



Transit Coating (Sprayable)

1 Scope

This specification covers the requirements for coatings designed to protect exterior paint from damage caused by iron particles that fall on the vehicle during rail shipment and other environmental damage.

1.1 Material Description. These coatings are liquids applied by spray application. These coatings are essentially air dried (but may require supplemental heating) and are removed by materials specified in 9982224.

1.2 Symbols. Not applicable.

1.3 Applicability. These sprayable transit coatings are designed to be applied over assembled automotive vehicles.

1.4 Remarks. None.

2 References

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

2.1 External Standards/Specifications.

ASTM D1475	ASTM D4212	ISO 1148	SAE J2527
ASTM D3960	ASTM D2369B		

2.2 GM Standards/Specifications.

9982224	GMW3011	GMW14270	GMW16170
GMW3002	GMW3059	GMW14729	GMW16625
GMW3008	GMW14124	GMW14873	

2.3 Additional References.

J.T. Baker 2226 available at www.avantorinc.com/commerce

3 Requirements

Transit coating must be submitted along with a corresponding remover as a complete system. There must be no damage to any current production paints or to any other components of the vehicle (glass, rubber, plastics, etc.) from contact with properly applied coating or remover.

3.1 Material Requirements. As part of the initial submission package, the following information must be provided:

3.1.1 Complete material identification by code, batch, general chemical composition and physical description.

3.1.2 Physical Constants. Formula values for mass and volume solids. Analytical values for Volatile Organic Compounds (VOC) per ASTM D3960, Percent Mass Solids per ASTM D2369B and Density per ASTM D1475, Application Viscosity per ASTM D4212 and pH per ISO 1148.

3.1.3 Materials Safety Data Sheets (MSDS).

3.1.4 Film build range and target film build plus the recommended method for measuring the films for testing and quality control.

Note: The minimum film build specified can be no < 5 μm and the range can be no < $\pm 2.5 \mu\text{m}$ from target. Maximum film thickness is the thickest film that can be removed easily after 6 months (1200 kJ/m² at 340 Nm) Florida exposure.

3.1.5 Material disposal requirements and all other health and safety concerns/control methods.

3.1.5.1 VOC Limits. Products must have no more than 4.8 g/L (0.04 lb VOC/gal) of coating as received.

3.1.5.2 Health and Safety. Both the transit coating and transit coating remover must meet all local and federal standards for air quality and waste water treatment.

3.2 Processing Requirements. The product must have sufficient latitude to perform in the range of conditions typically encountered in an automotive production facility. The following data must be submitted as part of the original submission package.

3.2.1 Recommended application equipment.

3.2.2 Film build as a function of gun distance vs viscosity.

3.2.3 Drying time as a function of film build, air temperature, and relative humidity (RH). Define conditions that allow the coating to withstand a light rain after 1 minute of drying time.

3.2.3.1 Test. Pour 1 L of water on a coated 100 mm × 300 mm panel at a rate of 10 mL/s at an angle of 45 degrees. Check coating integrity, finger imprint sensitivity and recovery time to a hard film.

3.3 Performance Requirements. Performance is measured by protection from environmental contaminants at the low end of film build and ease of removal after environmental conditioning at the high end of the film build range. There must be no cracking, hazing, discoloration, distortion, or adhesion loss of the paint finish from the transit coating. The degree of protection is measured by a subjective scale, where:

- 0 = no effect (etching) from contaminants
- 1 = trace/slight effect
- 2 = moderate effect
- 3 = pronounced/severe effect

A summary of Performance Requirements can be found in Appendix A, Table A1.

3.3.1 Moisture Resistance (GMW14729). No loss of film integrity or softening after 96 h exposure at 100% RH, 38 °C (100 °F) plus a 24 h recovery period.

3.3.2 Heat Age. 14 d at 82 °C (176 °F) plus removability. No discoloration or cracking of paint film.

3.3.3 Spotting Resistance. There shall be no detrimental effects on the paint finish from any of the spotting solutions when exposed for 2 h at 60 °C (140 °F). At other temperatures, performance should equal or better a control coating. Apply drops of the solutions listed as follows to the test panels. Check removability and etch resistance under the following conditions:

- 24 h at room temperature
- 2 h (or until drops are dry) at 71 °C (160 °F)
- 2 h (or until drops are dry) at 82 °C (176 °F)

Note: Condition at elevated temperatures for a maximum of 7 h. Allow 24 h recovery prior to removing coating.

Solutions:

- 3 pH acid rain per GMW16625
- 4 pH acid rain per GMW16625
- Tap water
- Egg albumin (2% by mass)

3.3.4 Rust Resistance. Apply the iron filings/powder over white panels (approximately ¼ teaspoon per 100 mm × 300 mm panel). Mist with 4 pH acid rain solution (per GMW16625) on ½ the panel. Heat age 7 h at 82 °C (180 °F) and then test for 96 h humidity. Test panels horizontally. (Iron filings/powder, (150 to 200) mesh, 99.5% purity such as J.T. Baker 2226 or agreed upon equivalent).

3.3.5 Environmental Cycle (GMW14124) Plus Spot Resistance. Test panels in 10 cycles of Cycle I, plus spotting resistance test per 3.3.3 with the following conditions: 2 h (or until dry) at 60 °C (140 °F) with 3 pH acid rain solutions per GMW16625.

3.3.6 Florida Exposure (GMW14873) Plus Spot Resistance. Record dates of exposure and removal from test. Expose paint samples without transit film as controls to measure effectiveness of the film.

- 2 months
- 4 months
- 6 months
- 12 months

3.3.6.1 After each exposure interval, apply spots of 3 pH acid rain on ½ of the panel. Condition for 2 h (or until dry) at 60 °C (140 °F) and then remove coating. After exposing the panels for 1000 kJ/m², transit coating must be removed with a 1 minute application of remover.

After 12 months, Florida exposure coating must be removed with no more than two application cycles of 2 minutes each using the supplier's recommended remover and removal procedure. There must be no hazing, marring, cracking, or other detrimental effects to the paint surface or other components. There shall be no significant change in acid resistance compared to results prior to exposure. (Also, expose paint samples without transit coating as controls to measure effectiveness of the coating.)

3.3.7 Xenon Exposure (SAE J2527) Plus Removability. Expose samples for 250 kJ and 500 kJ. After exposure, transit coating must be removed with a 1 minute application of remover. There must be no marring, cracking, discoloration, or other detrimental effect to the paint surface.

3.3.8 Field Exposure Testing. Verification of panel testing is done on hoods or vehicles exposed at Jacksonville, Florida or other selected sites during the summer months. Specific requirements are per agreement with the responsible engineer.

3.3.9 Compatibility with Other Components. The transit film must not harden plastic or rubber components, etch or haze glass, chrome and aluminum, or deteriorate in any way the components that it may contact. It must be easily removed after exposure in (Florida after 4 months April to September) or comparable to xenon exposure kilojoules in 3.3.7. Materials shall be defined by responsible engineer.

Note: Compatibility with these generic types of products is required as part of the release of a transit coating. Prior to release of a product to a plant, the specific plant paint system and the specific vehicle components must be evaluated. In addition, the plant-specific application parameters must be established to obtain the optimum film build.

3.4 Panel Preparation. Test panel preparation is as follows for all tests, unless deviations are agreed to with the specific engineer responsible:

3.4.1 Panels. Laboratory or production prepared steel panels - Pretreatment per GMW3011/GMW16170, Electrodeposition (ELPO) primer per GMW3008 and Primer Surfacer per GMW3002, or as defined by the responsible engineer.

3.4.2 Topcoat Technologies. Technologies to be defined by responsible engineer.

3.4.2.1 Standard Original Equipment Manufacturer (OEM) basecoat/clearcoat topcoat.

3.4.2.2 General assembly basecoat/clearcoat reprocess paint.

3.4.3 Topcoat Color - Designated by Test:

- B = Black or Black Metallic
- W = White
- M = Additional colors as defined by responsible engineer

3.4.4 Transit Coating Film Build:

- L = Lowest film build as specified by supplier
- T = Target film build as specified by supplier
- H = Highest film in range specified by supplier

Note: H must be a minimum of 5 µm greater than target film.