



Adhesive, One-Part, Structural, Expanding

1 Scope

This specification relates to a one component, structural epoxy adhesive suitable for automotive applications, such as, vehicle body panels and reinforcements. This material shall be used in the body shop or fabrication plant, on oily metal. This adhesive cures and expands in the heat of the paint bake ovens.

1.1 Material Description. This material shall be compatible with current application equipment and shall be capable of being applied at ambient temperatures. This material shall also be compatible with production phosphate, Electrocoat (E-coat) and topcoat systems, and shall not be adversely affected by maximum production paint bake temperatures.

1.2 Symbols. Not applicable.

1.3 Applicability. Provides structural adhesive strength in metal bonding applications where the bond gap is large or variable.

1.4 Remarks. Structural bonds resulting from the use of this material shall provide an adhesive strength to the substrate (oily Cold Rolled Steel (CRS), galvanized or aluminum), that is greater than the materials cohesive strength when tested in shear, tension and/or peel.

2 References

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

2.1 External Standards/Specifications.

ASTM D570	ASTM D2369	ASTM E502	SAE J1524
ASTM D1875	ASTM D4339	SAE J243	SAE J1864
ASTM D2240			

2.2 GM Standards/Specifications.

GMW3059	GMW14270	GMW15200	GMW15735
GMW3221	GMW14444	GMW15481	GMW16853

2.3 Additional References.

 None.

3 Requirements

3.1 General Requirements.

3.1.1 Sample Conditioning. All samples are to be conditioned prior to each requirement test to GMW3221, Code A.

3.1.2 Toxicity. The toxicity shall be disclosed in kind and magnitude, as required, by the GM Safety Data Sheet (SDS). In addition, the material must have full approval of the appropriate medical department prior to production use.

3.1.3 Stability. Material conditioned using potential storage conditions must be capable of passing all the requirements of this specification.

3.1.3.1 Elevated Temperature Stability. As shipped, the adhesive must be capable of withstanding a temperature of 55 °C for 72 h, without separation or caking.

3.1.3.2 Low Temperature Stability (GMW15735). As shipped, the adhesive must be capable of withstanding three (3) cycles of GMW15735 Cycle A.

3.1.3.3 Storage Stability. The shelf life of the adhesive in closed containers shall be 90 days at a temperature not to exceed 35 °C. Shelf life of the material commences upon the receipt of the material from the manufacturer.

3.1.4 Pressure Stability (SAE J1864). As shipped, the adhesive must not separate or cake.

3.2 Material Properties; Uncured Adhesive. See Table 1.

Table 1: Uncured Adhesive Properties

Properties	Values	Test Methods
Color	Red	Visual
Odor	The material shall not have a noxious odor in either the cured or uncured condition.	ASTM D4339
Sag Resistance	No sag or slide during exposure to maximum paint oven temperatures.	SAE J243, ADS-10, C
Moisture Absorption	< 2%	ASTM D570
Volatile Organic Content (VOC)	< 1%	ASTM D2369
Solids Content	> 99%	ASTM D2369
Viscosity – Initial at 25 °C	Report	SAE J1524
Viscosity – Aged 90 days at 35 °C, measured at 25 °C	Report	SAE J1524
Density	1.1 to 1.3	ASTM D1875
Flash Point	> 200 °C	ASTM E502
Homogeneity	Material must be homogeneous and free of lumps or air bubbles	Visual

3.3 Material Properties; Cured Adhesive. See Table 2.

Table 2: Cured Adhesive Properties

Properties	Values	Test Methods
Hardness – Shore D	75 to 85	ASTM D2240
Nominal Cure – Metal Temperature	30 minutes at 170 °C	Visual
Bulk Material Tensile Strength	Report	GM – CAE recommendations
Bulk Material Shear Modulus	Report	GM – CAE recommendations
Poisson's Ratio	Report	GM – CAE recommendations
Stress/Strain Curves	Report	GM – CAE recommendations
Volumetric Expansion	100% to 200%	GMW15481

Key: CAE = Computer Aided Engineering.