GM ENGINEERING STANDARDS	Material Specification	9982256

Adhesive, Anti-Flutter, Expanding, Pumpable, Aluminum

1 Scope

1.1 Material Description. This specification describes a pumpable, one (1)-part adhesive suitable for bonding aluminum inner and outer panels for stiffening and/or anti-flutter applications.

1.2 Symbols. Not applicable.

1.3 Applicability. This material is intended for use between inner and outer aluminum panels to eliminate metal to metal contacts, act as a vibration dampener, and maintain a pre-established spacing between surfaces.

1.4 Remarks. The material shall be capable of being dispensed through standard pumping equipment, provide good adhesion to all oily automotive aluminum substrates and be compatible with production phosphating/pretreatment systems, Electrodeposition Paint Operations (ELPO) paint systems and paint bake oven temperatures up to 205 °C.

1.4.1 This material shall expand and cure in the heat of the ELPO paint ovens. The amount of volumetric expansion exhibited by the material shall be approximately 300%. The resulting bond provided by the curing reaction shall render an adhesive strength, between the adhesive and the substrate that is greater than the cohesive strength of the material.

2 References

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

2.1 External Standards/Specifications.

ASTM D1875	ASTM E502	SAE J1864
ASTM D2369	SAE J1524	

2.2 GM Standards/Specifications.

GMW3059	GMW14874	GMW15735
GMW14270	GMW15481	

3 Requirements

3.1 Material Properties; Uncured Adhesive (see Table 1).

Table 1: Uncured Adhesive; Material Properties

Property	Value	Test Method
Color	Off-White	Visual
Density	1.33 g/cm^3 ± 0.1 g/cm^3	ASTM D1875
Solids Content	> 99%	ASTM D2369
Flash Point	> 200 °C	ASTM E502
Volumetric Expansion	300% ± 30%	GMW15481
Viscosity	85 s ± 10 s	SAE J1524 Pressure Flow Meter Method with 2.64 mm orifice at 414 kPa
Homogeneity	Material must be homogeneous and free of lumps or air bubbles	Visual

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3.2 Material Properties; Cured Adhesive.

3.2.1 Performance Requirements (GMW14874). Materials approved to this specification shall meet the requirements of GMW14874 –HE-MS.

4 Manufacturing Process

4.1 Storage Stability (GMW15735). Material conditioned using potential storage conditions shall be capable of passing all the requirements of this specification.

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

4.3 Low Temperature Stability. As shipped, the adhesive shall be capable of withstanding three (3) cycles of the applicable cycle schedule outlined in GMW15735.

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

5 Rules and Regulations

5.1 Legal Regulations. All materials must satisfy applicable laws, rules, regulations and recommendations valid in the country of usage.

5.2 Language. In the event of conflict between the English and domestic language, the English language shall take precedence.

5.3 Inspection and Rejection. Samples of components or materials released to a GM material specification shall be tested for conformity with the requirements of this material specification and approved by the responsible Engineering department prior to commencement of delivery of bulk supplies.

A new approval must be received for any changes, e.g., properties, manufacturing process, location of manufacture, etc. If not otherwise agreed, all testing and documentation normally required for initial release must be completed.

It is the responsibility of the supplier to inform the customer in a timely manner, without solicitation, and to include documentation of all modifications of materials and/or processes and to apply for a new release.

5.4 Material Safety Data Sheets/Safety Data Sheets (MSDS/SDS). For new product submissions, or when a change in chemical composition of an existing product has occurred, a complete copy of the Material Safety Data Sheet/Safety Data Sheet must be submitted in compliance with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) requirements or other country-specific MSDS/SDS requirements.

5.5 All materials supplied to this standard must comply with the requirements of the International Material Data System (IMDS) and GMW3059, **Restricted and Reportable Substances.**

6 Approved Sources

Materials supplied to this specification must be approved by General Motors.

A list of approved materials can be found in GM Materials Approved Source List. This GM Material File is provided to third parties to reduce redundant testing of materials. If approved material already listed is used, the part supplier can use GM Material File reference for Production Part Approval Process (PPAP) material approval. If the decision is made to use a not yet approved material, contact GM Materials Engineering for details on the approval process. The material approval process must be completed prior to PPAP start date of the part supplied to General Motors.

Engineering qualifications of an approved source are required for this standard. Only sources listed in the GM Materials File (i.e., GM SupplyPower) under this standard number have been qualified by engineering as meeting the requirements of this standard. To access this list, reference GMW14270 for latest location.

For other GM locations, the responsible engineering group should be contacted to obtain the approved source in that individual country.

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