



Low MDI Urethane Acoustic Foam, Mixture

1 Scope

This specification describes the requirements of a rigid polyurethane foam. The material is used as an acoustic baffle in enclosed areas such as A, B, and C pillars and engine compartment structures. It must be capable of bonding to e-coated metal, be non-wicking and be compatible with all manufacturing processes.

1.1 Material Description. This material is a two-component material comprised of a polymeric methylene diphenyl diisocyanate (MDI) prepolymer and a water/amine curative. This material contains soy based, renewable content.

The acoustical foam system is comprised of a 16:1 mixture (by volume) of a polymeric MDI prepolymer, 9986409, and a water/amine curative, 9986410. The mixture of 9986409 and 9986410 is identified as 9986411.

1.2 Symbols. Not applicable.

1.3 Applicability. Typical applications include acoustic baffles.

2 References

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

2.1 External Standards/Specifications.

ASTM D1622	ASTM D2126	SAE J1756
ASTM D1735	ASTM D4339	

2.2 GM Standards/Specifications.

9986409	GMW3059	GMW14093	GMW14729
9986410	GMW3259	GMW14124	

2.3 Additional References.

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

3 Requirements

3.1 Requirements on Test Specimens.

3.1.1 Odor (ASTM D4339). The cured foam must not have a toxic or noxious odor.

3.1.2 Toxicity. The foam must not adversely affect the personnel handling it.

3.1.3 Adhesion. The foam must not crack, promote corrosion, or lose adhesion to the test panel before, during or after the following conditions.

- Initial
- After 24 h at Room Temperature
- GMW14124 Cycle F, Six Cycles
- Heat Aging of 336 h at 70 °C

Note: Test panels can be flat or preferably a simulated pillar, or tail section consisting of production intent metal plus primer and topcoat (if applicable). After all environmental cycles, evaluation shall consist of cutting the part open and visually inspecting. There must not be any corrosion on the panel surface underneath the foam.

3.1.4 Cold Impact (GMW14093, Apparatus C, Code 3, Minimum 1.7 J). The material must not crack or lose adhesion to the substrate prior to, or after, two 1.7 J impacts at -30 °C. Sample size shall be 250 mm x 250 mm x 25 mm with trimmed edges.

3.1.5 Humidity (GMW14729 Option A). Test for 168 h at 38 °C/100% Relative Humidity (RH). The material must not crack or lose adhesion to the substrate. Remove foam from the surface of the panel after exposure. There must not be any corrosion on the panel surface underneath the foam.

3.1.6 Water Absorption. Water absorption shall not exceed 10% (by mass) when tested as follows:

3.1.6.1 Prepare five 101 mm x 101 mm x 305 mm (4 in x 4 in x 12 in) rectangular cavities constructed from 101 mm x 305 mm (4 in x 12 in) e-coated panels (e-coat should be representative of GM assembly plant). Tape the panels together along the length of the joints using duct tape or aluminum tape (moisture resistant tape).

3.1.6.2 On one side of the cavity, drill a hole in the center of the panel. Weigh each of the empty cavities to the nearest 0.1 g. Record this weight as: **W1**.

3.1.6.3 Stand each of the rectangular cavities on end and dispense enough foam through the pre-drilled hole in the center of the cavity. Allow the foam to rise 38 mm to 76 mm (1.5 in to 3 in) above the top end of the cavity. Re-weigh the cavities to the nearest 0.1 g. Record this weight as: **W2**.

3.1.6.4 Allow the test assemblies to cure at 23 °C ± 5 °C for a minimum of 24 h prior to testing.

3.1.6.5 Determine the mass of the foam material prior to exposure by subtracting the weight of the metal cavity section: **W1**, from the weight of the filled cavity section: **W2**. Record the weight of foam as: **F1**.

3.1.6.6 Age the test assemblies (standing on end with the foam crown over the cavity section) for 10 days in humidity per ASTM D1735 at 38 °C and 100% RH.

3.1.6.7 Remove the test assemblies from the humidity environment and allow them to condition for 24 h at 23 °C ± 5 °C and 50% RH.

3.1.6.8 Re-weigh the aged test assemblies to the nearest 0.1 g and record this value as: **W3**.

3.1.6.9 Determine the weight of wet foam mass by subtracting the weight of the metal: **W1**, from the weight of the aged test cavity: **W3**. Record this weight as: **F2**.

3.1.6.10 Calculate the percent water absorption by the following formula for all five (5) test assemblies:

- Percent Water Absorption = $[(F2-F1)/(F1)] \times 100\%$.

3.1.6.11 Record the average water absorption for the five (5) samples tested.

3.1.7 Salt Spray (GMW14124, Cycle J). The foam must not crack, lose adhesion, or promote corrosion underneath the foam after five (5) cycles.

3.1.8 Density (ASTM D1622). Free rise sample, core sample, 24 kg/m³ ± 2.4 kg/m³.

3.1.9 Dimensional Stability (ASTM D2126). Percent (%) volume change, maximum.

- 28 Days at -15 °C, Dry 3%
- 28 Days at 38 °C, 100% RH 3%
- 28 Days at 70 °C, 100% RH 6%
- 28 Days at 70 °C, Dry 3%
- 28 Days at 23 °C, Ambient 3%

3.1.10 Fogging (SAE J1756). The amount of fog when measured with a 60 degree glossmeter shall have a rating of 60 units or better when tested at a bath temperature of 85 °C and a cooling temperature of 38 °C. Samples that produce a transparent film or crystallinity at 40x magnification do not pass this requirement.

3.1.11 Gel Time. Gel Time shall be 3 s maximum.

3.1.12 Cavity Filling Capability. Contact requesting GM Engineering group for instructions on how to demonstrate cavity filling capability.

3.1.13 Mildew Growth (GMW3259). No mildew growth or odor is permissible.

4 Equipment Processing Conditions

4.1 Processing equipment must be approved prior to implementing this product into an assembly plant.

4.2 Typical Operating Conditions.

- Material Pressure: 2000 kPa to 4200 kPa.
- Operating Pressure: 2000 kPa minimum.
- Nitrogen (N₂ only) Supply Pressure: 415 kPa minimum for prepolymer.