



Adhesive, Two-Part, Acrylic, Mixture

1 Scope

This specification covers the mixture of an anaerobic two-part structural adhesive for hem flange bonding of exterior body panels. Sheet metal substrates include oily steels (galvanized and cold rolled) and aluminum. It is intended for application to take place in the body shop prior to Electrodeposition (ELPO) primer bake. The adhesive cures at room temperature to resist movement between inner and outer panels during body and paint shop processing. Full strength is obtained during ELPO primer bake.

1.1 Material Description. The adhesive system is comprised of a resin component 9985870 and a hardener component 9985871. The mixture of 9985870 and 9985871 is identified as 9985872.

1.2 Symbols. Not applicable.

1.3 Applicability. Adhesive for hem flange bonding of exterior body panels.

1.4 Remarks. This system must be capable of being metered, mixed and dispensed with current production equipment. It shall be compatible with production paint systems and cannot be adversely affected by paint oven temperatures reaching 205 °C.

1.4.1 Key Properties. The resin component contains glass beads to maintain bond-line thickness and minimize squeeze-out of mixed adhesive. This adhesive also has improved sag resistance and good retention of properties at elevated temperatures.

1.4.2 Key Words. Adhesive, two-part, acrylic, epoxy, anaerobic, mixture, hem flange, metal bonding.

2 References

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

2.1 External Standards/Specifications.

ASTM D638	ASTM D1338	ASTM D2369	ASTM E502
ASTM D790	ASTM D1875	ASTM D3418	ASTM E831
ASTM D1144	ASTM D2240	ASTM D4339	SAE J243

2.2 GM Standards/Specifications.

9985870	GMW3059	GMW14270	GMW15200
9985871			

2.3 Additional References.

None.

3 Requirements

3.1 Requirements on Delivery.

3.1.1 Chemical Requirements.

3.1.1.1 Toxicity. The adhesive must not have any adverse effects on personnel handling it. In addition, the supplier must receive approval from all medical, safety and industrial hygiene departments before material can be used in production.

3.1.1.2 Mixed Ratio. The ratio of resin to hardener is 4.0 by volume to 1.0 by volume, (3.4 by weight to 1.0 by weight) and the ratio shall be capable of being varied $\pm 5\%$ and meet all the requirements of this specification.

3.1.2 Mechanical Requirements. Cured Adhesive (see Table 2).

3.1.3 Physical Requirements.

3.1.3.1 Color. The two components shall be in contrasting colors. The colors shall be chosen, such that, in instances of improper mixing, color striations shall be visible in the dispensed bead.

3.1.3.2 Material Properties; Uncured Adhesive. See Table 1.

Table 1: Uncured Adhesive

Properties	Values	Test Methods
Odor	The material shall not have a noxious odor in either cured or uncured condition.	ASTM D4339
Sag Resistance	< 0.2 mm	SAE J243 - ADS-10, 5 mm bead, 23 °C
Working Life	15 minutes, minimum	ASTM D1338, 23 °C, dew point ≤ 10 °C
Time to Handling Strength, of 1.03 MPa	50 minutes	ASTM D1144, 23 °C
Cure Time	60 minutes	ASTM D1144, 121 °C
Solids Content	99.14%	ASTM D2369
Flashpoint	> 93 °C	ASTM E502, SETAFLASH

3.1.3.3 Material Properties; Cured Adhesive. See Table 2.

Table 2: Cured Adhesive

Properties	Values	Test Methods
Density	1.33 kg/L to 1.36 kg/L	ASTM D1875
Hardness	Shore D: 65 nominal	ASTM D2240, Method A
Glass Transition	78.6 °C	ASTM D3418, DMA Method
Coefficient Of Thermal Expansion	$5.3 \times 10^{-4} \mu\text{m/m/}^\circ\text{C}$	ASTM E831
Elongation	35%	ASTM D638
Tensile Strength	12.3 MPa nominal	ASTM D638
Flexural Strength	356.4 MPa nominal	ASTM D790
Flexural Modulus	15.9 MPa nominal	ASTM D790
Poisson's Ratio	0.45 to 0.48	ASTM D638
Young's Modulus	364.30 MPa nominal	ASTM D638
Bond-line Read-through	No unacceptable bond-line read-through	Visual Inspection
Shrinkage	Report	See 3.3.3.1

3.2 Processing Requirements.

3.2.1 Nonsmoking The adhesive shall not smoke up to 200 °C.

3.3 Performance Requirements.

3.3.1 Chemical Requirements. Not applicable.

3.3.2 Mechanical Requirements.