



# SPECIALTY POLYMER COATINGS

## MANUFACTURER'S QUALIFIED APPLICATION PROCEDURE

FOR SP-2888® R.G.

BRUSH GRADE, SPRAY GRADE, AND CARTRIDGES

MQAP IDENTIFIER – SP-2888 R.2.0

### DOCUMENT REVISION HISTORY

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## INTRODUCTION

SP-2888® R.G. is a 100% solids, epoxy/urethane, coating used for below ground corrosion control on pipe, piping assemblies, valve assemblies, pipe components, girth welds, horizontal directional drilling (HDD) pipe and HDD girth welds. SP-2888® R.G. is available in Spray Grade, Brush Grade, and Cartridge. This MQAP addresses the requirements outlined in CSA Z245.30 Clause 5.3.2 for SP-2888® R.G. Brush Grade, Spray Grade, and Cartridge application where pipeline service temperatures do not exceed 85°C (185°F).

### 1.0 STANDARDS AND SPECIFICATIONS

NACE Recommended Practices / SSPC Standards – Surface Preparation: NACE No.2/SSPC-SP-10.

### 2.0 DEFINITIONS

**Adequate Cure** - where preheating is used in cold weather application or to accelerate a cure, adequate cure shall be achieved for Shore D hardness  $\geq 80$  measured at  $21^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . For the purpose of handling the coated surface (lowering in or backfilling), adequate cure for temperatures above  $10^{\circ}\text{C}$  is achieved when the coating is dry hard.

**Applicator** - the company which is applying the coating. Typically, this is either the contractor or his subcontractor.

**Contractor** - those who have been contracted to prepare the surface and apply coatings covered in this specification.

**DFT - Dry Film Thickness** - the thickness of the coating after it has hardened to a solid state, as defined in SSPC PA2.

**Dry Hard** - coating does not indent when pressed forcefully with a thumbnail.

**Epoxy** - a two-component liquid epoxy or epoxy/urethane coating system.

**Gel Time** - coating begins to thicken past the point of workability.

**Manufacturer** - Specialty Polymer Coatings

**Owner** - pipeline owner/operator including its affiliates, engineering agencies, inspectors and other authorized representatives.



**Sweating/Damp Pipe** - any substrate to be coated or blasted is considered to be sweating or damp if its temperature is less than 3°C (5°F) above the dew point of the air immediately adjacent to the surface.

**Tacky** - refers to a coating in an uncured state. Coating is said to be tacky when coating adheres to a finger contacting it.

**Touch Dry Time** - coating does not adhere to a fingertip when lightly touched.

**Wet Immersion/Inservice Temperature** - the maximum operating temperature at which the coating will perform.

**WFT - Wet Film Thickness** - the thickness of the coating film while in a liquid state.

### 3.0 COMPATIBILITY WITH OTHER ANTI-CORROSION COATINGS

SP-2888® R.G. is compatible with all SPC and fusion bonded epoxy (FBE) anti-corrosion coatings. For compatibility with other anti-corrosion coatings, please consult with SPC.

### 4.0 PACKAGING

Brush & Spray Grade Material

- Part "A" - 3 Parts of Base (measured by volume)
- Part "B" - 1 Part of Hardener (measured by volume)

Cartridge Material

- Part "A" - 2 Parts of Base (measured by volume)
- Part "B" - 1 Part of Hardener (measured by volume)

### 5.0 RECOMMENDED FILM THICKNESS

For standard corrosion protection, a DFT of 500 microns minimum to 1750 microns (20 mils to 70 mils, 0.50 mm to 1.75 mm), is recommended.

For HDD and mechanical protection, a DFT of 1000 microns minimum to 1750 microns (40 mils to 70 mils, 1.00 mm to 1.75 mm), is recommended.

## 6.0 SAFETY CONSIDERATIONS

SP-2888® R.G. is harmful if absorbed through skin, inhaled or swallowed. It is a skin and eye irritant. Personal protective equipment is required. Refer to the Safety Data Sheets for additional information.

### Gloves

Appropriate hand and wrist protection shall be worn in conjunction to the work being performed. Check with the glove manufacturer to determine the proper glove type. The glove/clothing overlaps should be sealed by tape.

### Safety Glasses/Face Shields

Appropriate eye protection shall be worn when there is a probability that such protection equipment could prevent injury. Examples of such equipment include safety glasses with side shields, direct vent goggles and indirect vent goggles. Face shields shall be used when a potential for facial injury exists from flying debris or chemical splashes. Face shields shall not be utilized as the sole method of eye protection.

### Foot Protection

Foot protection shall be selected in regards to the potential hazard. Steel-toe footwear shall be used when the potential for toe and lower foot injury exists.

### Protective Clothing

Long-sleeved clothing shall be worn over regular clothing to cover all exposed areas of arms, legs and torso during mixing and application of the coating. Breathable clothing, such as cotton or disposable coveralls, is recommended.

### Respirator

An appropriate, properly fitted vapour respirator (NIOSH / OSHA approved) shall be worn during coating application where vapour/mist is likely to be encountered, e.g. confined spaces and/or when the substrate is preheated. A dust respirator shall be worn for any activity such as sanding or grinding of cured coating.

### Other Safety Considerations

As a minimum, all selected protective equipment shall meet the requirements of the appropriate ANSI standards. Selection of such equipment shall be accomplished after completion of the pre-job safety review. After selection, changes in specific safety equipment must be approved by the job supervisor or the safety coordinator.

An emergency eyewash and a shower shall be in close proximity. A barrier cream may be used, in conjunction with the stated protective measures, as an additional safeguard against skin contact.



Containers shall be kept closed when not in use. In case of spillage, the material shall be disposed of in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

No open flames, smoking or welding shall be allowed in the immediate vicinity during coating application.

Members of the coating crew shall wash thoroughly after exposure to the coating.

## **7.0 SURFACE PREPARATION**

Surfaces to be blast cleaned shall be free of oil, grease, injurious contamination, slivers, mud, soils, burrs, weld spatter, etc. Prior to blast cleaning, the contractor shall examine the surface for contaminants. Any oil, grease or magnetic particle inspection products or ultrasonic couplant shall be removed using SSPC SP1 cleaning method using acetone, xylene, MEK, or non-oily solvent approved by the Owner.

If the temperature of surface to be blast cleaned is not 3°C (5°F) above the dew point or the possibility of moisture is present, the surface shall be heated. The surface temperature shall be at least 3°C (5°F) above the dew point temperature from the completion of blast cleaning until the application of the coating has been completed, however a minimum surface temperature of 10°C (50°F) should be maintained until the coating has reached an adequate cure, not exceeding 100°C (212°F) or the Owner's maximum preheat temperature.

Where coating application has been completed and the substrate temperature falls below 10°C (50°F) or below the required substrate temperature above dew point, you may experience longer cure times and/or various degrees of blushing which will not affect the coating performance or properties. If blushing becomes present, consult an SPC Representative prior to overcoating.

During surface preparation and coating application, where ambient conditions show high relative humidity readings, care shall be taken to ensure the separation between the dew point and substrate temperature are above the recommended 3°C (5°F). This shall be closely monitored frequently and as close to the substrate as possible. In some scenarios preheating may be required to achieve the separation required.

All surfaces to be coated shall be abrasive blasted to minimum NACE No.2 (Near White) cleanliness. Material for abrasive cleaning shall be the appropriate blend of grit to produce an angular-surface profile of 62.5 microns (2.5 mils) minimum and a maximum of 125 microns (5.0 mils) peak to valley.

The underside and narrow edges of all angles, weld beads and structural members shall be blast cleaned to minimum NACE No.2 (Near White) cleanliness. All surfaces to be coated shall be thoroughly cleaned to ensure all residual dust and/or abrasive is effectively removed.



Only areas that can be coated in a day shall be blast cleaned. Any area that is allowed to sit overnight shall 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 rain or moisture.

If the coating operation is to continue the following day, the edges of the area coated with SP-2888® R.G. shall be feathered down to the steel substrate. All blasting onto existing SP-2888® R.G. shall be directed for a minimum of 50 mm (2") from the coated surface to the adjacent substrate rather than from the substrate onto the coating.

When coating girth welds where the parent coating is FBE, polyethylene (PE), polypropylene (PP), coal tar or liquid coating, sweep blasting shall be directed from the parent coating to the adjacent substrate. The blasting shall extend 50 mm (2") onto the parent coating.

For the repair of pinholes and holidays 150 mm (6") or less in diameter, the repair area shall be roughened using carborundum cloth, sandpaper (80 grit or coarser), MBX® Bristle Blaster®, abrasive blasting or as directed by the Owner. Care must be taken to ensure all gloss has been removed from the repair area. The adjacent coating shall be abraded for a minimum distance of 25 mm (1") in all directions to ensure inter-coat adhesion. Dust shall be removed by wiping with a clean paint brush or with compressed air. A dust respirator shall be worn for all sanding or grinding activities. All surfaces to be coated shall be clean and completely dry prior to the application of the coating.

For repair of areas greater than 150 mm (6") in diameter, the repair area shall be mechanically abraded using an MBX® Bristle Blaster®, abrasive blasting, or as directed by the Owner. Care must be taken to ensure all gloss has been removed from the repair area. The adjacent coating shall be abraded for a minimum distance of 25 mm (1") in all directions to ensure inter-coat adhesion. Dust shall be removed by wiping with a clean paint brush or with compressed air. A dust respirator shall be worn for all sanding or grinding activities. All surfaces to be coated shall be clean and completely dry prior to the application of the coating.

For repair of areas greater than 150 mm (24") in diameter, the repair area shall be abrasive blasted, or as directed by the Owner. Care must be taken to ensure all gloss has been removed from the repair area. The adjacent coating shall be abraded for a minimum distance of 25 mm (1") in all directions to ensure inter-coat adhesion. Dust shall be removed by wiping with a clean paint brush or with compressed air. A dust respirator shall be worn for all sanding or grinding activities. All surfaces to be coated shall be clean and completely dry prior to the application of the coating.

## 8.0 PREHEATING AND POST-HEATING

The surface temperature of the substrate to be coated should be maintained in the range stated in this document from completion of abrasive blasting through coating cure which may require preheating and/or post-heating. Any preheating or accelerated curing other than what is outlined in this Section shall be approved by the Manufacturer or Owner.

To expedite the curing process and/or cold weather application, the recommended substrate preheat temperature for coating application is as follows:

- 65°C - 75°C (150°F - 170°F) when substrate to be coated is between -10°C and 15°C (15°F - 59°F).
- 85°C - 90°C (185°F - 195°F) when the substrate is colder than -10°C (15°F).

The preheat temperature shall be measured using a surface contact thermometer or by a method approved by the Owner. The use of Infrared Laser Thermometers is not recommended for use on blasted ferrous substrates.

Preheating shall be accomplished using a direct flame, induction coil, or catalytic infrared heater. Where direct flame is used, sweep blasting shall be done after preheating to ensure no contamination is present.

The surface shall be prepared in accordance with Section 7.0. Preheating shall raise the surface temperature so that coating application takes place when the pipe surface is at or above the minimum specified temperature.

Preheating shall not damage the existing coating, repair coating or exceed the Owner specified maximum preheat temperature. Application of the coating shall not be attempted when the substrate temperatures are above 100°C (212°F).

Valves to be coated should be completed in an enclosure or indoors with no direct heat applied to the valve assembly. Preheating and post-heating temperature limits should be acquired from valve supplier/manufacturer. The minimum surface temperature of 10°C (50°F) shall be maintained until four (4) hours after the coating is touch dry.

Neither handling nor backfilling shall be permitted until the coating has adequately cured, as determined by the Owner's inspector. Post-heating, to accelerate curing, shall be performed by using an indirect method such as induction coil/plate, flameless torch, heat gun, forced air or method by raising ambient temperature. Direct flame shall not be used. The post-heat temperature of the coating surface shall not exceed 90°C (194°F) as measured by a surface contact thermometer, an infrared laser thermometer or by a method approved by the Owner. Valves shall not be post heated except by increasing ambient air temperature.





## 9.0 EQUIPMENT

Disposable tools, such as brushes, short nap mohair rollers and mixing impellers (available from SPC), should be used to apply SP-2888® R.G. Brush Grade.

Graco Hydra-Cat, XP-70, XM, or Xtreme Mix plural component spray equipment or an SPC approved equivalent such as WIWA shall be used to apply SP-2888® R.G. Spray Grade coating systems in accordance with SPC's recommendations and specifications. See Appendices A and B.

SPC's Pneumatic Spray Cartridge Dispensers shall be used to apply SP-2888® R.G. Spray Cartridges (900ML/1000ML) in accordance with SPC's recommended equipment. See Appendix C.

Cartridge Coating material shall be applied with a paint brush or spatula.

## 10.0 COATING APPLICATION

### 10.1 Brush Grade Application

A DFT of 1.27mm (50 mils) or greater can typically be applied to a vertical surface in a single application. Higher builds are possible on horizontal surfaces.

The acceptable ambient temperature range for brush grade application is -40°C to 50°C (-40° to 122°F). The acceptable substrate temperature range for application of SP-2888® R.G. Brush Grade is 10°C to 100°C (50°F to 212°F). The substrate temperature shall be a minimum of 3°C (5°F) above the dew point temperature before proceeding with the coating application.

To achieve an adequate cure or accelerated cure during cold weather application, see Section 8. The coating shall not be allowed to freeze before an adequate cure is reached. An adequate cure is achieved when the Shore D hardness is  $\geq 80$ . The appropriate substrate preheat temperature and cure time can be determined from the SP-2888® R.G. Curing Table, Appendix E.

During coating application, WFT measurements may be taken as a guideline for achieving the minimum film thickness specified. Where preheating of the substrate is utilized, WFT measurements may be inaccurate and final DFT's shall be taken to ensure the specified coating thicknesses have been achieved. In general, a WFT of 1.78 mm (70 mils) can be applied in a single application. Should the over coating interval be exceeded, the surface must be blast roughened ensuring the removal of all gloss prior to over coat application. Blast roughening shall not be attempted until the coating has cured to a dry-hard condition in accordance with the SP-2888® R.G. Curing Table, Appendix E.



### 10.1.1 Mixing Instructions - Brush Grade Coating

- a) Mix Part "A" Base slowly with a variable speed drill fitted with a 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 shall be above 15°C (59°F) to enhance mixing. Only Base and Hardener with the same colour coded dots (shown on the container lids), or identified as the same kit size, shall be mixed together. The kit sizes are also identified on the container lids. Refer to the Colour Chart in Appendix D.
- c) Begin by 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 and bottom of the container.
- d) Mix at a speed that ensures a uniform mix, but does not create a vortex in the liquid.
- e) Slow the mixer down at the surface of the liquid to prevent the introduction of air into the coating.
- f) The ideal mixing and application temperature is between 20°C (68°F) and 30°C (86°F).
- g) Mix for one to two minutes blending both parts to create one uniform colour with no streaks.
- h) Application may be done at this time by brushing or rolling.

### 10.2 Spray Grade Application

The acceptable ambient temperature range for spray grade application is -40°C to 50°C (-40° to 122°F). The acceptable substrate temperature range for application of SP-2888® R.G. Spray Grade is 10°C (50°F) to 100°C (212°F). The substrate temperature shall be a minimum of 3°C (5°F) above the dew point temperature before proceeding with the coating operation.

To achieve an adequate cure or accelerated cure during cold weather application, see Section 8.0. The coating shall not be allowed to freeze before an adequate cure is reached. An adequate cure is achieved when the Shore D hardness is  $\geq 80$ . The appropriate substrate preheat temperature and cure time can be determined from the SP-2888® R.G. Curing Table, Appendix E.

The recommended Spray Grade coating-preheat temperatures are as follows:

- Base: 70°C  $\pm$  5°C (158°F  $\pm$  9°F) to 80°C  $\pm$  5°C (176°F  $\pm$  9°F).
- Hardener: 20°C  $\pm$  5°C (68°F  $\pm$  9°F) to 30°C  $\pm$  5°C (86°F  $\pm$  9°F)  
(Ambient- typically not heated).
- In cases of adverse weather conditions, the recommended temperatures may change, please consult your SPC representative.
- Preheating of the base material is required for viscosity balance.



SP-2888® R.G. Spray Grade shall be applied to the specified DFT in a single application using Graco Hydra-Cat, XP-70, XM, or Xtreme Mix plural component airless spray equipment or approved equivalent. During coating application, WFT measurements may be taken as a guideline for achieving the minimum film thickness specified. In general, a WFT of 1.27mm (50 mils) or greater can typically be applied in a single application. Where preheating of the substrate is utilized, WFT measurements may be inaccurate and final DFT's shall be taken to ensure the specified coating thicknesses have been achieved. If additional coats are required, they shall be applied while the preceding coat is still tacky. Should the over coating interval be exceeded, the surface must be blast roughened ensuring the removal of all gloss prior to over coat application. Blast roughening shall not be attempted until the coating has cured to a dry-hard condition in accordance with the SP-2888® R.G. Curing Table, Appendix E.

See Appendices A and B for recommended equipment set-up.

### **10.3 Spray Cartridge Application**

The acceptable ambient temperature range for Spray Cartridge application is -40°C to 50°C (-40°F to 122°F). The minimum surface temperature for coating is 10°C (50°F). The substrate temperature shall be a minimum of 3°C (5°F) above the dew point temperature.

For application of Cartridge coating, the surface shall be prepared as follows:

- a) The surface shall be prepared in accordance with Section 7.0.
- b) The adjacent coating shall be abraded for a minimum distance of 50 mm (2") to ensure inter-coat adhesion.
- c) The area to be coated shall be wiped with a clean paint brush or compressed air to remove dust. A dust respirator shall be worn for all sanding or grinding activities.
- d) All surfaces to be coated shall be clean and completely dry prior to the application of the coating.

To achieve an adequate cure or accelerated cure during cold weather application, see Section 8. The coating shall not be allowed to freeze before an adequate cure is reached. An adequate cure is achieved when the Shore D hardness is  $\geq 80$ . The appropriate substrate preheat temperature and cure time can be determined from the SP-2888® R.G. Curing Table, Appendix E. SP-2888® R.G. Spray Cartridge shall be applied to the specified DFT in a single application using SPC's Pneumatic Spray Cartridge Dispenser. During coating application, WFT measurements may be taken as a guideline for achieving the minimum film thickness specified. In general, a WFT of 1.25 mm (50 mils) can be applied in a single application. Where preheating of the substrate is utilized, WFT measurements may be inaccurate and final DFT's shall be taken to ensure the specified coating thicknesses have been achieved. If additional coats are required, they shall be applied while the preceding coat is still tacky. Should the over coating interval be exceeded, the surface must be blast roughened ensuring the removal of all gloss prior to over coat application. Blast roughening shall not be attempted until the coating has cured to a dry-hard condition in accordance with the SP-2888® R.G. Curing Table, Appendix E.

### 10.3.1 Spray Cartridge Preparation (900ML)

- a) Remove the retaining cap to separate the SP-2888® R.G. Spray Cartridge Base (white material) from the SP-2888® R.G. Spray Cartridge Hardener (blue material).
- b) Place the SP-2888® R.G. Spray Cartridge Base in the microwave, warming oven or hot water bath and preheat.
- c) Using an Infrared Laser Thermometer, measure the temperature of the preheated SP-2888® R.G. Spray Cartridge Base from all sides. Temperature readings should range from 57°C to 76.5°C (135°F to 170°F).
- d) Once the SP-2888® R.G. Spray Cartridge Base has achieved the target preheat temperature window, set aside and begin preheating the SP-2888® R.G. Spray Cartridge Hardener.
- e) Place the SP-2888® R.G. Spray Cartridge Hardener in the microwave, warming oven or hot water bath and preheat.
- f) Using an Infrared Laser Thermometer, measure the temperature of the preheated SP-2888® R.G. Spray Cartridge Hardener from all sides. Temperature readings should range from 43°C to 54.5°C (110°F to 130°F).
- g) Once the SP-2888® R.G. Spray Cartridge Hardener has achieved the target preheat temperature window, rejoin the SP-2888® R.G. Spray Cartridge Base tube and SP-2888® R.G. Spray Cartridge Hardener tube.
- h) Insert the pre-heated connected SP-2888® R.G. Spray Cartridge Base tube and SP-2888® R.G. Spray Cartridge Hardener with the static mixer attached into the SPC pneumatic dispenser.
- i) Attach airline to air input valve and adjust the air pressure to no more than 50 psi.
- j) On the dispenser, turn the dispense rate valve to zero "0", which is counter clock wise and change the brass pinion valve to forward motion or the dispense mode.
- k) Initial flow of material should be dispensed away from the substrate to be coated until an adequate spray fan has been achieved. Adjusting the dispense rate and air pressure may be required.
- l) Once the cartridge system has an adequate fan, begin applying material onto the substrate to be coated.

### 10.3.2 Spray Cartridge Preparation (1000ML)

- a) Place the SP-2888® R.G. Spray Cartridge in the microwave, warming oven or hot water bath and preheat.
- b) Using an Infrared Laser Thermometer, measure the temperature of the preheated SP-2888® R.G. Spray Cartridge from all sides. Temperature readings should range from 60°C to 75°C (140°F to 167°F).
- c) Once the SP-2888® R.G. Spray Cartridge has achieved the target preheat temperature window, unscrew the retaining cap and attach the static mixing tube.
- d) Insert the pre-heated SP-2888® R.G. Spray Cartridge tube with attached static mixing tube into the SPC pneumatic dispenser.
- e) Attach airline to air input valve and adjust the air pressure to no more than 100 psi.

- f) On the dispenser, turn the dispense rate valve to zero "0", which is counter clock wise and change the brass pinion valve to forward motion or the dispense mode.
- g) Initial flow of material should be dispensed away from the substrate to be coated until an adequate spray fan has been achieved. Adjusting the dispense rate and air pressure may be required.
- h) Once the cartridge system has an adequate fan, begin applying material onto the substrate to be coated.

#### **10.4 Manual Cartridge Application**

The acceptable ambient temperature range for Manual Cartridge application is -40°C to 50°C (-40°F to 122°F). The minimum surface temperature for coating is 10°C (50°F). The substrate temperature shall be a minimum of 3°C (5°F) above the dew point temperature.

For application of Cartridge coating, the surface shall be prepared as follows:

- a) The surface shall be prepared in accordance with Section 7.0.
- b) The adjacent coating shall be abraded for a minimum distance of 25 mm (1") to ensure inter-coat adhesion.
- c) The area to be coated shall be wiped with a clean paint brush or compressed air to remove dust.  
A dust respirator shall be worn for all sanding or grinding activities.
- d) All surfaces to be coated shall be clean and completely dry prior to the application of the coating.

To achieve an adequate cure or accelerated cure during cold weather application, see Section 8.0. The coating shall not be allowed to freeze before an adequate cure is reached. The appropriate preheat temperature and cure time can be determined from the SP-2888® R.G. Curing Table, Appendix E.

The Manual Cartridge shall be applied as follows:

- a) Eject the required amount of coating material from the cartridge onto a clean non-absorbent surface using the manual dispenser.
- b) Hand-mix the product with a stir stick until the coating colour becomes uniform with no streaks. Cartridge static mixers may be used.
- c) Apply the coating to the required thickness on the area to be repaired using a spatula or paintbrush.
- d) Extend the coating to at least 25 mm (1") over the surrounding pre-roughened coating.

For coating repair using a Manual Cartridge, indirect or induction methods can be used to preheat the area to be coated or to post-heat/force cure the applied coating. This is suitable for small and medium sized patch repairs of 150 mm (6") or less in diameter. It is not suitable for large repairs.



## 11.0 BRUSH GRADE COATING REPAIR

### 11.1 Repair of Pinholes and Holidays

Repairs less than 150 mm (6") in diameter shall be accomplished by using SP-2888® R.G. Manual Cartridges in accordance with Section 10.4 or SP-2888® R.G. Brush Grade in accordance with Section 10.1. Surface preparation shall be in accordance with Section 7.0.

### 11.2 Repair of Large Areas

Repairs larger than 150 mm (6") in diameter shall be accomplished by using SP-2888® R.G. Manual Cartridges in accordance with Section 10.4 or SP-2888® R.G. Brush Grade in accordance with Section 10.1. Surface preparation shall be in accordance with Section 7.0.

## 12.0 SPRAY GRADE COATING REPAIR

### 12.1 Repair of Pinholes and Holidays

Repairs less than 150 mm (6") in diameter shall be accomplished by using SP-2888® R.G. Manual Cartridges in accordance with Section 10.4 or SP-2888® R.G. Brush Grade in accordance with Section 10.1. Surface preparation shall be in accordance with Section 7.0.

### 12.2 Repair of Large Areas

Repairs larger than 150 mm (6") in diameter shall be accomplished by using SP-2888® R.G. Manual Cartridges in accordance with Section 10.4, SP-2888® R.G. Brush Grade in accordance with Section 10.1 or SP-2888® R.G. Spray Grade in accordance with Section 10.2. Surface preparation shall be in accordance with Section 7.0.

## 13.0 RECOAT INTERVAL

The following recoat windows were conducted at 50% Relative Humidity:

#### Brush Grade

- 25°C (77°F) Maximum: 60 minutes
- 80°C (176°F) Maximum: 3 minutes

#### Spray Grade

- 25°C (77°F) Maximum: 90 minutes
- 80°C (176°F) Maximum: 2 minutes

The recommended recoat intervals are general guidelines only. The recoat interval may vary significantly due to variable conditions including but not limited to ambient conditions, surface temperatures and product application temperatures. Consult your SPC Representative for assistance in determining the minimum and maximum recoat intervals specific to your application.



SP-2888® R.G. is recommended to be applied in a single coat application vs. multiple coats as variable environmental conditions such as RH%, Dew Point and surface & ambient temperatures can cause blushing as is present with all epoxy coatings/linings. At times an amine blush may be difficult to detect but will create adhesion issues between layers if proper surface cleaning and abrasive preparation is not followed.

#### 14.0 BACKFILLING

Mechanical stress, including backfilling, shall not be applied to the coating until it has been adequately cured as defined in Section 2.0.

Application of coating for Horizontal Directional Drill (HDD) sections shall have achieved a Shore D value of 85 ±3 before continuing.

#### 15.0 HANDLING PROPERTIES

	<b>Brush Grade:</b>	<b>Spray Grade:</b>
Pot Life:	15 Minutes	
Gel Time:		1.5 Minutes
Touch Dry Time:	55 Minutes	40 Minutes
Dry Hard Time:	3.5 Hours	2.5 Hours

- \* Pot Life conducted with 200gm (7oz) mass with both Base & Hardener @ 25°C (77°F).
- \* Gel Time conducted with 200gm (7oz) mass with a Base temperature of 70°C (158°F) & a Hardener temperature of 25°C (77°F).
- \* Touch dry and dry hard times for Brush & Spray Grade were conducted at 0.75 mm (25 mils) coating thickness and substrate at 25°C (77°F).

#### 16.0 MATERIALS

- SP-2888® R.G. containers shall be sealed when not in use.
- No amount of SP-2888® R.G. shall be given, sold or exchanged without express written permission from SPC.
- The acceptable shipping and storage temperature range for SP-2888® R.G. is 5°C (41°F) to 50°C (122°F).
- SP-2888® R.G. shall be stored in a cool, dry, well-ventilated area with the lids sealed.
- The shelf life is a maximum of 24 months from the date of manufacture in unopened containers.



## 17.0 DISPOSAL

Once the coating materials have been used, any residual material left in the containers shall be “kicked over”. To do this, the Contractor shall scrape out the unmixed resin material (base) from its container, and mix it with the matching product material (hardener) in the hardener container. The two components will react to produce a cured coating.

By mixing the hardener and resin materials, the resultant product will be rendered inert and not pose a hazard to the environment when disposed of under reasonable conditions and in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

All parties handling SPC materials shall refer to the applicable Safety Data Sheets and follow the Preventative Measures and Safety Precautions referred to therein.

## 18.0 INSPECTION

Inspection of the surface preparation prior to coating application should be completed to ensure that all outlined surface preparation parameters have been achieved.

During coating application, WFT measurements may be taken as a guideline for achieving the minimum film thickness specified. Where preheating of the substrate is utilized, WFT measurements may be inaccurate and final DFT's should be taken to ensure the specified coating thickness has been achieved. After the SP-2888® R.G. has cured to a dry hard condition, the Owner's Representative and/or Contractor's Inspector should measure the coating thickness (DFT's) with an approved, calibrated, magnetic and/or electronic DFT gauge. Notification to the applicator of all inadequately coated sections should be made immediately.

Shore D readings should be taken periodically or as directed by the Owner to verify the coating has cured to an adequate Shore D hardness of 80 or greater prior to mechanical stress, such as lowering in and backfilling. Applications of coating for Horizontal Directional Drill (HDD) sections shall achieve a Shore D value of  $85 \pm 3$  before continuing. Accelerated cure methods can be utilized to decrease cure time.

In cold weather applications, the Shore D hardness may be measured when the coating has cooled to the Owner approved recommended temperature range. Additionally, the Shore D hardness shall be measured in accordance with ASTM D2240-05.

Once coating has reached a dry hard state, holiday testing of the finished coating film should be performed as per NACE SP0188 or Owner approved method to ensure there are no unacceptable discontinuities or voids in the coating film.

Notification of all defects should be made within a reasonable time frame from completion of the coating work to allow for repairs within the allotted time frame for the project.



## APPENDIX A

### Graco Fixed Ratio Recommended Equipment Set-Up for Spraying SPC 100% Solids, Epoxy & Urethane Coatings

<b>Coating Ratio:</b>	3:1, 2:1 & 4:1
<b>EQUIPMENT:</b>	<b>DESCRIPTION</b>
<b>Transfer pumps:</b>	1 – 5:1 ratio transfer pump for B side 1 – 10:1 ratio transfer pump for A side
<b>Solvent Flush Pump:</b>	23:1 or greater
<b>Proportioning Pump:</b>	56:1 or greater
<b>Displacement Pump For Hydra Cat:</b>	<b>3:1</b> 2 – #222-012 displacement cylinder for A side 1 – #222-017 displacement cylinder for B side <b>4:1</b> 2 – #222-012 displacement cylinder for A side 1 – #222-019 displacement cylinder for B side <b>2:1</b> 2 – #222-012 displacement cylinder for A side 1 – #222-012 displacement cylinder for B side
<b>Displacement Pump For XP:</b>	<b>3:1</b> 1 – 145cc displacement cylinder for A side 1 – 48cc displacement cylinder for B side <b>4:1</b> 1 – 145cc displacement cylinder for A side 1 – 36cc displacement cylinder for B side <b>2:1</b> 1 – 115cc displacement cylinder for A side 1 – 58cc displacement cylinder for B side
<b>Gauging:</b>	2 – 0 to 500psi fluid gauges at the base and hardener inlets 3 – 0 to 10000psi fluid gauges at outlet manifold (Hydra Cat) 2 – 0 to 10000psi fluid gauges at outlet manifold (XP) 2 – 0 to 7500psi fluid gauges at the mix manifold



**Heaters:**

- 1 – Viscon high pressure fluid heater (240 V, 4000 W & 16.7A) installed in-line on the base side
- 1 – Viscon high pressure fluid heater (240 V, 4000 W & 16.7A) installed in-line on the hardener side (necessary for cold weather application)
- 1 – Viscon high pressure fluid heater (240 V, 4000 W & 16.7 A) installed in-line with the glycol hose bundle

**Hose Bundle:**

- Base hose – 3/8” diameter wire braided (7250psi working pressure)
- Hardener hose –1/4” diameter wire braided (7250psi working pressure)
- Solvent hose –1/4” diameter wire braided (3000psi working pressure)
- Glycol recirculation hose –1/4” or 3/8” ID or Electric Heat Trace
- Husky 307 diaphragm pump with air regulator (used with glycol system)
- Reservoir tank (used with glycol system)

**NOTE:**  
Hardener, base & glycol lines to be wrapped with insulation and solvent line secured on the outside of the hose bundle. Connect Glycol lines to the Husky pump, reservoir tank and Viscon heater to form a loop.

**Mix Manifold:** Graco high volume mix manifold with 1/2” NPT fluid outlet and 3/8” NPT fluid inlets.

**Whip Hose:** Whip hoses can vary in length from 10’ to 70’ depending on the SPC product that is braided. The hose diameter can vary from 1/4” to 3/8” diameter wire-hoses with 7250psi working pressure. Please consult your SPC representative.

**Static Mixers:**

- 1 – Stainless steel or Teflon coated spiral pipe mixer and housing (3/8” ID x 9.5” long) positioned between the mix manifold and whip hose
- 1 – Stainless steel or Teflon coated spiral pipe mixer and housing (3/8” ID x 9.5” long) positioned between the two whip hoses

**Spray Guns:** Graco Silver, Silver Plus or XTR series

**Spray Tips:** Graco reversible tips: .019” - .031”

**Drum Heaters:** Suitable drum heaters (steel or silicone) are required on the base drum and may be required on the hardener drum (dependent on ambient temperature) in order to achieve suitable viscosity to facilitate proper mixing, atomization and ratio. Also, a water bath may be used to heat the product in a drum.



### WIWA Fixed Ratio Recommended Equipment Set-Up for Spraying SPC 100% Solids, Epoxy & Urethane Coatings

**Coating Ratio:** 3:1, 2:1 & 4:1

**EQUIPMENT: DESCRIPTION**

**Transfer pumps:** 1 – 5:1 ratio transfer pump for B side  
1 – 10:1 ratio transfer pump for A side

**Displacement Pump**

**For WIWA Duomix 333: 3:1**

2 – 99cc displacement cylinder for A side  
1 – 66cc displacement cylinder for B side

**4:1**

2 – 115cc displacement cylinder for A side  
1 – 58cc displacement cylinder for B side

**2:1**

2 – 115cc displacement cylinder for A side  
1 – 115cc displacement cylinder for B side

**Gauging:** 2- 5000 PSI gauges on displacement cylinder  
1- Manometer 10,000 psi

**Heaters:** 1 – WIWA high pressure fluid heater (240 V, 3500 W & 16A) installed in-line on the base side  
1 – WIWA high pressure fluid heater (240 V, 3500 W & 16A) installed in-line on the hardener side (necessary for cold weather application)

**Hose Bundle:** Base hose – 3/8” diameter wire braided (7250psi working pressure)  
Hardener hose – 1/4” diameter wire braided (7250psi working pressure)  
Solvent hose – 1/4” diameter wire braided (6100psi working pressure) 240V 30A Electrically heated hose package with heat trace controller

**Mix Manifold:** WIWA high volume mix manifold with 1/2” NPT fluid outlet and 3/8” NPT fluid inlets

**Whip Hose:** Whip hoses can vary in length from 10’ to 70’ depending on the SPC product that is being applied. The hose diameter can vary from 1/4” to 3/8” diameter wire-braided hoses with 7250psi working pressure. Please consult your SPC representative.



- Static Mixers:** 1 – Stainless steel or Teflon coated spiral pipe mixer and housing (3/8" ID x 9.5" long) positioned between the mix manifold and whip hose  
1 – Stainless steel or Teflon coated spiral pipe mixer and housing (3/8" ID x 9.5" long) positioned between the two whip hoses
- Spray Guns:** WIWA 500F, WIWA 500D
- Spray Tips:** Trittech reversible tips: .019" - .031"
- Drum Heaters:** Suitable drum heaters (steel or silicone) are required on the base drum and may be required on the hardener drum (dependent on ambient temperature) in order to achieve suitable viscosity to facilitate proper mixing, atomization and ratio. Also, a water bath may be used to heat the product in a drum.



## **APPENDIX B**

### **Graco Variable Ratio Recommended Equipment Set-Up for Spraying SPC 100% Solids, Epoxy & Urethane Coatings**

**COATING RATIO:** 3:1, 2:1 & 4:1

**EQUIPMENT DESCRIPTION**

**Transfer Pumps:** 1 – 5:1 ratio transfer pump for the B side  
1 – 10:1 ratio transfer pump for the A side

**Solvent Flush Pump:** 1 – 23:1 or greater

**Proportioning Pump:** 1 – 56:1 or greater

**Displacement Pump  
For Xtreme Mix:** 1 –180cc displacement cylinder for A side  
1 –180cc displacement cylinder for B side

**Displacement Pump  
For XM:** 1 –180cc displacement cylinder for A side  
1 –145cc displacement cylinder for B side

**Gauging:** 2 – 0 to 500psi fluid gauges at the base and hardener inlets  
2 – 0 to 7500psi fluid gauges at the base and hardener inlets on the mix manifold

**Heaters:** 1 – Viscon high pressure fluid heater (240 V, 4000 W & 16.7 A)  
installed in-line on the base side  
1 – Viscon high pressure fluid heater (240 V, 4000 W & 16.7 A) installed in-line  
on the hardener side (necessary for cold weather application)  
1 – Viscon high pressure fluid heater (240 V, 4000 W & 16.7 A)  
installed in-line with the glycol hose bundle



**Hose Bundle:** Base hose – 3/8” diameter wire braided (7250psi working pressure)  
Hardener hose –1/4” diameter wire braided (7250psi working pressure)  
Solvent hose –1/4” diameter wire braided (3000psi working pressure)  
Glycol recirculation hose –1/4” or 3/8” ID or Electric Heat Trace  
Husky 307 diaphragm pump with air regulator (used with glycol system)  
Reservoir tank (used with glycol system)

**NOTE:**

Hardener, base & glycol line to be wrapped with insulation and solvent line secured on the outside of the hose bundle. Connect glycol lines to the Husky pump, reservoir tank and Viscon heater to form a loop.

**Mix Manifold:** Graco high volume mix manifold

**Whip Hose:** Whip hoses can vary in length from 10’ to 70’ depending on the SPC product that is being applied. The hose diameter can vary from 1/4” – 3/8” diameter wire braided hoses with 7250psi working pressure. Please consult your SPC representative.

**Static Mixers:** 1 – Stainless steel or Teflon coated spiral pipe mixer and housing (3/8” ID x 9.5” long) positioned between the mix manifold and whip hose.  
1 – Stainless steel or Teflon coated spiral pipe mixer and housing (3/8” ID x 9.5” long) positioned between the two whip hoses.

**Spray Guns:** Graco Silver, Silver Plus or XTR Series

**Spray Tips:** Graco reversible tips: .019” – .031”

**Drum Heaters:** Suitable drum heaters (steel or silicone) are required on the Base drum and may be required on the Hardener drum (dependent on ambient temperature) in order to achieve suitable viscosity to facilitate proper mixing, atomization and ratio. Also, a water bath may be used to heat the product in a drum.



**WIWA Variable Ratio Recommended Equipment Set-Up for Spraying  
SPC 100% Solids, Epoxy & Urethane Coatings**

<b>Coating Ratio:</b>	3:1, 2:1 & 4:1
<b>EQUIPMENT:</b>	<b>DESCRIPTION</b>
<b>Transfer Pumps:</b>	1 – 5:1 ratio transfer pump for the B side 1 – 10:1 ratio transfer pump for the A side
<b>Solvent Flush Pump:</b>	1 – 33:1 or greater
<b>Proportioning Pump:</b>	1 – 56:1 or greater
<b>Displacement Pump WIWA Fleximix:</b>	1 –189cc displacement cylinder for A side 1 –189cc displacement cylinder for B side
<b>Gauging:</b>	2 – 0 to 5000psi fluid gauges at the base and hardener outlets Realtime Digital gauges on PLC
<b>Heaters:</b>	1 – WIWA high pressure fluid heater (240 V, 3500 W & 16A) installed in-line on the base side 1 – WIWA high pressure fluid heater (240 V, 3500 W & 16A) installed in-line on the hardener side (necessary for cold weather application)
<b>Hose Bundle:</b>	1 – Base hose –3/8” diameter wire braided (7250psi working pressure) 1 – Hardener hose – 1/4” diameter wire braided (7250psi working pressure) 1 – Solvent hose – 1/4” diameter wire braided (6100psi working pressure)
<b>Mix Manifold:</b>	WIWA high volume mix manifold
<b>Whip Hose:</b>	Whip hoses can vary in length from 10’ to 70’ depending on the SPC product that is being applied. The hose diameter can vary from 1/4” – 3/8” diameter wire braided hoses with 7250psi working pressure. Please consult your SPC Representative.



- Static Mixers:** 1 – Stainless steel or Teflon coated spiral pipe mixer and housing (3/8" ID x 9.5" long) positioned between the mix manifold and whip hose.  
1 – Stainless steel or Teflon coated spiral pipe mixer and housing (3/8" ID x 9.5" long) positioned between the two whip hoses.
- Spray Guns:** WIWA 500F, WIWA 500D
- Spray Tips:** Trittech reversible tips: .019" – .031"
- Drum Heaters:** Suitable drum heaters (steel or silicone) are required on the Base drum and may be required on the Hardener drum (dependent on ambient temperature) in order to achieve suitable viscosity to facilitate proper mixing, atomization and ratio.





## **APPENDIX C**

### **Recommended Equipment for SPC Spray Cartridge System**

- Power Source:** 1,000-watt 12-volt inverter units located on trucks, generators or approved power source capable of running spray cartridge heating method chosen.
- Heating Source:** 750 – 1000-watt microwave heating units, warming oven or hot water bath heating source. Infrared laser thermometers shall be used to determine coating preheat temperatures after preheating.
- Air Supply:** A minimum of 50 CFM air supply should be provided to each individual pneumatic dispenser to provide a maximum input of 45 PSI. Input air pressure shall be regulated by an air regulator installed inline.
- Cartridge Dispenser:** Specialty Polymer Coatings, Inc. Pneumatic Dispenser fitted with 1 straight or 90° angle static mixer. Extra static mixers are recommended to have on hand as this allows the use of partial spray cartridges.

**APPENDIX D**

**Brush Grade Kit Sizing**

<b><u>SIZE</u></b>	<b><u>VOLUME</u></b>	
	<b><u>BASE</u></b>	<b><u>HARDENER</u></b>
0.50 Litres	0.3750 Litres	0.1250 Litres
1.00 Litres	0.7500 Litres	0.2500 Litres
1.50 Litres	1.1250 Litres	0.3750 Litres
2.00 Litres	1.5000 Litres	0.5000 Litres
2.50 Litres	1.8750 Litres	0.6250 Litres

## APPENDIX E

### SP-2888® R.G. Curing Table

SUBSTRATE TEMPERATURE	DRY HARD CURING TIME	
	Brush Grade	Spray Grade
90°C (194°F)	2.5 Minutes	1.6 Minutes
80°C (176°F)	3 Minutes	2 Minutes
70°C (158°F)	5 Minutes	3 Minutes
60°C (140°F)	9 Minutes	9 Minutes
50°C (122°F)	37 Minutes	16 Minutes
40°C (104°F)	1 Hour 20 Minutes	38 Minutes
30°C (86°F)	1 Hour 45 Minutes	1 Hour 40 Minutes
25°C (77°F)	3 Hours 30 Minutes	2 Hours 30 Minutes
20°C (68°F)	5 Hours 40 Minutes	4 Hours 50 Minutes
10°C (50°F)	16 Hours	14 Hours

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

Brush Grade Material Temperature: Base and Hardener: 25°C (77°F)

Spray Grade Material Temperature: Base: 70°C (158°F)

Hardener: 25°C (77°F)

Dry Film Thickness: 0.50 mm (20 mils) DFT as per ASTM D1640

**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.