



Purge Solvent/Cap Cleaner for Waterborne Enamel

1 Scope

1.1 Material Description. This specification defines the basic physical, chemical and performance requirements of waterborne solutions used for both purge of waterborne paint materials and for cap cleaner of equipment used to spray waterborne paint materials (basecoat and primer). These materials may be supplied as concentrates, but requirements are based on the ready-for-use mixtures in de-ionized water.

1.1.1 Material Identification. Materials approved to these specifications are primarily comprised of deionized water. They are targeted to contain no more than 1.5% by weight of any ingredient listed as a Hazardous Air Pollutant per Section 112 of the Clean Air Act as amended in 1990. There may be no more than 4.5% by weight of total Hazardous Air Pollutant (HAP) in the solution to be defined as a HAP-compliant material.

1.2 Symbols. Not applicable.

1.3 Applicability. Materials approved under this specification are used to clean both interior waterborne paint lines and cap cleaner equipment.

2 References

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

2.1 External Standards/Specifications.

40 CFR 261 Subpart D	ASTM D56	ASTM D891B	ASTM D1353
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2.2 GM Standards/Specifications.

GMW3059	GMW15574	GMW15586
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2.3 Additional References.

- Environmental Protection Agency (EPA) Method 24
- Section 112 of the Clean Air Act as amended in 1990

3 Requirements

All relevant requirements are highlighted in Appendix A, Data Sheet A1: Purge Solvent Submission Checklist.

3.1 Requirements on Delivery.

3.1.1 Chemical Requirements. Submission samples must include all chemical species anticipated. Purge blends are not interchangeable, and must be evaluated and approved for use with plant-specific material, equipment, and cycles.

3.1.1.1 Composition Identification. The Environmental Assessment Form (EAF) and full disclosure Material Safety Data Sheet (MSDS) will be used to identify the material.

3.1.1.2 Total Alkalinity. Report total alkalinity by amine titration.

3.1.1.3 Flash Point (ASTM D56). No minimum requirement. Flash must be reported for each material.

3.1.1.4 Non-Volatiles (ASTM D1353). Maximum is 0.5% by weight as used.

3.1.1.5 Volatile Organic Compound (VOC). VOC is plant specific requirement. VOC calculation results should meet plant permit requirements. United States Environmental Protection Agency (EPA) Method 24 will be used to calculate VOC.

3.1.2 Physical Requirements.

3.1.2.1 Appearance (Visual Observation). Color must be water white. Material should be a clear liquid that is free of haze and insoluble materials. Filtration with a 1 µm (micron) (absolute) filter must be certified.

3.1.2.2 Specific Gravity (ASTM D891B). Data must be reported as part of the submission. Variation from batch must be no greater than ± 0.02 from the approved formulation.

3.1.2.3 Resistivity. (Ransburg Meter 70367 or Equivalent). No requirement. Purge material must be compatible with typical application equipment for waterborne enamel.

3.1.3 Additional Requirements. The supplier must provide pertinent data regarding composition, physical characteristics, usage, emissions, and test information as part of a basic submission package.

3.1.3.1 Productive Material Review Process. All materials must be evaluated through the Productive Material Review Process (PMRV) initiated by Manufacturing Engineering Vehicle System (ME VS) Paint Engineer prior to plant implementation.

3.1.3.1.1 Material Safety Data Sheet. A full disclosure Material Safety Data Sheet (MSDS) must be provided to General Motors.

3.1.3.1.2 Environmental Assessment Form. An Environmental Assessment Form (EAF) must be provided.

3.1.3.2 Change Notification. A Supplier Notice of Proposed Change must be forwarded to ME VS Paint Materials to describe proposed material changes prior to any trials or production implementation.

3.1.3.3 Source Shipment Responsibility. All shipments must be made in clean, sealed containers which are clearly identified. A Certificate of Analysis (COA) must accompany all batch shipments.

3.1.3.4 Certificate of Analysis. Information provided in the COA must include product code, batch number, manufacturing date, 998 number (#), specific gravity, total alkalinity, percent (%) non-volatile, VOC, color, particulate and composition. Additional information may be provided as required. The COA must be signed and kept on record by the supplier. See Appendix B, Data Sheet B1 for form.

3.2 Processing Requirements.

3.2.1 Physical Requirements.

3.2.1.1 These purge solvents/cap cleaners shall clean all residual paint from the internal and external surfaces of conventional and electrostatic application equipment during color changes and before shutdown of the equipment.

3.2.1.2 Purge solvents must not be used for paint reduction.

3.2.2 Additional Requirements.

3.2.2.1 Usage. The supplier or Chemical Manager is required to track amount of purge solvent and report amounts monthly (or as required) to plant engineering and environmental. The report must include usage in gallons (total and per job) and VOCs (total and per job). It must also include all pertinent information required for emission calculations.

3.3 Performance Requirements.

3.3.1 Additional Requirements.

3.3.1.1 Odor Testing. When required by the plant Environmental Engineer, new purge blend odor shall be compared to a control purge material (designated by the responsible GM Engineer). Plant Environmental Engineer will identify the approved laboratory to submit the purge solvent samples to run the testing. A change in formulation requires a re-evaluation for odor.

3.3.1.2 Test Data. Supplier must provide ME VS Paint Engineer written reports of performance test results as part of the submission package.

3.3.1.3 Test Colors. Testing must be done with three basecoat colors and two primer colors (when applicable) for generic approval. Specific supplier source(s) will be determined at test initiation. Basecoat colors are a clean white, a medium red tone mica color, and a dark metallic. Primer colors are a white and grey. Paint must be reduced to spray viscosity for the target plant.

3.3.1.4 Efficiency Screen Test.

Note: For this testing, run the Efficiency Screen Test with a control purge against the new proposed purge solvent. The control purge will be used to determine the time that takes to remove an area of paint about

12.7 mm (½ in) in diameter. The control purge solution consists of 98% to 99% butyl cellosolve and 1% to 2% amine, diluted to a concentration of 10% by volume with deionized water.

Apply 4.0 mils (102 µm) of wet paint with a drawdown bar onto a clean glass panel. Minimum paint area must be 100 mm by 150 mm (4 in x 6 in). Bake panel at 49 °C (120 °F) for 30 minutes. Place the panel on a fixture at a 90 degree angle, 152 mm (6 in) in front of a conventional spray gun having a 1.07 mm fluid tip size (0.042 in). Spray non-aerated purge onto the dry film at 34 kPa (5 psi), and capture the solvent used.

Using a stopwatch, record the time (in seconds) required to remove an area of paint about 12.7 mm (½ in) in diameter. Measure the volume of control purge used in milliliters (mL).

After recording how long it takes to clean a paint area of 12.7 mm (½ in) in diameter with control purge, repeat testing with the new proposed purge. Spray new proposed purge for the same length of time and same volume spent as the control purge. Compare the size of the area of paint removed against the area removed by the control purge. New purge solvent must clean an area equal to or larger than the control.

Repeat screening testing with solutions at other temperatures as described, see 3.3.1.4.

3.3.1.4.1 Purge Concentration. Testing should be done at the recommended concentration. This concentration level must be reported as part of the approval package. There can be no deviations from this concentration in actual plant applications unless a Supplier Notification of Change (NOC) is submitted to ME VS Paint Engineering and the required testing is completed.

3.3.1.4.2 Efficiency Measurements. Volumes of the control purge and new purge used in the Efficiency Screen Test need to be identical. Test durations also need to be identical for proper comparisons. After measuring the cleaned area of each paint sample, record the results on the panels and take pictures for the final report.

3.3.1.4.3 Cleaning Criteria. The solvent must remove the film, not lift or wrinkle it. Lifting and wrinkling of the film constitutes a failure. The solution must clean the paint away completely, leaving no residue of paint in the cleaned area of the glass panel. An effect purge blend shall be able to remove the dry film in less than 30 s.

3.3.1.4.4 Temperature Variables. The test solution should be evaluated at 22 °C, 41 °C, and 49 °C (72 °F, 105 °F, and 120 °F).

3.3.1.5 Bell Testing (GMW15586). Run Bell Testing with the new purge against a known purge control. New purge shall perform equal to or better than the control purge.

3.3.1.6 Foam Testing (GMW15574). Run Foam Testing with the new purge against a known purge control. New purge shall perform equal to or better than the control purge.

3.3.1.7 Paint Compatibility Testing. Purge is evaluated for compatibility with paint in both lab tests and plant trials.

3.3.1.7.1 Mixing Compatibility. Reduce a waterborne paint sample 1.0% by volume with the test cleaner and spray a standard steel test panel with the paint to specified dry film build ((1.0 mil ± 0.2 mils) (25.4 µm + 5 µm) for waterborne primer). Cure the film at the recommended bake schedule and examine the surface for cratering or other surface defects.

3.3.1.7.2 Overspray Compatibility. Spray a standard steel test panel with the test paint at specified film build (1.0 mil (25.4 µm dry film)). Mist coat the wet film with the test purge. Cure the film at the recommended bake schedule and examine the surface for cratering.

3.3.1.7.3 Under-spray Compatibility. Mist coat a standard steel test panel with the test thinner and then spray the panel with paint at specified film build (1.0 mil (25.4 µm)). Cure the film at the recommended bake schedule and examine the surface for cratering.

3.3.1.8 Plant Trial. Trials will be allowed after full technology and/or plant-specific approval. A written letter of approval must be obtained from ME VS Paint Engineering after all parties buy-in on trial the affected plant's Paint Department, ME VS Paint Engineering, Environmental Engineer, and the affected Paint Supplier. The purge material must be assessed with the intended coating materials, equipment and purge process. Failure to perform satisfactorily shall constitute reason for rejection in a specific plant regardless of compliance with the other requirements of this specification, prior approval and release to the MATSPC Approved Source List, or approval and release to other plants.