



Antiflutter Adhesive/Sealer (Body in White) Performance Requirements

1 Scope

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 Material Description. This standard is intended to cover the performance requirements of antiflutter adhesive candidates that are used to bond metallic automotive substrates. For specific material specifications that meet the classifications described, see 3.5.4.

1.2 Symbols. Not applicable.

1.3 Applicability.

1.3.1 Antiflutter. Bonding of inner and outer panels to eliminate metal contacts, act as a vibration dampener and can give the assembly part stiffness. For example, inner and outer panel of hood, tailgate, door, roof bow to roof, fuel filler and wheel arch.

2 References

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

2.1 External Standards/Specifications.

ASTM D638	ASTM D792	ASTM D2240	ISO 4587
ASTM D790	ASTM D1876	ASTM E831	

2.2 GM Standards/Specifications.

9982256	EDS-M-8634	GMW3286	GMW16700
9985745	GMW2	GMW14124	GMW16853
9985800	GMW8	GMW14444	L 000 0058
9985918	GMW11	GMW14706	L 000 0063
9985996	GMW3008	GMW14729	L 000 0131
9986265	GMW3011	GMW15416	L 000 0737
9986321	GMW3025	GMW15477	L 000 0776
EDS-M-8506	GMW3059	GMW15481	L 000 0780
EDS-M-8515	GMW3154	GMW15634	L 000 0789
EDS-M-8597	GMW3205	GMW15635	
EDS-M-8622	GMW3221	GMW16152	

2.3 Additional References.

GM Part Numbers:

- 9273089 Adhesive – Front Side Outer Panel
- 9273329 Sealer
- 9273474 Sealer – Hem Flange Body in White
- 9274178 Cement – Sealing Compound
- 9274298 Sealer – Hem Flange Body in White

- 9274773 Adhesive – Front Panel to Body Side Outer Panel
- 94545782 Adhesive – Rear Compartment Lid Panel
- 95999838 Sealer – Pumpable

3 Requirements

3.1 Requirements on Test Specimens. Reference GMW3221.

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 Volumetric Expansion (GMW15481). Volumetric expansion after curing shall be evaluated according to GMW15481. The volumetric expansion range shall be used to determine the approval category per Table 1.

Table 1: Volumetric Expansion

Volumetric Expansion Code	Volumetric Expansion
Low Expansion (LE)	≤ 25% at Minimum Cure
Medium Expansion (ME)	25% to 150% at Minimum Cure
High Expansion (HE)	150% at Minimum Cure

3.4 Substrates. Testing shall be completed with the substrates in Table 2. For oily metal, use one (1) challenging approved lubricant as specified by the approving material engineer. Degreasing and oiling according to GMW15477. Oil coating weight shall be 3 g/m² for corrosion protection oils/lubricants and 1.7 g/m² for dry lubes.

Table 2: Substrates

Substrate Description ^{Note 1}	Galvanized Coating Weight
Oily Cold Rolled Steel (CRS) (GMW2) ^{Note 2}	---
Oily Hot Dipped Galvanized Steel (HDG) (GMW8)	60 g/m ²
Oily Electrogalvanized Steel (EG) (GMW11)	60 g/m ²

Note 1: After application of the sealer, the oily metal panels shall be processed through pretreatment and Electrodeposition (ELPO) prior to baking and exposure according to 3.7.4. Use any GM approved pretreatment (GMW3011) ELPO (GMW3008) at target film thickness, as specified by the approving material engineer. Other substrates identified and required by the regional material engineering group or the regional material specification

Note 2: Neutral Salt Spray (NSS) testing according to 3.7.4.2 and Cyclic Corrosion Laboratory Test according to 3.7.4.3 is not required with oily CRS.

3.5 Bond Strength, Adhesion, and Corrosion. Antiflutter adhesive candidates shall be evaluated for strength, separation mode and corrosion protection. Samples testing shall be done in sample **sets**. Five (5) samples shall constitute a **set**.

3.5.1 Lap Shear (ISO 4587). All antiflutter adhesive candidates shall be evaluated using the lap shear configuration.

Lap shear testing shall be done to establish tensile shear strength and separation mode of the adhesive.

Lap shear shall be tested according to ISO 4587.

Evaluation according to 3.7.

The only acceptable separation mode of the adhesive shall be **cohesive** within the adhesive layer. Adhesive separation of the adhesive layer to a test substrate shall be deemed unacceptable.

In any case, the minimum required lap shear strength shall be maintained, both initially, and after environmental exposure.

Test specimen sizes according to ISO 4587 with a bond gap of 1.0 mm ± 0.1 mm. In deviation to this norm, other individual sample sizes, e.g., 20 mm × 100 mm, with a bond flat of 20 mm × 20 mm, are acceptable.

Lap shears shall be **tensile** tested (pulled) at a rate of 100 mm/minute.

The lap shear range shall be used to determine the approval category according to Table 3.

Table 3: Lap Shear

Lap Shear Code	Lap Shear Strength
Low Strength (LS)	< 0.2 MPa
Medium Strength (MS)	0.2 MPa to 1.5 MPa
High Strength (HS)	> 1.5 MPa

3.5.2 Classification of Strengths and Expansion Performance. Antiflutter adhesive/sealer (body in white) systems shall be classified as described in Table 4.

Table: 4: Classifications

	Expansion Degree per GMW15481	Lap Shear Strength per ISO 4587
Low Expansion-High Strength (LE-HS)	up to 25%	> 1.5 MPa
Low Expansion-Medium Strength (LE-MS)	up to 25%	> 0.2 MPa but < 1.5 MPa
Medium Expansion-High Strength (ME-HS)	> 25% but < 150%	> 1.5 MPa
Medium Expansion-Medium Strength (ME-MS)	> 25% but < 150%	> 0.2 MPa but < 1.5 MPa
Medium Expansion-Low Strength (ME-LS)	> 25% but < 150%	< 0.2 MPa
High Expansion-Medium Strength (HE-MS)	> 150%	> 0.2 MPa but < 1.5 MPa
High Expansion-Low Strength (HE-LS)	> 150%	< 0.2 MPa

3.5.3 Adhesion (GMW14706) and Corrosion. All antiflutter adhesive candidates shall be evaluated using the Adhesion and Corrosion configuration.

- Adhesion shall be tested according to GMW14706 to establish separation mode.
- Test piece preparation according to GMW15477 (panel configuration: constrained).
- Evaluation according to 3.7.
- The evaluation criteria are summarized in Table 5.

3.5.3.1 T-Peel (ASTM D1876). If the results of the adhesion testing according to GMW14706 are not definitive, T-Peel Testing according to ASTM D1876 will be required.

- Individual sample pieces shall measure 30 mm × 200 mm, with a bond flat of 30 mm × 100 mm.
- The bond gap shall be 2.0 mm ± 0.1 mm.
- T-Peels shall be tested (pulled) at a rate of 50 mm/minute.