



**Application Procedures for Steel and Other  
Metallic Surfaces**

**For**

***Chem*LINE<sup>®</sup> 784 WS**  
***Wine and Spirits***

**Ambient or Low Temperature Cure Protective Coating**

**“Tomorrows Solutions Today”**



## TABLE OF CONTENTS

<b>1.0 SCOPE</b> .....	<b>1</b>
<b>2.0 APPLICABLE DOCUMENTS</b> .....	<b>1</b>
<b>3.0 GENERAL NOTES</b> .....	<b>2</b>
<b>4.0 APPLICATION REQUIREMENTS</b> .....	<b>2</b>
<b>5.0 EQUIPMENT</b> .....	<b>3</b>
5.1 BLASTING .....	3
5.2 ENVIRONMENTAL CONTROL .....	4
5.3 VENTILATION.....	4
5.4 SPRAY .....	4
<b>6.0 MATERIAL STORAGE</b> .....	<b>5</b>
<b>7.0 SURFACE PREPARATION AND PRECLEANING</b> .....	<b>5</b>
7.1 SURFACE FINISH REQUIREMENTS.....	5
7.2 WELDING AND GRINDING .....	5
7.3 GREASE AND OIL REMOVAL .....	5
7.4 WASHING .....	5
7.5 CONTAMINATION.....	5
<b>8.0 ENVIRONMENTAL REQUIREMENTS</b> .....	<b>6</b>
<b>9.0 SURFACE CLEANING PRIOR TO COATING/LINING APPLICATION</b> .....	<b>6</b>
9.1 BLASTING .....	6
9.2 GRIT AND DUST REMOVAL .....	6
<b>10.0 APPLICATION</b> .....	<b>7</b>
10.1 POT LIFE .....	7
10.2 MIXING AND THINNING .....	7
10.3 COATING/LINING SEQUENCE .....	7
10.4 STRIPE COATING .....	8
10.5 HOLIDAY TESTING, TOUCH UP AND REPAIR.....	8
<b>11.0 POST CURING</b> .....	<b>9</b>
<b>12.0 INSPECTION</b> .....	<b>9</b>
<b>13.0 GENERAL REQUIREMENTS</b> .....	<b>11</b>
<b>14.0 SAFETY</b> .....	<b>12</b>

## 1.0 SCOPE

- 1.1 ChemLINE 784 WS is a hot forced air post cured protective lining for metallic surfaces, such as steel and stainless steel surfaces, etc. The application procedures described herein provide the best available information regarding the application of this product for the purpose of ensuring the best possible results when using ChemLINE 784 WS.
- 1.2 The coating contractor/applicator shall not deviate from these application procedures. The contractor/applicator shall acknowledge that the Application Procedures have been read and understood. In addition, the contractor/applicator shall have a copy of the most current application procedures on the jobsite at all times.
- 1.3 This specification is for use on steel, however, ChemLINE 784 WS can be applied to other metals, alloys and concrete surfaces. Contact Advanced Polymer Coatings for details on preparing and coating other metals, alloys and concrete surfaces.
- 1.4 If any modifications to or deviations from this specification are requested, they must be sent to APC in writing for approval.

## 2.0 APPLICABLE DOCUMENTS

- 2.1 ASTM D4417 "Standard Test Method for Field Measurements of Surface Profile of Blast Cleaned Steel"
- 2.2 ASTM E376 "Measuring Coating Thickness by Magnetic-Field or Eddy Current (Electromagnetic) Test Methods"
- 2.3 ASTM D1186 "Standard Test Methods for Nondestructive Measurement of Dry Film Thickness of Non-Magnetic Coatings Applied to a Ferrous Base " (withdrawn 2006, replaced with D7091)
- 2.4 ASTM D1400 "Standard Test Methods for Nondestructive Measurement of Dry Film Thickness of Non-Magnetic Coatings Applied to a Nonferrous Metal Base" (withdrawn 2006, replaced with D7091)
- 2.5 NACE SP0178 "Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to be Lined for Immersion Service"
- 2.6 NACE SP0188 "Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates"
- 2.7 ASTM D512-04 "Standard Test Methods for Chloride Ion in Water"
- 2.8 SSPC-PA 2 "Procedure for Determining Conformance to Dry Coating Thickness Requirements"
- 2.9 SSPC-SP 1 "Solvent Cleaning"
- 2.10 "Joint Surface Preparation Standard NACE No. 2/SSPC-SP 10 Near-White Metal Blast Cleaning"
- 2.11 "Joint Surface Preparation Standard NACE No. 3/SSPC-SP 6 Commercial Blast Cleaning"
- 2.12 "Joint Surface Preparation Standard NACE No. 1/SSPC-SP 5 White Metal Blast Cleaning"
- 2.13 ASTM D3363 "Standard Test Method for Film Hardness by Pencil Test"
- 2.14 ISO 8502-3 "Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)"

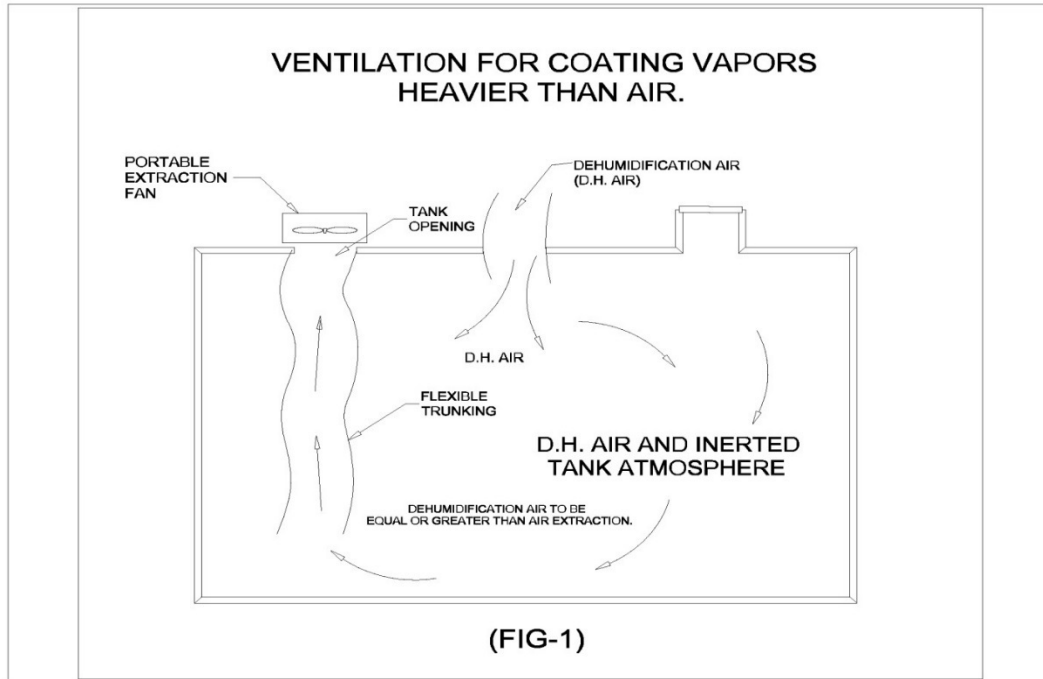
### 3.0 GENERAL NOTES

- 3.1 The contractor shall arrange for a pre-job conference at the job site so that all parties involved, including the asset owner, inspectors, coating contractor, safety and all other necessary personnel are familiar with the entire project, including all specifications, safety codes and jobsite conditions.
- 3.2 The coating contractor shall furnish workers who perform quality work and who are experienced and knowledgeable in the surface preparation and application of high performance industrial coatings and linings. Coating application procedures shall conform to the standards of craftsmanship discussed in the Society for Protective Coating's "Painting Manual, Volume 1, Good Painting Practice." These techniques include, but are not limited to, multiple passes of the spray gun, with each pass overlapped 50% and "crosshatching" successive coats of coating. The coating contractor shall use properly functioning equipment capable of performing the tasks required herein.
- 3.3 The contractor shall ensure proper ventilation of the workplaces and furnish proper safety equipment and clothing (PPE) for each worker using ChemLINE 784 WS products. The contractor is also responsible for providing all necessary equipment, supplies, and scaffolding for surface preparation, application of coating material and removal of dirt, debris and spent abrasives. The contractor or subcontractor is also responsible for supplying all necessary heating, dehumidification, and heat cure equipment.
- 3.4 All materials shall be delivered to the jobsite in their original, unopened containers.
- 3.5 The theoretical coverage of ChemLINE 784 WS is 1,444 ft<sup>2</sup>/gallon/mil (35 m<sup>2</sup>/liter/mil) on a smooth surface. ChemLINE 784 WS has a recommended total DFT of 12-14 mils (300-350 microns); therefore, at this thickness the theoretical coverage would be 90-100 ft<sup>2</sup>/gallon. However, some coating loss would be expected depending on the type of substrate, surface profile, substrate configuration, environmental conditions, operator technique and method of application. For example, using a 20% loss factor, the practical coverage would be 75-80 ft<sup>2</sup>/gallon at 12-14 mils DFT (300-350 microns).

### 4.0 APPLICATION REQUIREMENTS

- 4.1 Extraction ventilation shall always remain erect and functioning from the time the coating application starts, until all coating applications and touch-up/repair of the lining system is completed and accepted by the relevant parties or responsible QA/QC person and Owner's Representatives.
- 4.2 The relative humidity inside the tanks shall never exceed 50% during blasting operations or 65% during coating operations. The coating cannot be applied unless the steel temperature is more than 5 °F (3 °C) above the temperature of the dew point. The surface temperature is to be a minimum of 59 °F (15 °C) but no more than 104 °F (40 °C). See section 8.0 Environmental Requirements

4.3 If the steel surface temperature is lower than specified above, space heaters shall be installed to ensure that the proper conditions are always kept inside the tanks. If gas heaters are to be used, only LPG (propane) or natural gas combustion type heaters with indirect heated air supply are permitted. Electrically heated units are preferred. No gasoline or diesel heaters are allowed. The warm air shall be supplied to the lower regions of the tank.



## 5.0 EQUIPMENT

### 5.1 Blasting

- 5.1.1 Compressors shall be capable of providing a minimum of 100 psi at the blast nozzle(s) and shall provide clean air that is free of oil and moisture through the required oil and moisture traps.
- 5.1.2 The compressed oil-free air used for abrasive blasting shall be cooled after compression and shall not have a higher temperature, volume and humidity, than the air fed into the tanks by the dehumidifiers. A "Blotter Test" shall be performed periodically to confirm that the air is free from oil.
- 5.1.3 Suitable industrial-type vacuum cleaners are to be provided and used for removing residual grit and dust from internal surfaces after blasting and prior to coating. Particular attention is to be given to removal of grit and dust in pitted and horizontal areas. Scaffolding shall be vacuumed to remove dust.
- 5.1.4 Only clean, sharp, angular abrasives, capable of producing a 3-4 mil (75-100 micron) profile shall be used. Garnet abrasive is recommended for stainless steel. Please note that stainless steel will harden during abrasive blasting. Producing desired profiles can be difficult when blasting multiple times is required.

## 5.2 Environmental Control

- 5.2.1 Adequate dehumidification equipment shall be maintained at all times in the tanks during the blasting, coating application and the curing of the lining.
- 5.2.2 The dehumidification must have the drying capacity to keep the relative humidity at 50% or lower during abrasive blasting and 65% or lower during coating application.
- 5.2.3 The volume of the dehumidification air shall always exceed the volume of the extraction air (see 5.3 Ventilation) in order to maintain a positive balance of air and to prevent humid and unfiltered air from entering and contaminating the tank.
- 5.2.4 This equipment must remain erect and functioning until all coating applications and touch-up/repair of the lining system is completed and accepted by the relevant parties or responsible QA/QC person and Owner's Representatives, respectively.

## 5.3 Ventilation

- 5.3.1 Ventilation is to be a minimum capacity to maintain a clear atmosphere within the tanks during both blasting and coating operations.
- 5.3.2 During application, tanks must be sufficiently ventilated to maintain the atmosphere within the tank below 10% of the lower explosive limit.
- 5.3.3 Bag houses or other dust collection equipment must be used to conform to environmental regulations.
- 5.3.4 The extraction shall be erected to draw the contaminated air from the lowest, farthest portions of the tank to ensure proper removal of the air/solvent vapors.
- 5.3.5 Ventilation shall be continued until coating work has been accepted and is ready for heat cure.

## 5.4 Spray

- 5.4.1 Coating pumps should be 45:1 or higher, 3 gpm minimum, air operated and have airline filters and oil and moisture extractors. A #50-#60 mesh in-line filter on discharge side of pump must be used. A #50-#60 mesh filter is to be located between the gun and whip hose. A filter on the siphon line is recommended. The air input line should be ½ inch (1.25 cm) I.D. minimum.
- 5.4.2 It is suggested that airless tip size from .017-.023 inch (0.4 –0.6 mm) and a minimum of ¾ inch (0.95 cm) ID fluid hose with a ¼ inch (0.63 cm) ID 5 feet (1.5 meter) whip be used. In addition, a minimum 100-psi pressure at the airless spray pump and fluid hose length of a maximum of 100 feet (30 meters) should also be used. Only properly overhauled and cleaned spray pumps and spray guns will be allowed.
- 5.4.3 New spray hoses shall be used for the spray application of the ChemLINE 784 WS.
- 5.4.4 Each pump shall be fitted with an air pressure gauge and a reduction valve so air pressure can be adjusted to the correct level.

- 5.4.5 Pumps and spray guns should be properly cleaned with acetone (preferred) or MEK, by recirculating the solvent through the pump for 15 minutes.

## 6.0 MATERIAL STORAGE

- 6.1 Materials shall be stored in an approved location.
- 6.2 Storage areas shall be kept clean and free of fire hazard.
- 6.3 Oil rags, waste paper or other fire hazards shall be removed and disposed of in accordance with the applicable regulations at the end of each workday.
- 6.4 All ChemLINE materials are to be stored in climate-controlled facilities at temperatures no less than 72°F (22°C), but no more than 90°F (32°C).
- 6.5 Do not allow materials to freeze.
- 6.6 Do not store in direct sunlight.

## 7.0 SURFACE PREPARATION AND PRE-CLEANING

### 7.1 Surface Finish Requirements

- 7.1.1 All surfaces to be coated shall be prepared in accordance with NACE SP0178-2007/C Grade.
- 7.1.2 Pre-blasting (Note: Grease and oil may need to be removed as per section 7.3 prior to pre-blasting)
  - 7.1.2.1 A commercial blast (NACE 3/SSPC-SP 6/Sa 2) may be necessary for new steel to find and repair any defects in the plate that may be covered by shop primer.
  - 7.1.2.2 Welds on new construction should be blasted to white metal (NACE 1/SSPC-SP 5/Sa 3) to expose any blowholes or other defects to allow for proper repair.

### 7.2 Welding and Grinding

- 7.2.1 Remove all weld spatter.
- 7.2.2 Grind sharp edges to a minimum ¼-inch (0.3 cm) radius and grind welds smooth per NACE SP0178-2007/C Grade.
- 7.2.3 Skip welds should be seal welded.
- 7.2.4 No weld undercutting is acceptable. All weld undercuts shall be filled with weld metal.

### 7.3 Grease and Oil Removal

- 7.3.1 Degrease surface prior to abrasive blasting with a commercial degreaser or with a hydro-blast at 5,000 psi (34.5 MPa) containing a degreasing solution which will remove dirt, oil and grease per SSPC-SP 1.

### 7.4 Washing

- 7.4.1 All surfaces shall be pressure washed with clean, warm water. Distilled or demineralized water is preferred for removal of chlorides.

### 7.5 Contamination

- 7.5.1 Testing for surface contamination on blasted surfaces shall be accomplished using a Bresle Sampler Kit™, Chlor-Test™ or SCAT kit (or equal) in order to determine

the amount of total soluble salts and surface pH. The acceptable level of chloride contamination is 5 micrograms/cm<sup>2</sup> (33ppm or less). Acceptable surface pH is 7.

7.5.2 If after testing, the chloride or pH level exceed the acceptable level, all contaminated surfaces shall be pressure washed with a chloride remover or with clean, warm water, (distilled or demineralized water is preferred) and retested. If necessary repeat this process until the surfaces are in compliance with the requirements in section 7.5.1.

## 8.0 ENVIRONMENTAL REQUIREMENTS

8.1 The below table lists the environmental requirements for the application of ChemLINE materials:

Relative Humidity; During Blasting	50% or lower
Relative Humidity; During Coating	65% or lower
Substrate Temperature; range	59 - 104°F (15 - 40°C)
Substrate Temperature; minimum	5°F (3°C) above the dew point

**Note:** If the relative humidity level rises above 65%, or the substrate temperature drops below 5°F (3°C) above the temperature of the dew point at any time during the 1<sup>st</sup> coat application process for 12 hours or less the following procedure must be followed, prior to the application of the next coat of ChemLINE 784 WS, to remove all moisture from the coating surface:

- Bring the relative humidity level of the tank to 50% or below and the substrate temperature to 5°F (3°C) minimum above the temperature of the dew point and maintain these conditions for minimum of 24 hours prior to re-starting the ChemLINE 784 WS application.
- Re-starting of ChemLINE 784 WS application must be approved by relevant parties or responsible QA/QC person and Owner’s Representatives – RH, dew-point AND re-coat window must all be within spec.

## 9.0 SURFACE CLEANING PRIOR TO COATING/LINING APPLICATION

### 9.1 Blasting

9.1.1 The surface shall be abrasively blasted to NACE No. 2/SSPC-SP 10/ISO Sa 2½ near white metal finish.

9.1.2 The abrasively blasted surface shall result in an anchor pattern of 3-4 mils (75-100 microns) minimum for steel as measured with Testex™ Press-O-Film™ Replica Tape. Replica tape shall be retained as part of the permanent inspection records.

### 9.2 Grit and Dust Removal

9.2.1 After abrasive blasting, all surfaces and scaffolding shall be vacuumed with a bristle nozzle to remove all dust, grit and embedded abrasive.

9.2.2 A NACE No. 2/SSPC-SP 10/ISO Sa 2½ near white metal surface finish is defined as a blast cleaned surface in which “all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface by abrasive blasting, except for very light shadows, very slight



streaks or slight discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating. At least 95% of each square inch of surface area shall be free of all visible residues, and the remainder shall be limited to the light discolorations mentioned above.”

## 10.0 APPLICATION

### 10.1 Pot Life

10.1.1 The pot life of ChemLINE 784 WS 5 gallon kit is approximately 30-45 minutes at 75°F (24°C) after proper mixing.

### 10.2 Mixing and Thinning

10.2.1 ChemLINE WS is supplied in kits which contain the proper ratio of catalyst to resin. Complete kits must always be used for mixing. Splitting of kits for the purpose of making smaller portions are under **NO** circumstances allowed. Smaller units are available for purchase.

10.2.2 Mechanically agitate, using a high shear (SSPC recommended) mechanical mixer, component "A" (resin) until color and consistency is uniform (usually 1-2 minutes).

10.2.3 Slowly add component "B" (catalyst) and mix thoroughly for approximately 3-5 minutes.

10.2.4 If thinning, slowly add 200 proof (100%) ethanol and continue mixing until the thinner is thoroughly mixed (approximately 2-3 minutes). Do not use more than 1 quart (946 ml) of 200 proof (100%) ethanol per 5 gallon (19 liter) kits or 6.5 ounces (190 ml) per 1 gallon (3.8 liter) kits.

### 10.3 Coating/Lining Sequence

10.3.1 Apply ChemLINE 784 WS White to all tank surfaces at a wet film thickness of 7-8 mils (175-200 microns) to achieve 6-7 mils DFT (150-175 microns).

10.3.2 Make frequent wet film thickness measurements during the coating operation to ensure that the proper dry film thickness is achieved. The maximum dry film thickness for the first coat shall not in any place exceed 10 mils (250 microns). The minimum dry film thickness shall not be less than 5 mils (125 microns) on the first coat.

10.3.3 Allow the first coat to reach the “B” stage before applying the stripe coat. ChemLINE has reached “B” stage when the coating is dry and firm to the touch and has lost all tackiness, and can be walked on without causing damage.

10.3.4 ChemLINE 784 WS will “B” stage under ambient conditions (70°F [21°C]) in approximately 8-12 hours depending on environmental conditions.

10.3.5 Apply one stripe coat of ChemLINE 784 WS Gray as noted in Section 10.4.

10.3.6 Apply a second full coat of ChemLINE 784 WS Gray at a wet film thickness of 7-8 mils (175-200 microns) to achieve 6-7 mils DFT (150-175 microns). The maximum dry film thickness shall not in any place exceed 18 mils (450 microns) for both coats. The minimum dry film thickness shall not be less than 10 mils (250 microns).

10.3.7 Recoat window:

Air Temperature	Min.	Max.
60°F (16°C)	12	72
68°F (20°C)	8	72
77°F (25°C)	8	48
86°F (30°C)	6	48

Note: The recoat window is a function of chemistry, time, relative humidity, and temperature. Actual recoat times may vary due to temperature fluctuations throughout the day. All recoat times are based on proper environmental conditions being maintained uninterrupted throughout the application process.

10.4 Stripe Coating

10.4.1 Stripe coats may be applied prior to the application of the first coat or in between the first and second full coats. Any deviation from this practice must be approved by APC Technical Service department in writing and Owner Representative.

10.4.2 Stripe coats shall be applied in a stipple and level method, using a suitable clean, natural bristled brush to all edges, welds, lighting holes, drain holes, angle bars, pitted areas, and otherwise irregular shapes, and other hard to reach areas.

10.4.3 Do not apply stripe coats at a wet film thickness greater than 4-5 mils (100-125 microns).

10.4.4 Brush hairs, roller nap, and any other foreign material that may contaminate the stripe coat shall be removed while the stripe coat is still wet.

10.5 Holiday Testing, Touch Up and Repair

10.5.1 After lining has reached the “B” stage after the second coat, holiday (pinhole/spark) testing can be performed using a high voltage holiday detector set at 3,000 volts. Details on holiday (pinhole/spark) detection can be found in NACE SP0188.

10.5.2 Initial holiday (pinhole/spark) testing can be conducted at 3,000 volts. Wet sponge type low voltage testers are NOT ALLOWED at this stage. The coating is not completely post cured and wet sponge testing will damage coating.

10.5.3 Obvious defects and pinholes identified by spark testing can be repaired prior to heat curing with minimum surface preparation. If repairs are made within 24 hours of the topcoat application, or within the recoat window (refer to section 10.3.7), clean area to be touched-up with a clean cloth slightly dampened with clean solvent. Apply coating using a small, clean, stiff bristle brush. Work coating into the pinhole using the end of the brush in a twisting and dabbing motion. Lightly brush material over pinhole and a minimum of one inch around the repair site. Coating should be applied thick but not so thick that sags or runs are produced.

- 10.5.4 Repairs made after the coating has passed the recoat window (refer to section 10.3.7) require the area around the pinhole to be roughened by hand sanding using 50-80 grit abrasive paper before cleaning with solvent.
- 10.5.5 Spark test repaired areas at 1,200 to 1,400 volts (100 volts per mil). If pinholes/holidays are found, follow touch-up procedures outlined in Section 10.5.4.
- 10.5.6 Large areas that need to be repaired shall be masked off to protect adjacent good coating. Repair area is to be prepared by grinding, disc sanding or spot blasting to SSPC-SP 10 (ISO Sa 2½) near white metal finish. Achieve a 3-4 mil (75-100 microns) surface profile. Remove all blasting dust and grit using a vacuum. Wipe down area using a clean cloth slightly dampened with clean solvent. Surface should be free of dust, dirt, grease and oil. In addition, chloride ion levels should be less than 5 micrograms/cm<sup>2</sup>. Acceptable surface pH is 7. The ChemLINE coatings system should then be applied following the application procedures described in this application guide or as directed by APC Technical Service department.

#### 11.0 POST CURING

- 11.1 The final cure shall be performed after completing the high voltage (3,000 volt) holiday test, and repairs/ touch-ups and any repair holiday testing have been performed.
- 11.2 For elevated temperature cure, increase the substrate temperature by 50°F (28°C) per hour until the final cure (soak) temperature is reached. Refer to the APC Lab Review prepared for the specific project for actual soak temperature and time.
- 11.3 The size of heating equipment and number of heaters is dependent on the size and configuration of the coated item to be cured (consult a heating contractor for more information). Direct or indirect forced air heating or inductive heating is acceptable.
- 11.4 Use only propane or natural gas with direct heated air supply for heating. Diesel fuel, gasoline, kerosene, or fuel oil are not to be used.

#### 12.0 INSPECTION

- 12.1 All working operations and areas that are to be inspected by the relevant parties or responsible QA/QC person and Owner's Representatives shall be pre-inspected by the contractor to ensure that the work performed conforms to the specifications outlined herein. Substandard work areas shall be corrected prior to requesting inspection by the relevant parties or responsible QA/QC person and Owner's Representatives.
- 12.2 The Inspector(s)/Contractor shall record all pertinent information concerning inspections or work performed. Inspection data shall be recorded and kept on the owners or applicators inspection forms, or the owners/contractors approved forms. Inspections will be performed after the following operations, however, other inspections may be conducted when requested by either the Owner's representative or other relevant parties or responsible QA/QC person.
  - 12.2.1 Before blasting
  - 12.2.2 After blasting and cleaning

- 12.2.3 After each spray and stripe coat
- 12.2.4 After repair preparation and after repairs have been completed
- 12.2.5 After scaffold removal
- 12.2.6 Before final heat curing
- 12.2.7 After final heat curing
- 12.3 Minimum Required Inspection Equipment.
  - 12.3.1 Surface contamination testing for chlorides, sulfates, sulfides, etc. will be done using a SCAT kit, a Bresle Sampler Kit™ or Chlor-Test™ kit or equivalent.
  - 12.3.2 Testex Tape™ X-Coarse with dial thickness gauge, or Surface Profile Gauge.
  - 12.3.3 Dry film thickness gauge.
  - 12.3.4 Adjustable voltage high voltage holiday tester.
  - 12.3.5 MEK or acetone (preferred) solvent wipe.
  - 12.3.6 Hardness test to be done with a 9H pencil hardness tester.
- 12.4 Coating Integrity Inspection Procedures
  - 12.4.1 Holiday (pinhole/spark) Testing. Holiday testing shall be performed using a calibrated high voltage holiday detector. Initial holiday testing shall be conducted at 3,000 volts. Holiday testing can be performed as soon as the coating is firm to the touch and solvent is released. Additional spark testing should be performed at 100 volts per mil of coating thickness (1,200 to 1,400 volts). All testing results should be recorded including repair areas and the results of retesting.
  - 12.4.2 Dry Film Thickness Criteria. The minimum dry film thickness of the lining system shall not at any spot be less than 10 mils (250 microns). The maximum allowable DFT spot (a spot is defined as an area of 5 ft<sup>2</sup>. (0.5 m<sup>2</sup>)) reading should not be higher than 18 mils (450 microns). The average DFT should be 12 -14 mils (300 - 350 microns).
  - 12.4.3 Dry Film Thickness Readings. The overall condition and appearance of the tank shall determine the required number of dry film thickness readings. "Spot" dry film thickness readings shall be in accordance with SSPC-PA2 Specification. All DFT measurements should be recorded.
  - 12.4.4 Solvent Testing.
    - 12.4.4.1 A solvent wipe test is used to determine whether the coating is post cured.
    - 12.4.4.2 Soak a clean, white cloth with clean acetone (preferred) or MEK solvent.
    - 12.4.4.3 Rub the same area of the coating 40-50 times in a back and forth motion while applying pressure.
    - 12.4.4.4 If the coating becomes soft and tacky or coating material is transferred to the cloth, the coating is not properly cured.
    - 12.4.4.5 This test should be performed in at least ten different sections of the tank.

- 12.4.5 9H Pencil Hardness Test. A hardness test will determine whether the coating is post cured. Coating hardness can be tested using a pencil hardness gauge (e.g. Paul N. Gardner Co.). A properly cured coating will have a pencil hardness value of “9H” or greater. If a hardness value of less than “9H” is determined notify APC Technical Service department prior to restarting the final cure process.
- 12.5 Acceptance Criteria. The tanks may be rejected if any of the following occur:
  - 12.5.1 Sags or runs
  - 12.5.2 Pinholes in film
  - 12.5.3 Air bubbles and air bubble craters
  - 12.5.4 Dry spray and rough “grainy” finish
  - 12.5.5 Low DFT per coat
  - 12.5.6 High DFT per coat
  - 12.5.7 Blistering
  - 12.5.8 Lifting and peeling
  - 12.5.9 Insufficient dehumidification and ventilation
  - 12.5.10 Out of specified environmental conditions
  - 12.5.11 Poor cleaning procedures
  - 12.5.12 Insufficient cure
  - 12.5.13 Brush bristles/roller nap in stripe coats and/or touch ups
  - 12.5.14 Coating puddles
  - 12.5.15 Grit or other foreign matter in the coating
  - 12.5.16 Weld spatter
  - 12.5.17 Open coating film/holidays
  - 12.5.18 Dust on surfaces to be coated
  - 12.5.19 Dust on scaffolding
  - 12.5.20 Missed stripe coats or repairs
  - 12.5.21 Any other cause which the Owner’s representative or APC Technical Service department feels compromises the integrity of the coating.
- 13.0 GENERAL REQUIREMENTS
  - 13.1 The contractor is to mix the coating (resin and catalyst) in strict accordance with the instructions outlined in this specification.
  - 13.2 The tank coating is to be applied in the sequence outlined in this specification. Recoatability guidelines are mandatory, and if not adhered to, reblasting of the tank will be required.
  - 13.3 During the application of the coating, open flames, welding, smoking, and the use of spark-producing equipment (such as lights, wiring, motors, etc.) are absolutely prohibited in and around tanks being coated.
  - 13.4 All sprayers and personnel involved in the application of the coating shall use approved fresh air masks and safety suits as specified by the SDS. See section 14.0 SAFETY for further details.

- 13.5 Areas where the coating has failed due to poor surface preparation, improper application of coating, etc. are to be reblasted and recoated according to this application procedure.
  - 13.6 The contractor is responsible for following the coating manufacturer's MSDS at all times. All safety related rules and requirements that apply to any specific work area shall be adhered to.
  - 13.7 For final approval and limited material warranty of the project, daily project documentation and inspection reports will be submitted and reviewed by relevant parties or responsible QA/QC person and Owner's Representatives and a completion document shall be signed by the Owner's Representative and the relevant parties or responsible QA/QC person.
  - 13.8 Warranty will become effective upon delivery of all, but not limited to, documentation, inspection test results, reports, heat cure charts, etc. to Advanced Polymer Coatings.
- 14.0 SAFETY
- 14.1 Review all information in the MSDS prior to using the coating materials.
  - 14.2 Required Safety Equipment (PPE)
    - 14.2.1 While mixing, stripe coating, and touch up/repair by brush:
      - 14.2.1.1 Respiratory Protection: Gas and Vapor Removing Air Purifying Respirator (Cartridge)
      - 14.2.1.2 Eye Protection: Chemical Goggles or Face Shield
      - 14.2.1.3 Protective Clothing: Tyvek® or Saranex™ suit
      - 14.2.1.4 Protective Gloves: Natural Latex Rubber or Nitrile
    - 14.2.2 While Spraying:
      - 14.2.2.1 Respiratory Protection: Full face positive pressure demand type (Supplied Air Mask)
      - 14.2.2.2 Eye Protection: Same as Respiratory Protection above.
      - 14.2.2.3 Protective Clothing: Saranex™ suit with hood or equal
      - 14.2.2.4 Protective Gloves: Natural Latex Rubber or Neoprene.
  - 14.3 ChemLINE 784 WS coating systems are intended for application by experienced, professional personnel. If ChemLINE 784 WS coating materials are to be applied by your own people or a third party contractor, please be sure they are aware of the following safety precautions:
    - 14.3.1 Exposure to resins, catalysts, and hardeners through direct skin contact and / or inhalation may cause dermatitis reactions in some people. Cleanliness of the skin and clothing is critical and must be of paramount concern.
    - 14.3.2 Fumes are flammable and heavier than air. Proper ventilation should be maintained to minimize breathing of concentrated fumes.
    - 14.3.3 Suitable respirators should be used during application.
    - 14.3.4 Safety glasses, gloves and suitable protective clothing must be worn at all times during application. Do not alter PPE. All PPE is to be worn as intended by the manufacturer.

- 14.3.5 If contact with liquid coating materials does occur, remove any clothing involved and flush the skin with flowing water. Discard contaminated clothing. Do not attempt to wash and reuse.
- 14.3.6 Cleaning solvents for spray equipment are acetone or MEK.
- 14.3.7 Keep open flames and sparks away from the area where materials are being mixed and applied.
- 14.3.8 If a rash occurs, remove the individual from the work area and seek a physician's care for dermatitis.
- 14.3.9 In case of eye contact, flush with water for at least 20 minutes and consult a physician.
- 14.3.10 If swallowed do not induce vomiting and call a physician immediately.