



Organic Coating for Cast Iron Parts

1 Scope

1.1 Material Description. This coating can be an organic electrostatically applied powder epoxy paint or liquid applied paint.

1.2 Symbols.

- **Type A.** Electrostatic Applied Epoxy Powder Coating. Only epoxy materials are approved for this type coating. Other paint technologies may be suitable and shall require validation to assure conformance to durability, machinability and topcoating specifications.
- **Type B.** Liquid Applied Paint Film.

1.3 Applicability. This coating is suitable for medium to large parts in underhood and underbody applications where protection from ultraviolet (UV) light exposure is not required. The resultant paint film is intended to provide cosmetic corrosion resistance to exterior surfaces of cast iron components, e.g., cylinder heads and blocks.

1.4 Remarks. This standard covers the performance requirements for organic paint finishes to underbody/hood parts for cast iron parts.

2 References

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

2.1 External Standards/Specifications.

ISO 105	ISO 1463	ISO 9227	SAE 5W30
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2.2 GM Standards/Specifications.

9985809	GMW14700	GMW14829	GMW15282
GMW3059	GMW14729		

3 Requirements

3.1 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to submit a full material composition disclosure to GM via the International Material Data System (IMDS) or via a completed GMW3059 report form.

3.2 Appearance. The cured paint film shall be free from inclusions and runs. The color shall be black or gray as defined on the drawing.

3.3 Coating Thickness. Coating thickness is specified for both electrostatic applied Epoxy Powder and liquid coatings:

- **Type A:** Epoxy Powder Coating: 100 +50/-25 µm.
- **Type B:** Liquid Applied Coating: 50 µm minimum.

Note: For referee purposes, the coating thickness shall be determined by microscopic examination of cross sections taken perpendicular to significant surfaces per ISO 1463.

Note: Overspray is not permitted unless otherwise specified on component drawings.

3.4 Adhesion. Crosshatch tape adhesion test per GMW14829. Rating 0 and 1 as delivered and after 96 h humidity testing per GMW14729 (option A or B).

This test requirement shall apply to all component locations that can physically be tested.

3.5 Corrosion and Creepback Resistance. Coated parts shall show no evidence of blistering, separation, softening, discoloration or other appearance changes at the end of exposure per ISO 9227. The exposure time is 168 h for Type A and 96 h for Type B. Maximum allowable creep back is 3 mm for Type A and 2 mm for Type B coatings per GMW15282. Less than 10% of coated surface shall be corroded (excluding scribe area and within 2 mm, of sharp edges).

Note: For Type B, this test shall be performed on parts in two conditions:

- As-received condition
- After exposure for 120 h in a drying oven at $+100\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$.

3.6 Chip Resistance. Test coated part per GMW14700, Method (A or B) and C. Test at room temperature and $-18\text{ }^{\circ}\text{C}$. A minimum rating of 7 is required.

3.7 Chemical Resistance. After exposure to the following fluids, the coating shall show no blistering, separation (no loss of adhesion), softening, discoloration or other appearance changes.

3.7.1 Water. Completely immerse coated parts in potable water for $24\text{ h} \pm 1\text{ h}$ at $+63\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

3.7.2 Motor Oil Resistance. The coated part shall be immersed in SAE 5W30 motor oil, removed and drained for a few minutes, then placed in a drying oven at $+100\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ for $24\text{ h} \pm 1\text{ h}$.

3.7.3 Fuel Resistance. Coated parts shall be immersed in commercial grade E10 gasoline, E85 gasoline, and diesel fuel $24\text{ h} \pm 1\text{ h}$ at room temperature.

3.7.4 Solvent Resistance. Coated parts shall be subjected to ten double rubs with soft cheesecloth (cotton rubbing cloth to ISO 105-F09) saturated with 60% isooctane/40% toluene.

3.7.5 Completely immerse coated parts in a 50% solution of extended life coolant (9985809) and potable water for $24\text{ h} \pm 1\text{ h}$ at $63\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

3.8 Sensor Compatibility. Coating material shall not degrade the response time or functionality of the oxygen sensors or any other engine sensor. Coating composition shall be free of silicone and silicon-based organic compounds.

3.10 Topcoat Compatibility (Type A Only). Coating shall not contain film formers, resins or additives detrimental to topcoat adhesion. Painted test panels shall be topcoated with finishes commonly used by engine Marinizers. Topcoated panels representative of the Marinizer coating process shall satisfactorily pass GMW14829, cross-cut tape adhesion test (topcoat to powder) after exposure to 96 h of condensing humidity per GMW14729, Option A or B.

Note: This test is optional, based on usage of the painted part for marine application.

3.11 Process and Machining Compatibility. Coatings shall be sufficiently cured prior to machining to avoid any damage during subsequent operations and cleaning processes. A production run of parts shall be monitored to ensure that paint machinability does not adversely affect tool life, washer performance, or appearance, etc., and that common plant cutting fluids, cleaners, solvents, etc., which contact components do not adversely affect coating appearance or performance.

4 Manufacturing Process

The coating process, including pre-treatment (cleaning), coating, and post-treatment shall be performed by one company in one facility. The equipment, process controls, chemicals, and location used shall remain the same for regular production. This includes pre-treatment (such as cleaning) and post-treatment. These operations shall not deviate without prior approval by GM.

For each production lot of coated parts, the applicator shall supply a certificate to their customer with the following information:

- This specification number.
- Applicator name and address.
- Coating system used.
- Part number.
- Date(s) the parts were coated.
- Coating thickness.