



Sealer, Global, Pumpable, Body Shop Applied, Weld-through - Generic Qualification

1 Scope

This specification details the requirements of a pumpable, weld-through sealer. The material is applied in a body shop or fabrication plant and is intended to cure in the E-coat (Electrodeposition or Electrocoat) oven. The material may be either manually or robotically applied and is intended to seal body joints against water, dust, air intrusion and corrosion.

1.1 Material Description. The material must be a smooth and homogeneous mixture free of air, lumps, unmixed particles or foreign materials.

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

1.1.2 It must not have a noxious or toxic odor in either the uncured or cured state.

1.1.3 In addition, the material must not adversely affect the personnel handling it.

1.1.4 The material must adhere to all GM globally approved metal substrates. The material must be compatible with GM globally approved metal-forming lubricants and must not cause defects in the phosphate, thin film or E-coat layers. In addition, it must not have corrosion-causing ingredients, such as polyvinyl chloride (PVC).

1.2 Symbols. Not applicable.

1.3 Applicability. This material is typically applied to bare, oily metal in the body shop of the assembly plant. It is designed to cure in the plant E-coat ovens. It is **not** designed for application in the paint shop.

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	EPA Method 24	SAE J1524
ASTM D2369	ISO/TS 16949	

2.2 GM Standards/Specifications.

9986321	GMW3008	GMW14131	GMW15634
9986390	GMW3011	GMW14217	GMW15635
9986391	GMW3016	GMW14706	GMW15735
9986392	GMW3025	GMW14729	GMW16152
9986393	GMW3059	GMW15192	GMW16656
GMW2	GMW3205	GMW15416	GMW16700
GMW8	GMW3221	GMW15477	GMW16701
GMW11	GMW14124	GMW15481	GMW16723

2.3 Additional References.

- Global Welding Standards (GWS), GWS-5K Weld test for weld-through sealers (available at www.gmsupplypower.com).
- Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). European Union.
- Toxic Substances Control Act (TSCA). (United States (U.S.))

3 Requirements

Unless otherwise specified, the following requirements must be met. All testing shall be performed with materials that are representative of production processes.

3.1 Requirements on Test Specimens.

3.1.1 Test Specimen Conditioning. (GMW3221). Test specimens shall be conditioned per GMW3221, Code D.

3.2 Requirements on Delivery. Requirements in this section refer to the uncured material.

3.2.1 Specific Gravity (ASTM D1475). Typically 1.4 ± 0.2 .

3.2.2 Odor. The material shall have a neutral odor that is not unpleasant in the uncured condition.

3.2.3 Plant Emissions.

3.2.3.1 Oven-condensing Volatiles Test (GMW3016). Evaluate at maximum bake per 3.3.2.3, followed by 2 h at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$. Volatile Organic Compounds (VOC) shall be 2% by mass, maximum. If reported VOC exceeds 2% by mass, the composition of the VOC must be declared.

3.2.3.2 Plant Emissions. Volatile Organic Compound Determination (EPA Method 24, Section 2.2, using ASTM D2369, Method B). EPA Method 24 is required for the United States (U.S.) and Canada and shall be 35.9 Kg/m^3 (0.3 lb/usgal) or less. Bake per the test method. Local plant review and approval may be required prior to each new plant implementation of this material.

3.2.4 Viscosity. The viscosity shall be determined using the Pressflow method.

3.2.4.1 Pressflow Viscosity (SAE J1524).

- Orifice: 2.64 mm (0.104 in)
- Pressure: 414 kPa (60 psi)
- Sample Weight: 20 g
- Test temperature: $25^{\circ}\text{C} \pm 0^{\circ}\text{C}$

The viscosity requirements are as follows:

The Key Product Characteristic (KPC) requirement is at 72 h from batch manufacture. The KPC viscosity requirements shall be 40 s to 50 s.

In addition, when stored in proper conditions, the rate at which the viscosity increases with age should not exceed the following guidelines:

- Viscosity at 30 days: $\leq 72 \text{ h value} + 20\%$
- Viscosity at 60 days: $\leq 72 \text{ h value} + 40\%$
- Viscosity at 90 days: $\leq 72 \text{ h value} + 60\%$

3.2.4.1.1 The material viscosity must not exceed 80 s at the end of the 90 day shelf life of the material.

3.2.4.1.2 The initial and aging viscosity data shall be provided in both numerical and graphed format in the material submission book.

3.3 Performance Requirements.

3.3.1 Expansion.

3.3.1.1 General Expansion. Sealer shall display controlled expansion that is smooth and uniform after all bake conditions. Cell structure shall be closed cell, uniform, and free of large voids. Sealer shall show no loss of expansion or detrimental effects from subsequent bakes.

3.3.1.2 Volumetric Expansion Range (GMW15481). The volumetric expansion measured for the material shall be contained within the volumetric expansion range (see Table 1) after each of the specified bake conditions.

Table 1: Volumetric Expansion

Volumetric Expansion Description	Material Specification	Volumetric Expansion Code	Volumetric Expansion at Minimum and Maximum Bakes
No Expansion	9986390	E0	0%
Low Expansion	9986391	E20	20% ± 15%
Medium Expansion	9986392	E100	100% ± 15%
High Expansion	9986393	E200	200% ± 15%

3.3.2 Adhesion (GMW14706). Prepare test pieces per GMW15477. Adhesion and corrosion testing shall be completed with a minimum of three (3) sample per test condition. Allow test pieces to age for a minimum of 24 h at 23 °C ± 5 °C following any specified bake prior to exposure to any test environments per 3.3.2.4, unless otherwise specified.

3.3.2.1 Substrates. Testing shall be completed with the substrates in Table 2. For oily metal, use two challenging GMW16656 approved lubricants, as specified by the approving material engineer.

Table 2: Substrates

Substrate Description ^{Note 2}
Oily Cold Rolled Steel (CRS) (GMW2) ^{Note 1}
Oily Hot Dipped Galvanized Steel (HDG) (GMW8), 60 g/m ² galvanized coating weight
Oily Electrogalvanized Steel (EG) (GMW11), 60 g/m ² galvanized coating weight
Oily Aluminum (AL) ^{Note 3} (GMW15192)
Other substrates identified and required by the regional material engineering group or the regional material specification

Note 1: Corrosion testing is not required with Oily CRS.

Note 2: After application of the sealer, the oily metal panels shall be processed through pre-treatment and electrodeposition (ELPO) prior to baking and exposure per 3.4.6.3 Humidity, 3.3.2.4.2 Thermal Cycle or 3.3.2.4.3 Corrosion. Use any GM approved pre-treatment (GMW3011) and ELPO (GMW3008) at target film thickness, as specified by the approving material engineer.

Note 3: Aluminum alloy and any required pre-treatment shall be defined by GM Material engineer at the start of test and shall be documented in the submission book.

3.3.2.2 Panel Configurations. If there is a conflict between GMW15477 and this standard, the requirements in this standard shall take precedence.

3.3.2.2.1 Weldable Test Panel Configuration. Weldable sealers shall be tested fully constrained (all expansions) as defined in Global Welding Standards (GWS), GWS-5K, unless otherwise agreed to by the approving material engineer. Any changes to GWS-5K setup must be documented.

3.3.2.3 Bake Conditions. All bakes are specified as times at metal temperature and defined in Table 3.