



Preliminary Sprayable Damper - Generic Qualification

1 Scope

This specification details the requirements of waterborne, sprayable sound damper (Liquid Applied Sound Damper (LASD)).

The purpose of this material is to reduce vehicle metal noise vibrations excited by engine, tires, transmission and stone impingement.

The material is applied in the paint shop after electrocoat and must be capable of robotic application.

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose/Material Description. 1.1.1 The material must be a smooth and homogeneous mixture that contains no lumps, air, unmixed particles or foreign materials.

1.1.2 The material must be capable of being dispensed with approved production pumping and application equipment.

1.1.3 The material must not exhibit a noxious odor or adversely affect personnel handling it at any time.

1.1.4 The material must not contain corrosion-causing ingredients.

1.1.5 This bake-able material must adhere to all GM globally approved production electrocoats.

1.1.6 The material must be compatible with electrocoat, sealer, primer surfacer, topcoat and interior component systems.

1.2 Symbols. Not applicable.

1.3 Applicability. The material reduces resonant vehicle vibration of metal panels by adding damping to selected areas. The material can be applied to typical acoustical hot spots, such as the floor pan, toe pan or rear cargo/trunk floors. Where material rheology and vehicle build conditions allow, the material may also be used on the plenum, door panels and roof panels.

1.4 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

ASTM D1475	ASTM E756	IATF 16949	SAE J1637
ASTM D2196	EN ISO 1524	ISO 2811	SAE J1864
ASTM D2369	EPA Method 24	SAE J1524	

2.2 GM Standards/Specifications.

9984558	9986593	GMW3059	GMW14729
9984559	GMW3016	GMW14124	GMW14829
9986288	GMW3019	GMW14270	GMW15481
9986289	GMW3025	GMW14700	GMW16701

3 Requirements

3.1 Requirements on Test Specimens. See Appendix A, Table A1 for testing summary.

3.1.1 Specific Gravity (ASTM D1475).

3.1.1.1 Typically 1.2 Specific Gravity to 1.9 Specific Gravity (see 9984558, 9984559, 9986288, 9986289).

3.1.1.2 Maximum Specific Gravity of 1.5 (see 9986593).

3.1.2 Volatile Organic Content (VOC) Determination (EPA Method 24 per 2.2, Using ASTM D2369 Procedure B). VOC requirement is 0.00 VOC. In addition to calculations and weights, the final VOC must be identified and reported.

3.1.2.1 Condensing Volatiles Test (GMW3016). Must not exceed 3% condensing volatiles when baked as follows:

- High Bake materials: 20 minutes at 165 °C ± 5 °C.
- Low Bake materials: 20 minutes at 130 °C ± 5 °C.

3.1.3 Viscosity. The viscosity shall be determined using the Press Flow and Brookfield methods.

3.1.3.1 Press Flow Viscosity (SAE J1524). Key Product Characteristic (KPC) requirement.

The viscosity range is as follows: 16 s ± 5 s at 24 h when tested according to the following equipment setup and parameters:

- Orifice: 3.175 mm (0.125 in).
- Extended tip: 50.8 mm (2.0 in).
- Pressure: 0.689 bar (10 psi).
- Sample weight: 20 g.
- Test temperature: 25 °C ± 0.5 °C.

3.1.3.2 Brookfield Viscosity (ASTM D2196). KPC requirement. The viscosity requirement is as follows: 65 000 cps minimum at 24 h not to exceed 100 000 cps at 90 days.

Test according to the following equipment setup and parameters:

- Spindle Number Seven (7).
- Rotational speed: 20 rpm.
- Take viscosity reading after 1 minute.
- Test temperature: 25 °C ± 0.5 °C.

3.1.3.3 Viscosity Data. Press Flow Viscosity and Brookfield Viscosity data shall be reported on initial (dump) viscosity after 24 h (KPC), 14 days, 30 days, 60 days and 90 days.

The material must exhibit a leveling or stabilizing of viscosity after 24 h.

Press Flow Viscosity increase should not exceed the following guidelines:

- ≤ 20% of the 24 h data at 30 days.
- ≤ 40% of the 24 h data at 60 days.
- ≤ 60% of the 24 h data at 90 days.

3.1.4 Particle Size (EN ISO 1524).

3.1.4.1 For (9984558, 9984559, 9986288, 9986289): Maximum of 774 µm.

3.1.4.2 For (9986593): Maximum of 350 µm.

3.1.5 Color. The material must be black.

3.1.6 Solids Content (ISO 2811). Seventy percent (70%) minimum by weight.

3.2 Performance Requirements.

3.2.1 Adhesion (GMW3019). One (1) full set of test panels must be prepared using a globally approved major production technology from each approved electrocoat source. This includes technologies from all GM regions globally. The materials must be capable of demonstrate at least a minimum of fine line cohesion performance after the primer bake (see Table 1).

3.2.1.1 For 9984558, 9984559, 9986288, 9986289: Allow only 10 minutes maximum open (dry) time before primer bake.

3.2.1.2 For 9986593: The following “open times” from application to bake shall be tested: 0 minutes, 20 minutes, 1 h, 8 h, 24 h, 72 h, 1 month. In addition, demonstrating at least a minimum of fine line cohesion performance, the material must not exhibit any cracking, bubbling or PITAs on test panels prepared using 2 mm, 3 mm and 4 mm applied wet film thickness.

Table 1: Primer Bake Cycle

Bake System	9984559, 9986288, 9986593 High Bake	9986593 Three (3) Wet	9984558, 9986289, 9986593 Low Bake
Minimum Primer	15 minutes at 158 °C	10 minutes at 140 °C	15 minutes at 125 °C
Nominal Primer	20 minutes at 165 °C	10 minutes at 149 °C	20 minutes at 130 °C
Maximum Primer	60 minutes at 180 °C	20 minutes at 163 °C	90 minutes at 145 °C
Maximum Powder Primer	60 minutes at 190 °C	Not applicable	Not applicable

When baked as described in Table 1, the material must not lose adhesion to the substrate during or after exposure to test environments of 3.2.1.3.

In addition, the material must demonstrate 100% cohesive adhesion when peeled.

3.2.1.3 Test Environment. The following tests should be performed on panels baked according to Table 1.

- Initial Test: After cooling to ambient temperature.
- Exterior Cycle Test: GMW14124 Cycle F, 12 cycles.

3.2.2 Shrinkage/Expansion (GMW15481).

3.2.2.1 For 9984558, 9984559, 9986288, 9986289: Material baked as described in Table 1: Primer Bake Cycle should not exceed 20% shrinkage. Expansion generally will not exceed 5%. However, actual shrinkage and expansion data must be reported and recorded (tabular and graphical formats) as a function of temperature and film build.

3.2.2.2 For 9986593: Material baked as described in Table 1: Primer Bake Cycle must not exceed 30% expansion and must have NO shrinkage.

3.2.3 Porosity. The material must be thoroughly de-aired during the manufacturing process and must not show any signs of trapped air (popping, spitting, skipping, etc.) during dispense.

3.2.3.1 Water Soak. Material applied to a panel and baked according to Table 1: Primer Bake Cycle shall be immersed in Room Temperature water for the following times: 24 h, 48 h. and 72 h. At the end of the soak time the panels shall be removed from the water bath and blotted with a paper towel to remove visible surface water. Upon visual examination there must be no evidence of blisters or cracking. If the material exhibits any loss of adhesion when removed from the bath, wait 24 h and recheck. The material must have recovered adhesion to the substrate within 24 h. after removal from the water bath and blot dry.

3.2.4 Degradation Resistance. Apply two (2) strips of damper 3 mm high x 40 mm wide x 200 mm long to the surface of a phosphated or thin film coated steel panel (inspect the panel first to ensure it is free of surface corrosion). Repeat the application over a panel coated with production electrocoat. Allow 10 minutes open time before baking.

3.2.4.1 Prepare the panels as follows:

- High Bake materials (9984559, 9986288, 9986593): Bake 1 h at 200 °C.
- Low Bake materials (9984558, 9986289, 9986593): Bake 1 h at 150 °C.

Remove the baked panels from the oven and allow to cool to room temperature.

Note: The material must not smoke during the bake portion of this test.

3.2.4.2 After Baking.

- Remove one (1) damper strip and inspect the surface of the panel.
- There must not be any corrosion on the panel surface where the damper previously existed.

3.2.4.3 After Humidity (GMW14729).

- Expose the panel with the remaining material strip to 40 °C and > 98% Relative Humidity (RH) for 240 h.
- Remove the remaining strip and again inspect the panel.
- There must be no corrosion on the panel surface where the damper previously existed.

3.2.5 Compatibility with Associated Production Material/Process.

- Compatibility with plant-specific materials, such as sealer, deadener, anti-chip primers, primers and topcoat, shall be evaluated before introduction to production facilities.
- If any plant-specific material issues need to be addressed during the approval process, the details must be discussed and resolved between the responsible engineer and the supplier prior to the start of testing.

3.2.6 Topcoat Compatibility (GMW14829). For waterborne damper materials, apply material and allow to dry for 10 minutes prior to primer surface application. The damper shall be baked according to the conditions found in Table 2. The primer surfacer and topcoats shall be applied using overspray conditions.

Note: Allow only 10 minutes maximum open (dry) time before primer bake.

Table 2: Full Paint System Bakes

Bake System	9984559, 9986288, 9986593 High Bake	9986593 Three (3) Wet Bake	9984558, 9986289, 9986593 Low Bake
Minimum Primer plus Nominal Topcoat	15 minutes at 158 °C plus 20 minutes at 130 °C (WB or SB plus 1K) or 20 minutes at 121 °C (WB plus 2K)	10 minutes at 140 °C plus 20 minutes at 135 °C	15 minutes at 125 °C plus 20 minutes at 130 °C (WB or SB plus 1K) or 20 minutes at 121 °C (WB plus 2K)
Nominal Primer plus Nominal Topcoat	20 minutes at 165 °C plus 20 minutes at 130 °C (WB or SB plus 1K) or 20 minutes at 121 °C (WB plus 2K)	10 minutes at 149 °C plus 20 minutes at 135° C	20 minutes at 130 °C plus 20 minutes at 130 °C (WB or SB plus 1K) or 20 minutes at 121 °C (WB plus 2K)
Maximum Primer plus Nominal Topcoat	60 minutes at 180 °C plus 20 minutes at 130 °C (WB or SB plus 1K) or 20 minutes at 121 °C (WB plus 2K)	20 minutes at 163 °C plus 20 minutes at 135 °C	90 minutes at 145 °C plus 20 minutes at 130 °C (WB or SB plus 1K) or 20 minutes at 121 °C (WB plus 2K)
Maximum Powder Primer plus Nominal Topcoat	60 minutes at 190 °C plus 20 minutes at 130 °C (WB or SB plus 1K) or 20 minutes at 121 °C (WB plus 2K)		Not applicable

Key:

1K = One component

2K = Two component

SB = Solventborne

WB = Waterborne

3.2.6.1 Combinations and Technologies.

3.2.6.1.1 Layering Combinations.