.4-160-02.

3 Requirements

3.1 General. This material shall be a polyurethane foam with density, as specified on the part drawing, and which is suited to its application and purpose. Parts made from this foam shall be uniform in foam structure, cell size and mechanical properties. The foam shall not cause any skin irritation, or have an unpleasant odor. The foam part shall have no unfoamed areas (e.g., shrinkage spots, voids, missing foam), no cracks, and no densification areas (e.g., streaks, mis mix, knit lines) which could have adverse effects on appearance, performance or serviceability. The foam must be physiologically unobjectionable. It must be free from constituents which could cause health damages or skin irritations.

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 Type Descriptions.

3.3.1 Type 1: See GMW14196. Legacy type

3.3.2 Type 2: Used for gasket for vibration and shock insulation. Intended for use under 120 °C and not intended for water sealing applications.

3.3.3 Type 3: Used for air, dust, and/or light seals and in squeak and rattle applications. Material can be used in a temperature range of -29 °C to 120 °C.

3.3.4 Type 4: Used for air, dust, light and/or water seal (water seal must be compressed at least 50%). Suitable temperature range is from -40 °C to 120 °C.

3.4 Requirements for Test and Specimens.

3.4.1 Requirements on Test Specimens. Unless otherwise specified, the shape, size, and number of test pieces shall be in accordance with the relevant test procedures. Specimen conditioning shall be as specified in the relevant test methods. The minimum time between manufacturing and testing shall be 72 h.

3.4.2 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.

3.4.3 Air, Dust, Light Seals Application Only for Type 3-I. Report air flow when tested to ASTM D737 (13 mm thick sample).

3.4.3.1 Test using paint pot test. Test apparatus shall consist of a 7.6 L paint pressure tank with a 0.6 mm pipe at least 15.2 cm long extending from the top of the pot. On the top of the 6.35 mm pipe shall be a standard 2.5 cm pipe flange (29 mm diameter opening). The tank shall be equipped with an air pressure gage having a 10 psi total scale graduated in 0.1 psi units.

Place a test piece of foam 15.2 cm × 15.2 cm × 2.5 cm thick of the 2.5 cm pipe flange; place a piece of 1.6 mm screening on top of the test piece; put another 2.5 cm pipe flange to the one attached to the pressure pot, with the test piece and screen in between, tighten the bolts until secure but avoid tightening one any more than the others.

Introduce a pressure of 35 kPa into the pressure pot and allow the pressure to build up slowly, turn off the air supply and observe the pressure drop over a 30 minute time period. At the end of 30 minutes, the residual pressure in the paint pot must be a minimum of 7 kPa.

3.4.4 Water Sealing Applications. Applications that require a water seal shall be tested to GMW17650 method C at 50% compression with 25 mm head of water, high temperature 120 °C, low temperature -29 °C. Test as received sealability and aged sealability.

3.4.5 Additional Requirements.

3.4.6 Shelf Life. The material shall be packed to prevent permanent deformation when shipped or stored. It must meet all requirements of this specification after 6 months of storage at +50 °C.

3.4.7 Material and Performance Requirements. Material requirements are summarized in Table 1 and Table 2. All materials are required to test a minimum of six (6) lots to Table 1 requirements, and one (1) lot to Table 2 requirements.

3.4.8 Test Laboratory. Test shall be performed at an ISO/IEC 17025 accredited laboratory, or a facility approved by GM Materials Engineering.

3.4.9 Annual Certification. All materials approved to this specification shall be listed in in the GM Materials Approved Source List. After a material has been granted approval, the required testing for annual material certification shall be Density, Tensile Strength, Elongation, Water Absorption, Compression Set, Compression Force Deflection, and Cold Resistance.