



CORPORATE HEAD OFFICE  
Specialty Polymer Coatings  
#101, 20529 – 62<sup>nd</sup> Avenue, Langley, BC, CANADA V3A 8R4  
Tel: (604) 514-9711 • Fax: (604) 514-9722

U.S.A. HEAD OFFICE  
Specialty Polymer Coating USA, Inc  
22503 FM521, Angleton, Texas, 77515, USA  
Tel: (281) 595-3530 • Fax: (281) 595-3717

Effective Date: March 8, 2017 Rev. 2

## SP-9888<sup>®</sup> SPRAY GRADE APPLICATION SPECIFICATION FOR PIPE LINING

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### **I. GENERAL**

- 1.1 SP-9888<sup>®</sup> Tank Lining is a 100% solids, epoxy manufactured and marketed by **Specialty Polymer Coatings, Inc.** (“SPC”), #101 – 20529 – 62<sup>nd</sup> Avenue, Langley, B.C., Canada, V3A 8R4, Telephone: (604) 514-9711, Fax: (604) 514-9722.
- 1.2 SP-9888<sup>®</sup> Tank Lining is to be applied by approved applicators.
- 1.3 This specification covers only the spray application of the material to the interior of steel tanks. Only application to steel surfaces is intended.
- 1.4 Mixing Ratio: 3 Parts Base to 1 Part Hardener (pre-measured) by volume.
- 1.5 Mixed Colour: Tan.

### **II. SURFACE PREPARATION**

- 2.1 All surfaces to be coated shall be abrasive blasted to NACE 2, SSPC SP-10 (Near White) cleanliness or equivalent. The resulting surface roughness profile shall be a minimum of 62 microns (2.5 mils) and a maximum of 125 microns (5.0 mils) peak to valley.
- 2.2 The underside and narrow edges of all angles, weld beads, pits and structural members must be blasted to the same surface condition as specified in Section 2.1. All surfaces must be cleaned of all blasting products, leaving no trapped particles or traces when blasting is completed.
- 2.3 All surfaces to be coated must be completely dry, free of moisture, soil, dust and abrasive material at the time the coating is applied. All weld spatters must be removed from the surface and rough welds must be ground smooth prior to coating.



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### **II. SURFACE PREPARATION (cont.)**

- 2.4 Only that area that can be coated in a particular day shall be blast-cleaned. If proper environmental conditions are maintained, the time between blasting and coating can be extended. Blast cleaning shall extend for at least 50 mm (2 in.) past the end of the coated area. Any area that is allowed to sit overnight must be returned to its original blast cleaned condition. This requirement also applies to any blast-cleaned surface that has flash rusted as a result of exposure to water or moisture. Relative Humidity must be 80% or less prior to and during the application of SP-9888<sup>®</sup> Tank Lining.
- 2.5 If the coating operation is past the maximum re-coat window 4 Hours at 25°C (77°F) or 6 Hours at 15°C (59°F), the edges of the area coated with SP-9888<sup>®</sup> Tank Lining are to be feathered down to the steel substrate after the coating has cured and before resumption of coating.
- 2.6 All blasting adjacent onto existing SP-9888<sup>®</sup> Tank Lining must be directed from the coated surface to the adjacent substrate rather than from the substrate onto the coating. The blasting should be initiated 150 mm (6 in.) onto the coating.
- 2.7 Prior to coating, all areas, including the floor, scaffolding, walkways, and decks within 15 m (50 in.) of the area being coated shall be swept or cleaned of abrasive products to prevent contamination of the coating surface.

### **III. APPLICATION**

- 3.1 SP-9888<sup>®</sup> Tank Lining must be applied to clean, dry surfaces only. Condensation, precipitation, water vapour or any other forms of contamination will **NOT** be acceptable on the blasted surface prior to coating. Surfaces subject to any of these conditions shall be cleaned with fresh water if necessary and re-blasted to return the surface to NACE 2, SSPC SP-10 cleanliness as per Section II.
- 3.2 The acceptable substrate temperature range for application of SP-9888<sup>®</sup> Tank Lining is 10°C (50°F) to 50°C (122°F). The substrate temperature must be a minimum of 3°C (5°F) above the dew point temperature before proceeding with the coating operation.
- 3.3 Coating application can be performed in cold temperature conditions if the tank interior is preheated using heating / de-humidification unit(s). Post-heating may be required for some applications to achieve an adequate cure depending upon ambient temperature. The coating must not be allowed to freeze before an adequate cure is reached. Preheating and post-heating may also be utilized if an accelerated cure time is required.



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### **III. APPLICATION (cont.)**

- 3.4 Preheating / de-humidification, if required, must be initiated prior to blasting in order to raise the surface temperature a minimum of 3°C (5°F) above the dew point temperature. Temporarily insulating by using scaffolding and tarps to encapsulate the exterior tank walls may be required in order to raise the interior temperature of the tank environment such that it is sufficient to perform the blasting and coating operations in extremely cold environments.
- 3.5 During the time of application, rough welds, joints and corners should be striped by brush or a spray stripe technique (wet on wet) to ensure adequate coverage over high asperities. The spray stripe coat may require brushing into the substrate as to minimize any voids in the coating film.
- 3.6 Preheat temperature of Part A (Base) material to 80°C - 90°C (176°F - 194°F) and Part B (Hardener) material is typically left at ambient temperatures of 15°C - 25°C (68°F - 77°F)

Hose bundle heat trace temperature of 75°C - 85°C (167°F - 185°F). For further Plural Component set up information contact SPC's Technical Department at 604-514-9711 or 1-800-801-6611.

#### 3.7 Use of SP-9888<sup>®</sup> Patch Kits:

- 3.7.1 Packaging - Part A: 3 Parts of Base (pre-measured) by volume.  
- Part B: 1 Part of Hardener (pre-measured) by volume.

#### 3.7.2 Mixing Instructions:

- a) Pre-mix Part A (Base) slowly with a variable speed drill fitted with an SPC approved mixing impeller. SPC mixing impellers assist in preventing the introduction of air into the coating and help to ensure a uniform mix.
- b) Pour Part B (Hardener) into Part A (Base). The temperature of the coating components should be above 15°C (59°F) to enhance mixing.
- c) Begin mixing slowly. After the initial mix has been achieved, a spatula or mixing stick should be used to remove any raw resin from the side of the container.
- d) Mix at a speed that ensures a uniform mix, but does not create a vortex in the liquid. Slow the mixer down at the surface of the liquid to prevent the introduction of air into the coating.
- e) The ideal mixing and application temperature is between 20°C (68°F) and 35°C (95°F).
- f) Mix for two (2) minutes at temperatures between 15°C (59°F) and 20°C (65°F), blending both parts to create one solid colour. If Part A (Base) is at a temperature between 20°C (68°F) and 35°C (95°F), mix for 30 seconds to one (1) minute. Do not attempt to mix and apply the coating if Part A (Base) is below 15°C (59°F).



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### **III. APPLICATION (cont.)**

#### 3.7.3 Application:

- a) Disposable tools such as brushes or short nap mohair rollers (available from SPC) should be used to apply the coating.
- b) A maximum Dry Film Thickness (DFT) of 1.5 mm (60 mils) can be applied to a vertical surface in a single application. Higher builds are possible on horizontal surfaces.

3.8 SP-9888<sup>®</sup> Tank Lining shall be applied to the specified DFT in a single application using Graco XP-70 or Hydra-Cat high pressure airless spray equipment or approved equal. Wet Film Thickness (WFT) measurements shall be continuously taken to ensure the minimum film thickness specified. In general, a WFT of 1.5 mm (60 mils) can be applied in a single application. If additional coats are required, they shall be applied while the preceding coat is still tacky. The maximum over-coating interval **shall not** exceed 4 Hours at 25°C (77°F) or six (6) Hours at 15°C (59°F) without roughening the surface.

3.9 SP-9888<sup>®</sup> Tank Lining can be over-coated without the need for an additional tie coat. Should the over-coating interval exceed 4 Hours at 25°C (77°F) or six (6) Hours at 15°C (59°F), the surface should be blast roughened prior to application of the topcoat. Blast roughening should not be attempted until the coating has dried to a dry hard condition in accordance with the SP-9888<sup>®</sup> Tank Lining Curing Table.

### **IV. APPEARANCE OF FINISHED COATING**

- 4.1 The finished coating shall be generally smooth and free of protuberances or holidays. All surfaces shall have the required minimum DFT. In general, the surface of the coating shall be no rougher than the base or substrate material. No drips, running, sagging or other discontinuities are acceptable.
- 4.2 The applicator shall exercise every reasonable precaution to assure proper application of the coating and satisfactory protection of the steel surface.



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### V. INSPECTION

- 5.1 The owner's appointed representative must inspect the quality of all blasted surfaces, including cleaning of abrasive from these surfaces prior to the application of SP-9888<sup>®</sup> Tank Lining. Acceptance to be given by said representative to the owner and contractor's representative.
- 5.2 WFT measurements should be continuously taken to ensure the minimum film thickness specified. WFT measurements should be taken using SPC approved WFT gauges.
- 5.3 After the SP-9888<sup>®</sup> Tank Lining has cured to a tack-free condition, the owner's representative and / or contractor's inspector shall measure the DFT with an SPC approved, calibrated, magnetic gauge. The appointed inspector shall notify the applicator of their acceptance. Notification to the applicator of all inadequately coated sections must be made immediately.
- 5.4 Holiday testing of the finished coating film may be performed to ensure adequate corrosion protection. The maximum voltage used for this testing shall not exceed 125 volts per 25 microns (1.0 mil). The holiday testing of SP-9888<sup>®</sup> Tank Lining coating is to be carried out in accordance with NACE SP0188-2006.
- 5.5 Immediately upon completion of the work, the coating application shall be subject to final inspection by SPC and / or the owner's representative. Notification of all defects must be made within a reasonable time frame from completion of the work to allow for all repairs within the allowed time frame for the project.
- 5.6 For each spray application a minimum of one plate sample coated to the specified DFT and one free film sample sprayed to a minimum DFT of 4.0 mm (100 mils) shall be taken. The plate size should be approximately 100 mm x 150 mm x 9.5 mm (4.0 in x 6.0 in. x 0.375 in.). The plate must be cleaned in accordance with Section II. Both samples should be cured for a minimum of four (4) days at 25°C (77°F) prior to testing.
  - 1) **Adhesion Test:** Apply three (3) tensile adhesion dollies to the plate sample with epoxy adhesive and cure for 24 hours at 25°C (77°F). Pull the dollies at a controlled rate with an elcometer adhesion tester or equal [approximately 25 mm (1.0 inch) per minute]. The minimum average adhesion should be 14 MPa (2000 PSI).
  - 2) **Hardness Test:** Test the Shore D Hardness of the free film sample. Hardness should be Shore D 80 ± 2.

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### **V. INSPECTION (cont.)**

5.7 **Fast Cure Test:** Fast Cure Testing can also be used to determine the quality of the coating. The procedure is as follows:

- Force-cure both plate and free film samples at 100°C (212°F) for one (1) hour.
- Cool samples to 25°C (77°F).
- Test the Shore D Hardness of the free film sample. Hardness should be Shore D 80 ± 2.
- Apply thumb to the surface of the free film sample. No thumbprint should be left in the coating.
- Conduct a "cross hatch" adhesion test on the plate sample as follows:
  - i) Using a sharp pointed knife, make two 13 mm (0.5 in.) long scribes through to the metal surface to form a V with an angle of approximately 30° at the intersection point.
  - ii) Starting at the point of intersection, force the coating from the steel substrate using the sharp pointed knife. Care should be taken to protect the eyes and hands when carrying out this operation.
  - iii) **Rating:** Shear adhesion shall be rated from 1 - 4 as follows:
    1. The coating cannot be removed cleanly from the surface and exhibits substantial resistance to cohesive failure.
    2. The extent of adhesive failure between the coating and the substrate shall not exceed 4 mm (0.15 in.) from the center point of the cross. The coating exhibits substantial resistance to cohesive failure.
    3. The extent of adhesive failure between the coating and the substrate exceeds 4 mm (0.15 in.) from the center point of the cross and / or the coating exhibits poor cohesive strength and can easily be delaminated.
    4. The coating exhibits little or no adhesion and peels off in large pieces.

*Note: A minimum rating of 2 is required to pass the shear adhesion test.*

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### **VI. REPAIRS**

- 6.1 Repair of pinholes and holidays 75 mm (3 in.) or less in diameter shall be repaired with SP-9888<sup>®</sup> Patch Kits or SP-9888<sup>®</sup> TF thin film. The procedure is as follows:
- The surface temperature prior to preparing the surface should be in accordance with Section II of this specification.
  - Repair areas should be roughened using a carborundum cloth, sandpaper, power wire brushing or surface grinder / profiler such as an MBX<sup>®</sup> Bristle Blaster<sup>®</sup>.
  - The adjacent coating should be abraded for a minimum distance of 25 mm (1 in.) to ensure inter-coat adhesion.
  - If the repair area is larger than 75 mm (3 in.) in diameter, power sanding or powered surface profiler such as an MBX<sup>®</sup> Bristle Blaster<sup>®</sup> must be used.
  - Wipe with a clean cloth to remove dust. Wear a dust respirator for all sanding or grinding activities.
  - All surfaces to be coated shall be clean and completely dry prior to the application of the coating.
  - The minimum surface temperature for coating is 10°C (50°F). The substrate temperature must be a minimum of 3°C (5°F) above the dew point temperature.
  - Coating application can be performed in cold temperature conditions if the tank interior is preheated using heating / de-humidification unit(s). Post-heating may be required for some applications to achieve an adequate cure depending upon ambient temperature. The coating must not be allowed to freeze before an adequate cure is reached. Preheating and post-heating may also be utilized if an accelerated cure time is required.
  - Preheating / de-humidification, if required, must be initiated prior to blasting in order to raise the surface temperature a minimum of 3°C (5°F) above the dew point temperature. Temporarily insulating by using scaffolding and tarps to encapsulate the exterior tank walls may be required in order to raise the interior temperature of the tank environment such that it is sufficient to perform the blasting and coating operations in extremely cold environments.
  - The appropriate preheat temperature and cure time can be determined from the SP-9888<sup>®</sup> Tank Lining Curing Table (Appendix “A”). The acceptable substrate temperature range for repair of SP-9888<sup>®</sup> Tank Lining is 15°C (59°F) to 50°C (122°F).
  - Coat the repair area in accordance with the requirements detailed in Section 3.7.3.

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### **VII. SAFETY PRECAUTIONS**

- 7.1 The contractor will provide safe and secure scaffolding for ready access to work areas.
- 7.2 Other contract services will be halted as necessary so as not to interfere with the workflow of the coating application.
- 7.3 SPC coating products are **HARMFUL IF ABSORBED THROUGH SKIN, INHALED OR SWALLOWED**. They are skin and eye irritants. Personal protective equipment is required. Refer to the **Material Safety Data Sheets**.
- 7.3.1 Chemical resistant gloves with a long cuff that will overlap the clothing sleeves should be worn when handling this product. The glove / clothing overlaps should be sealed by tape. Check with the glove manufacturer to determine the proper glove type.
- 7.3.2 Wear an appropriate, properly fitted vapour respirator (NIOSH / OSHA approved) during application where vapour / mist are likely to be encountered, e.g. confined spaces and during winter construction or when the substrate is preheated. Follow the respirator manufacturer's recommendations. Wear a dust respirator for any activity such as sanding or grinding of cured coating.
- 7.3.3 Wear splash proof chemical safety goggles and / or face shield.
- 7.3.4 Wear impervious boots.
- 7.3.5 Long-sleeved clothing is to be worn over regular clothing to cover all exposed areas of arms, legs or torso during mixing and application of the coating. Breathable clothing, such as cotton or disposable coveralls, is recommended.
- 7.3.6 Emergency eyewash and a shower should be in close proximity, where possible. A barrier cream may be used, in conjunction with the stated protective measures, as an additional safeguard against skin contact.





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### **VII. SAFETY PRECAUTIONS (cont.)**

- 7.4 Keep the containers closed when not in use. In case of spillage, absorb with inert material and dispose of in accordance with Federal, Provincial, and Municipal regulations in Canada and Federal, State, and County regulations in the United States of America.
- 7.5 No open flames, smoking or welding will be allowed in the immediate vicinity during the coating application.
- 7.6 All personnel on the application crew shall be informed of regulations regarding smoking, auto traffic restrictions, the meaning of warning bells, horns and whistles, fire warnings and restricted areas. Members of the coating crew shall maintain good personal hygiene and wash thoroughly after exposure to the coating application, particularly before eating or going on breaks.

### **VIII. EQUIPMENT**

- 8.1 Graco XP-70 or Hydra-Cat high pressure spray equipment or approved equal must be used to apply SP-9888<sup>®</sup> Tank Lining coating systems in accordance with SPC's recommendations and specifications.
- 8.2 For further Plural Component set up information contact SPC's Technical Department at 604-514-9711 or 1-800-801-6611.

### **IX. MATERIALS**

- 9.1 All coating containers must be sealed prior to use. Product exposed to the atmosphere must be protected with a blanket of nitrogen gas.
- 9.2 **NO** amount of SP-9888<sup>®</sup> Tank Lining or SP-9888<sup>®</sup> Patch Kits shall be given, sold or exchanged without the express written consent of SPC.
- 9.3 The acceptable shipping and storage temperature range for SP-9888<sup>®</sup> Tank Lining and SP-9888<sup>®</sup> Patch Kits is between 5°C (41°F) and 40°C (104°F).
- 9.4 Store SP-9888<sup>®</sup> Tank Lining and SP-9888<sup>®</sup> Patch Kits in a cool, dry, well-ventilated area. Keep the container lids sealed when not in use. The Shelf Life of SP-9888<sup>®</sup> Tank Lining or SP-9888<sup>®</sup> Patch Kits is a maximum of 24 months from the date of manufacture if the materials are in unopened containers



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### **X. SUBSTRATE TYPES**

- 10.1 This specification is applicable to standard steels.
- 10.2 Exotic metals, stainless steel or other special types of steel or alloys may require different consideration as to surface preparation and SPC formulations. Notification of the use of such metals must be made to SPC prior to the coating application.

### **XI. INSURANCE**

- 11.1 The contractor will provide all necessary insurance to protect itself and its employees during the application of SP-9888® Tank Lining and SP-9888® Patch Kits.
- 11.2 SPC will provide all necessary coverage to protect SPC employees on site.

### **XII. DISPOSAL**

- 12.1 Dispose of empty Base and Hardener containers according to Federal, Provincial, and Municipal regulations in Canada and Federal, State, and County regulations in the United States of America. Allow all mixed material to complete gel prior to disposal.

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#### **SPECIALTY POLYMER COATINGS, INC. (SPC)**

##### **Corporate Head Office**

#101 – 20529 – 62<sup>nd</sup> Avenue  
Langley, BC, CANADA V3A 8R4

Phone: (604) 514-9711  
Fax: (604) 514-9722

##### **USA Head Office**

22503 FM 521 RD  
Angleton, TX USA 77515

Phone: (281) 595-3530  
Fax: (281) 595-3717

[www.spc-net.com](http://www.spc-net.com)

# APPENDIX “A”



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## **SP-9888<sup>®</sup>-TANK LINING CURING TABLE**

<b>SUBSTRATE TEMPERATURE</b>		<b>DRY HARD CURING TIME</b>
<b>°C</b>	<b>°F</b>	
90	194	3.5 Minutes
80	176	5 Minutes
70	158	8 Minutes
60	140	14.5 Minutes
50	122	35 Minutes
40	104	1.75 Hours
30	86	3.5 Hours
20	68	7 Hours
10	50	15.5 Hours

Substrate: 12 mm (0.5 in.) Thick Steel Panels

Dry Film Thickness: 0.63 mm (25 mils) as per ASTM D1640

Material Temperature: Base: 80°C (176°F) Hardener: 20°C (68°F)  
Base and Hardener Mixed: 80°C (176°F)

Note: The information above is to serve as a guide only. The test results were compiled under laboratory-controlled conditions. Field results may vary due to variable conditions such as radiant heat loss and the cooling effects of wind.

Effective Date: April 11, 2014