



Sealer – Global, Paintable, Abrasion Resistant, Reprocess Material - Generic Qualification

1 Scope

This standard details the requirements of a Paintable Polyvinyl Chloride (PVC) abrasion resistant anti-chip reprocessing coating. The purpose of this material is to protect the metal substrate from stone damage that could result in corrosion. The material can be applied in the paint shop or General Assembly. It must be capable of being manually applied and is used to coat the rocker panels of vehicles to provide a high level of chip and abrasion resistance.

The material can be used for spot repair on grinded rocker panel protection material and for complete rocker panel application on grinded topcoat.

The material shall be compatible with primer surfacer and topcoat systems.

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

1.1.1 It shall be capable of being dispensed with approved and validated production displacement pumping and application equipment.

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

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

1.1.4 The material must adhere to all approved production E-Coats, grinded rocker panel protection materials and on grinded primer and topcoat.

1.1.5 It shall not have corrosion causing ingredients.

1.2 Symbols. Not applicable.

1.3 Applicability. Coating of exterior surfaces of the rocker panels in the paint shop repair areas (e.g. finesse area).

2 References

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

2.1 External Standards/Specifications.

ISO 37	ASTM D2369	ISO 2813	SAE J1524
ASTM D1475	ISO 1524	ISO 3219	SAE J1864
ASTM D2196	EPA Method 24	ISO/TS 16949	

2.2 GM Standards/Specifications.

GMW3059	GMW14270	L 000 0389
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2.3 Additional References.

- TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com)
- Z4 DIN

3 Requirements

Specific material requirements and appropriate Test Procedures are listed under the individual properties and summarized in Table 5. All bake schedules are specified in time at substrate temperature.

3.1 Requirements on Delivery.

3.1.1 Specific Gravity. According to ASTM D1475. Typically (1.15 ± 0.15) g/ml.

3.1.2 Odor according to GMW3205. The anti-chip/sealer must not emit a toxic or noxious odor. The material must not impose any adverse effects on personnel handling it. Also, after cure, the material must not have a perceptible odor. In addition, the ED50 value of the sealer odor may be requested at the time of approval.

3.1.3 Volatile Organic Compounds (VOC) Determination (EPA Method 24, Section 2.2, using ASTM D2369). Target is 35.9 kg/m^3 (0.3 lb/gal) or less. However, the final VOC of the product, including all weights, calculations and runs, shall be identified and reported as data in the submission book.

3.1.3.1 Condensing Volatiles Test (GMW3016), 10%. Maximum allowed when baked as follows and tested according to GMW3016.

- **L 000 0389:** 20 minutes at $+130^\circ\text{C}$

3.1.4 Viscosity.

3.1.4.1 Determination of the Viscosity Using a Rotational Viscometer (ISO 3219 and Z4 DIN Cup and Spindle).

- Run test according to program in Table 1 using the Z4 DIN Cup/Spindle setup.
- Rotation Speed: $(0 \text{ to } 130) \text{ s}^{-1}$.
- Sample Test Temperature: $(+23 \pm 0.5)^\circ\text{C}$.

Table 1: Viscometer Program

Test	Time in s	Start Speed in s^{-1}	End Speed in s^{-1}
Wait Period	300	0	0
Ascending	120	0	130
Hold Cycle	180	130	130
Descending	120	130	0

3.1.4.1.1 The relative viscosity, descending Bingham viscosity, and yield point (all KPC requirements) at 72 h after batch manufacture shall be as follows.

- **Relative Viscosity:** (0.45 to 0.80) Pa·s.
- **Yield Point:** (30 to 50) Pa.
- **Descending Bingham:** (0.25 to 0.40) Pa·s.

3.1.4.1.2 In addition, when stored in proper conditions, the viscosity variation with age shall not exceed the following values:

- **Relative Viscosity (at 90 days).** Variation must not exceed 20% of 72 h data.
- **Yield Point (at 90 days).** Variation must not exceed 20% of 72 h data.
- **Descending Bingham (at 90 days).** Variation must not exceed 10% of 72 h data.

3.1.4.1.3 The measured and calculated data, along with the curves generated, shall be included as data in the submission book.

3.1.5 Particle Size according to ISO 1524. 80 μm maximum.

3.2 Performance Requirements.

3.2.1 Adhesion according to GMW3019. One full set of test panels shall be prepared, according to the bakes in Table 2 and Table 3, using approved production technology from each approved source of E-Coat from all GM regions, GM North America (GMNA), GM Opel Vauxhall (GMOV), GM South America (GMSA), GM International Operations (GMIO).

The material shall be capable of demonstrating a minimum of fine line cohesion performance after the first Primer/Anti-chip/sealer bake.

Table 2: Bakes (Nominal Baked E-Coat)

Bake System	998XXXX / L 000 0389
Minimum IR-Bake	15 minutes at +125 °C
Nominal IR-Bake	20 minutes at +130 °C
Minimum Bake	15 minutes at +125 °C
Nominal Bake	20 minutes at +130 °C
Maximum Bake	20 minutes at +165 °C

3.2.1.1 The material, when baked as described in Table 2, must not crack or lose adhesion to the substrate during or after exposure to the following conditions. In addition, the material must demonstrate cohesive adhesion when peeled from substrate.

- **Initial Adhesion:** After cooling to ambient temperatures.
- **Cycle test according to GMW14124, Cycle F:** 12 cycles.
- **Mandrel Bend according to GMW3154, at -30 °C:** Samples prepared unpainted.

3.2.2 Elongation according to ISO 37, Type 2. Material baked as described in 3.1 must exhibit no < 100% elongation. This applies to all bakes (minimum, nominal and maximum).

3.2.3 Shrinkage/Expansion according to GMW15481. Material baked as described in 3.1 (maximum bake only, 20 minutes at +165 °C) must exhibit no (0%) expansion.

3.2.4 Porosity. The material must exhibit no signs of trapped air from either an external observation or a cross sectional view after being baked as described in 3.1 (maximum bake only).

3.2.5 Compatibility with Associated Production Materials/Processes. Compatibility with plant specific materials such as wheelhouse deadener, anti-corrosion wax, primer surfaces, and topcoats shall be evaluated prior to introduction to any production facilities.

If there are any plant specific material issues that shall be addressed, the details shall be discussed and resolved between the responsible engineer and the supplier prior to the initiation of testing.

3.2.6 Topcoat Compatibility according to GMW14829. The test panels shall be prepared according to combinations 3.2.6.1 and baked according to the appropriate bake schedule in Tables 2 and 3.

The paint systems tested shall represent at least one production system from each major paint supplier. The systems chosen should also cover the different types of Primer, Basecoat (BC), and Clearcoat (CC) technologies and must also represent paint systems/technologies from each region of GM globally, GM North America, GM Opel Vauxhall, GM South America, GM International Operations.

The test panels and layering combinations shall be prepared and baked as follows.

Note: For all paintability test panels, the anti-chip material **must** be spray applied to the test panel with the panel in vertical orientation. In addition, all subsequent paint layer applications shall also be applied **and** baked with the test panels in a vertical orientation.

3.2.6.1 Full Reprocess Paint System (Primer, BC and CC). Complete the following steps:

Apply Reprocess primer WOD (Wet on Dry) over anti-chip/sealer at target film build + Apply Reprocess basecoat/clearcoat at target film builds over the baked primer/anti-chip/sealer.