



SURFACE VEHICLE RECOMMENDED PRACTICE

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Electrocoat Compatibilities of Automotive Sealers

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Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. **Scope**—This SAE Recommended Practice sets forth a method for determining the compatibility of automotive sealers with cathodic electrocoat primer.
2. **References**—There are no referenced publications specified herein.
3. **Principal of Methods**—This practice sets forth two methods for evaluating what effect, if any, an automotive sealer has on an electrocoat primer bath or the resulting baked primer coating, or both.

Method #1 determines if a sealer's passage through the bath will "leach out" any material from the sealer, that will then produce coating irregularities.

Method #2 determines if a bath contaminated with sealer debris, 0.1% by weight, will have any effect on parts processed subsequent to the contamination.

4. **Equipment**

- a. DC Power Source: 0–600 V minimum and 0–10 A
- b. One gallon plastic pails 155 mm (6 in) ID and 190 mm (7.5 in) high
- c. 7700 mm² (12 in²) stainless steel Anode
- d. Laboratory Stirrer: 256 – 1200 rpm
- e. Stirring Shaft: 460 x 13 mm (18 x 0.5 in) long
- f. Mixing Blades
 1. Dispersion: 75 mm (3 in) standard stainless steel, high dispersion
 2. Agitation: standard stainless steel mixing propeller
- g. Sealant Applicator: opening in template is 25 x 1.5 mm (1 x 0.06 in)
- h. Oven: Gas fired or electric mechanical convection oven capable of obtaining 190 °C (375 °F) metal temperature on CRS 0.81 mm (0.032 in) in 8 – 10 min
- i. Cathodic Electrocoat Primer: 2 gal, at least 24 h old
- j. Steel Panels: 100 x 300 x 0.81 mm (4 x 12 x 0.032 in) zinc phosphated
- k. Sealant to be tested

5. Sealant Panel Preparation

- 5.1 Sealant should be conditioned for 24 h at 23 ± 2 °C (73 ± 4 °F) before use.
- 5.2 Unless freshly zinc phosphated, test panels should be dried at 120 °C (250 °F) for 6 min prior to sealant application to remove absorbed moisture.
- 5.3 Using the sealant applicator template, apply a 100 x 25 x 1.5 mm (4 x 1 x 0.060 in) strip of the sealant to be tested to the bottom half of one of the zinc phosphated panels. Start the bead 25 mm (1 in) from the bottom of the panel, see Figure 1.

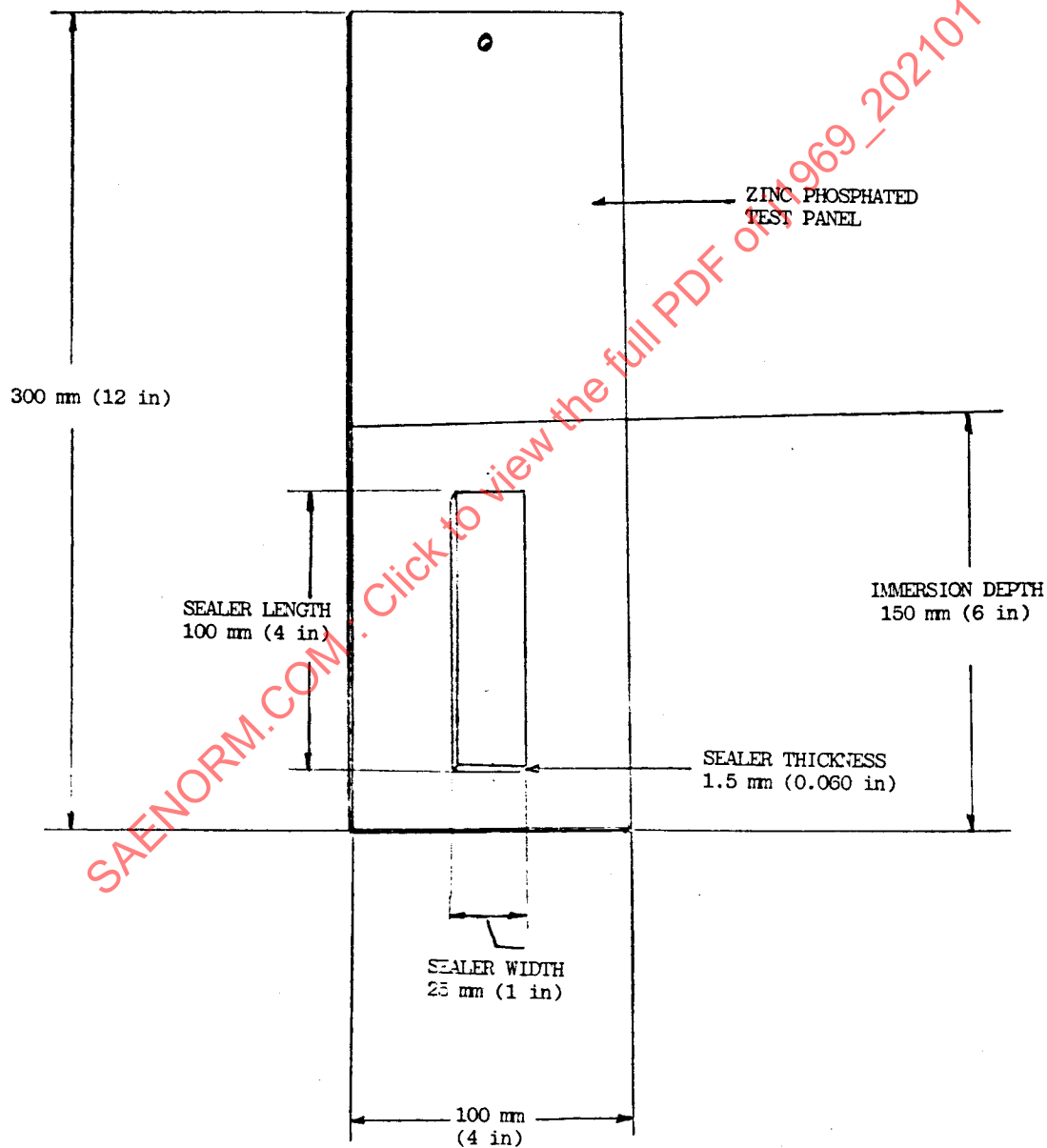


FIGURE 1—

5.4 The sealant coated panel must be conditioned at 23 ± 2 °C (73 ± 4 °F) for no less than 4 h nor more than 24 h prior to being placed in the primer bath.

5.5 Proceed to Section 6 while sealer panel is setting.

6. *Electrocoated Control Panel Preparation*

6.1 Fill a 1 gal plastic container, see Figure 2, within 2 in of the top with a sample of cathodic electrocoat primer.¹

6.2 Condition a 100 x 300 x 0.81 mm (4 x 12 x 0.032 in) zinc phosphated panel as in 5.2.

6.3 Electrocoat the panel at a primer thickness of 0.030 mm (0.0012 in) per the E-coat suppliers recommendations or as defined in Appendix A.

6.4 Bake the primed panel for 30 min at 182 °C (360 °F) or as specified.

6.5 Examine the baked surface, on both sides, for surface irregularities and craters. Use the Crater Rating System listed in Appendix B to grade the surface.

6.6 If the surface of the primed panel is smooth and has a Crater Rating of 10, and only 10², label the panel as "A-1" and retain as your standard for subsequent comparisons.

7. *Method I - Fresh Bath*

7.1 Place the sealer panel prepared in 5.3, after the designated conditioning period, into the 10 rated primer from 6.6. If the sealant is a die cut part, submerge the part in the bath, see Figure 2.

7.2 Agitate the primer bath, with sealant submerged, for 16 – 20 hours.

7.2.1 Agitate the primer bath with the propeller blade 25 mm (1 in) from the bottom with the mixer rpm controlled to avoid foaming or spillage.

7.3 Electrocoat the sealer panel at a minimum primer thickness of 0.030 mm (0.0012 in) per the E-coat supplier's recommendations, or as defined in Appendix A.

7.4 Bake the primed sealer panel for 30 min at 182 °C (360 °F) or as specified.

7.4.1 Label the baked sealer panel as "A-2".

7.5 Electrocoat another zinc phosphated panel, as described and conditioned in 4.2, at a primer thickness of 0.030 mm (0.0012 in) as in 7.3.

7.6 Bake the primed panel as in 7.4.

7.6.1 Label the baked primed panel as "A-3".

1. Note - The primer should be at least 24 h old.

2. Note - If the Crater Rating is less than 10, a new gallon of primer must be tested.

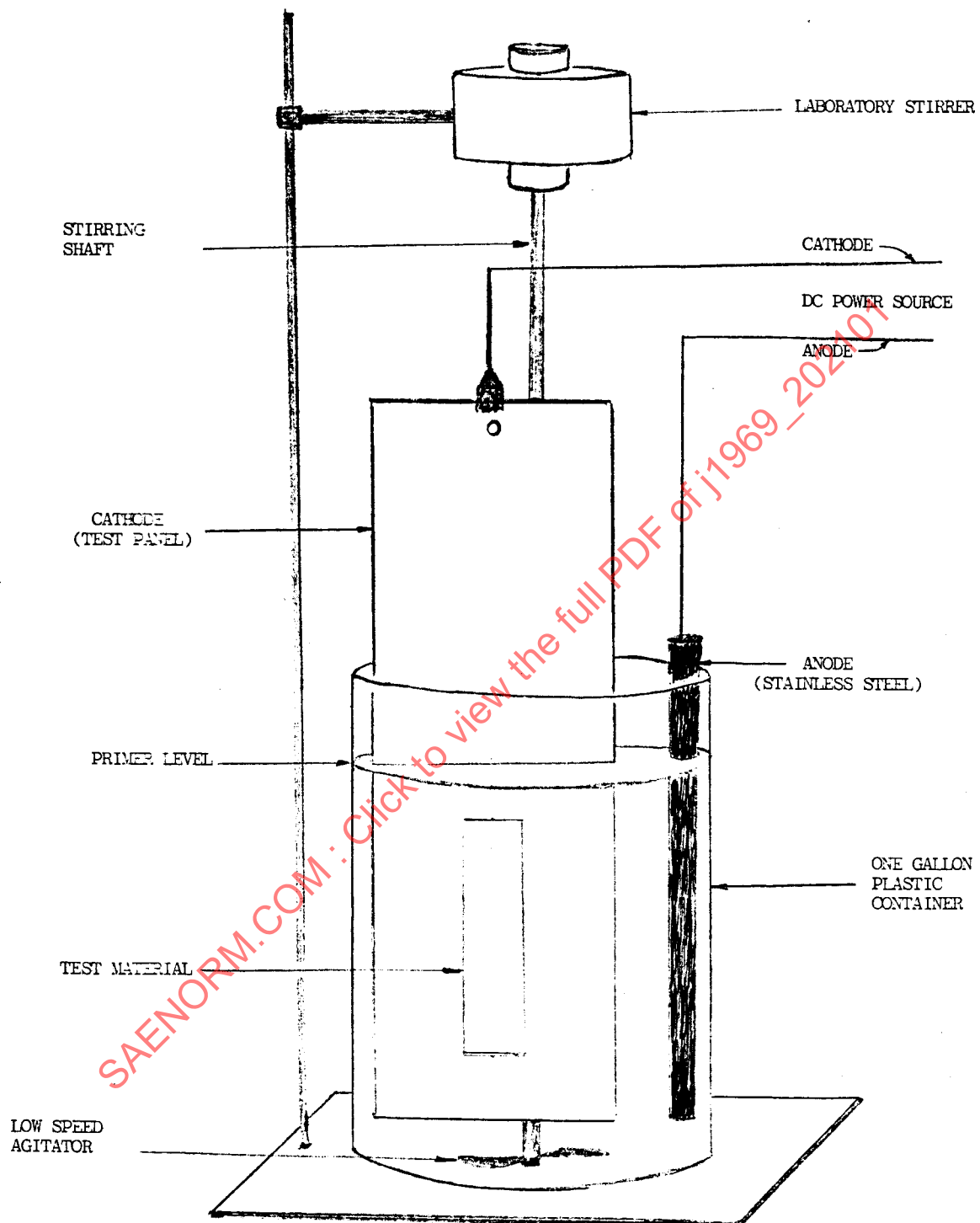


FIGURE 2—

7.7 Examine both sides of panels "A-2" and "A-3" using panel "A-1" as a standard.

7.7.1 Note any film irregularities

7.7.2 Count the total number of craters on both sides of each panel and record the values.

7.7.3 Assign the Crater Rating³ per Appendix B.

8. Method II - Contaminated Bath

8.1 Evaluate the quality of a second gallon of cathodic electrocoat primer as in steps 6.1 through 6.5.

8.2 If the surface of the primed panel is smooth and has a Crater Rating of 10, and only 10⁴, label the panel as "B-1" and retain as your standard for subsequent comparisons.

8.3 Transfer the gallon of the 10 rated primer to a clean 1 gal container.

8.4 Add three grams of the sealant to be tested to the primer bath. If the sealant is a die cut part, submerge the part in the bath.

8.5 Agitate the contaminated bath at high rpm with the dispersion blade for 1 h making sure the blade is 25 mm (1 in) from the bottom of the container.

8.6 Return the contaminated primer bath to the test container.

8.7 Agitate the contaminated primer bath for 16 – 20 hours.

8.7.1 Agitate the contaminated primer bath with the propeller blade 25 mm (1 in) from the bottom with the mixer rpm controlled to avoid foaming or spillage.

8.8 Electrocoat a 100 x 300 mm (4 x 12 in) zinc phosphated panel in the contaminated bath as described in Appendix A.

8.9 Bake the primed panel for 30 min at 182 °C (360 °F) or as specified.

8.9.1 Label this panel as "B-2".

8.10 Examine both sides of panel "B-2" using panel "B-1" as a standard.

8.10.1 Note any film irregularities.

8.10.2 Count the total number of craters on both sides of panel "B-2" and record the value.

8.10.3 Assign the Crater Rating⁵ per Appendix B.

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3. Note - A Crater Rating of eight or higher is usually an acceptable value.

4. Note - If the Crater Rating is less than 10, a new gallon of primer must be tested.

5. Note - A Crater Rating of eight or higher is usually an acceptable value.

APPENDIX A

COATING PROCEDURE

- A.1** Add cathodic electrocoat primer, aged at least 24 h before use, to within 2 in of the top of the 1 gal coating tank.
- A.2** Agitate the primer bath by means of the propeller stirrer.
- A.2.1** Speed of agitation should be limited to that necessary to cause moderate surface movement without creating a vortex, which could cause foaming.
- A.3** Temperature of the bath should be maintained at 28 °C (82 °F) or as specified by the primer manufacturer.
- A.4** Attach panel to be primed to the cathode of the coating tank.
- A.5** Reduce agitation during the coating process to prevent the panel from moving while in the bath.
- A.6** Coat panel for 2 min at the voltage recommended by the primer supplier needed to achieve the desired film thickness.
- A.6.1** Raise voltage from 0 to the recommended voltage over a 15 s period, ramp time.
- A.6.2** Maintain voltage, at the recommended voltage for 120 s and return to 0 V instantaneously.
- A.6.2.1 Decrease voltage if film builds are excessive.
- A.6.2.2 Increase bath temperature if film builds are insufficient.
- A.6.3** Wash coated panels with deionized water to remove undeposited paint.
- A.6.4** Air dry panels at ambient temperature or blow dry with oil free air.
- A.6.5** Bake panels in an oven for 30 min at 182 °C (360 °F), or as recommended by the primer supplier.
- A.6.6** Evaluate the cured primer for surface imperfections.⁶

6. Note - While the bath is not in use, it should be kept covered to prevent evaporation and introduction of contaminants. A dirty oven may also affect finished film appearance.