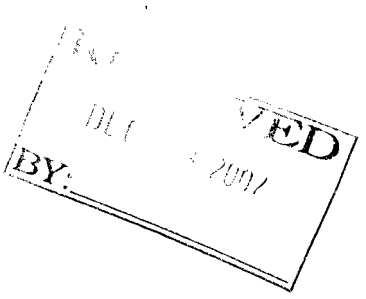
# ONEOK NGL PIPELINE, L.P.




November 29, 2007

R.M. Seeley
Director, Southwest Region
Pipeline and Hazardous
Material Safety Administration

**Re: Response to Notice of Amendment CPF 4-2007-5037M**

Dear Mr. Seeley:

This letter is in response to the Notice of Amendment referenced above.

Each finding is being addressed by editing or adding language to the ONEOK Operating, Maintenance, and Emergency Procedures Manual, as recommended. The new language is attached for each finding, with the O&M Manual location reference, and will be added to the O&M Manual at the next update. A copy of the ONP Underground Coating Specification is also attached.

Sincerely,

Wesley Christensen
Senior Vice President, ONEOK NGL Pipeline, L.P.

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**1.**

**ONEOK's procedures need to specify that appropriate changes will be made to the emergency response training program as necessary after an annual review.**

Response: Page 6-6 of ONEOK Operations and Maintenance Manual:

> At intervals not exceeding 15 months, but at least once each calendar year, the NGL Business Manager or his/her designee is responsible for reviewing the effectiveness of the emergency response training program in providing adequate instruction to employees. Following the annual review, recommended changes to the Emergency Response program will be incorporated into this Section of the Manual.

**2. A.**

**ONEOK's procedures need to specify that welds which are visually inspected and/or non-destructively tested and found unacceptable as determined by the standards in Section 9 of API 1104 (19th. Edition) must be repaired or removed.**

Response: Section 10 of the ONEOK Welding Manual
Repair and Removal of Defects of ONP TG1602.201, Welding of Pipelines.

> All welds will be visually inspected. Welds which are visually inspected and found unacceptable must be repaired or removed.
>
> Welds which are nondestructively tested and found unacceptable as determined by the standards in Section 9 of API 1104 (19th. Edition) must be repaired or removed.
>
> The disposition of all welds will be at the discretion of ONP.

**2. B.**

**ONEOK's procedures need to specify that each pressure limiting device, relief valve, pressure regulator, or other items of pressure control equipment will be tested and inspected to determining that it is functioning properly, in good mechanical condition, has adequate capacity, and is reliable.**

Response: Page 3-18 of the ONEOK Operations and Maintenance Manual

> Inspection and testing of each pressure limiting device, relief valve, pressure regulator, and other pressure control item are required at all pump station, delivery facilities, and injection points, or other pressure control equipment to determine that it is functioning properly, in good mechanical condition, has adequate capacity and is reliable.

**2. C.**

**ONEOK's procedures need to reference their Coating Material Specifications.**

Response: Page 3-31 of the ONEOK Operations and Maintenance Manual

> Refer to the ONP Underground Coating Specifications.

**2. D.**

**ONEOK's procedures need to reference electronic coating inspection (jeeping) procedures located in their Construction Guidelines.**

Response: Page 3-31 of the ONEOK Operations and Maintenance Manual

> Refer to the ONP Underground Coating Specifications.

**2. E.**

**ONEOK's procedures need to reference their Cathodic Protection Test Station Drawing which specifies requirements for installation of test leads.**

Response: Page 3-36 of the ONEOK Operations and Maintenance Manual

> When installing test leads, refer to ONEOK's Cathodic Protection Test Station drawing 999-CP-065 for instructions.

**2. F.**

**ONEOK's procedures need to specify that if external corrosion is found requiring corrective action, the pipe must be investigated circumferentially and longitudinally beyond the exposed portion to determine whether additional corrosion requiring remedial action exists in the vicinity of the exposed portion.**

Response: Page 3-39 of the ONEOK Operations and Maintenance Manual

> You must examine exposed portions of a pipeline for evidence of external corrosion if the pipe is bare or if the coated is deteriorated. If you find external corrosion requiring corrective action, you must investigate circumferentially and longitudinally beyond the exposed portion to determine whether additional corrosion requiring remedial action exists in the vicinity of the exposed pipe.

**2. G.**

**ONEOK's procedures need to reference ONEOK NGL Pipeline Specification for External Coating of Aboveground Piping.**

Response: Page 3-31 of the ONEOK Operations and Maintenance Manual

> Refer to the ONP Underground Coating Specifications.

# ONP

# UNDERGROUND COATING

# SPECIFICATIONS

**Table of Contents**



# Scope

This document defines the Company requirements and standards for Pipe Coatings, including, but not limited to: Pipe Coating Systems, Coating Protection, Holiday Detection, transitions from underground to atmospheric and Coating Repairs.

# General

Unless otherwise noted in the Scope of Work, Company shall supply pipe with a mill-applied coating. Upon taking custody of pipe, Contractor and the Oneok NGL Company Corrosion Representative shall visually inspect to verify coating conditions. Any coating found to be defective due to flaws or damage shall be clearly marked and repair.

The Contractor shall provide all supervision, labor, and equipment necessary for the field application of coatings in conformance with the Scope of Work, this standard, and as required for approval of the Oneok NGL Company Corrosion Representative.

Contractor shall be responsible for application of coating according to the Manufacturer's specifications and requirements of the Oneok NGL Company Corrosion Representative. Coating materials transferred from storage area to field application area shall be limited to quantities that can be applied during the same workday.

To prevent damage, coating materials shall be transported, handled, and stored per Manufacturer's recommendations.

All coating material shall be stored in a clean, dry location and in a manner to protect them from contact with the ground and moisture. All coating material shall be shielded from direct sunlight when not in use. No substitute coating material or application procedure shall be permitted without prior approval of the Oneok NGL Company Corrosion Representative.

Primer and coating materials shall be stored in closed cans or drums when not in use (to prevent solvent evaporation and contamination from dirt, water and other foreign matter). Primer or coating material that has thickened or passed expiration date shall be discarded.

The use of primer thinner is not permitted.

The Contractor shall exercise due care at all times to avoid damaging pipe and coating. Only belts, padded slings, approved cradles, or padded calipers shall be used to handle coated pipe.

All buried or submerged metallic pipelines, valves, fittings and other appurtenances shall be installed with a protective external coating approved by the Oneok NGL Company Corrosion Representative.

Prior to lowering-in, all pipe and fittings shall be coated in the manner specified and Contractor shall inspect coating for damage using a holiday detector and repair all damage that is discovered. A Company Representative shall witness this inspection, repair and lowering-in at all times.

Liquid coating materials and solvents shall be handled and stored as hazardous materials in conformance with all Oneok NGL procedures and policies.

Contractor shall apply all coatings in conformance with Manufacturer's specifications and safety procedures. Contractor shall ensure all applicators use personal protective equipment (PPE) as specified on applicable MSDS. For additional safety procedures, refer to the Oneok NGL O&M, Environmental Procedures and Technical Guild lines.

All coating used or recommended shall meet at the minimum the requirements of 195.557 and the Oneok NGL O&M. Which is as follows: (a) Each external protective coating, whether conductive or insulating, applied for the purpose of external corrosion control must: (1) Be applied on a properly

prepared surface; (2) Have sufficient adhesion to the metal surface to effectively resist underfilm migration of moisture; (3) Be sufficiently ductile to resist cracking; (4) Have sufficient strength to resist damage due to handling and soil stress; and (5) Have properties compatible with any supplemental cathodic protection. (b) Each external protective coating which is an electrically insulating type must also have low moisture absorption and high electrical resistance. (c) Each external protective coating must be inspected just prior to lowering the pipe into the ditch and backfilling, and any damage detrimental to effective corrosion control must be repaired. (d) Each external protective coating must be protected from damage resulting from adverse ditch conditions or damage from supporting blocks. (e) If coated pipe is installed by boring, driving, or other similar method, precautions must be taken to minimize damage to the coating during installation.

Contractor shall apply all coatings in conformance with Manufacturer's specifications and safety procedures. Contractor shall ensure all applicators use personal protective equipment (PPE) as specified on applicable MSDS. For additional safety procedures, refer to the Oneok NGL O&M, Environmental Procedures and Technical Guild lines.

## Coating Application

Contractor shall coat all pipe with specified coatings in conformance with Manufacturer's recommendations. Contractor shall review the Manufacturer's recommended cleaning and surface preparation requirements before application of coatings. Contractor shall dry the pipe before application of primers or coatings. Unless a coating is designed to be applied to wet surfaces (as specified in the coating Manufacturer's recommendations), Contractor shall not apply coatings when steel surfaces are wet. Unless otherwise specified, Contractor shall use abrasive grit blasting for surface preparation. If abrasive grit blasting is not feasible, Contractor shall use hand tools or power equipment with 80-grit abrasive disk pads, air-driven needle scalers, or non-woven abrasive pads to remove corrosion, rust products, and previously-applied coating products (to prepare the surface for coating).

Prior to backfilling, Contractor shall:

- Allow time for coatings to cure in conformance with Manufacturer's specifications.
- Inspect coatings.

During backfilling, Contractor shall provide additional protection to the coating (where needed) using clean earth padding, rock shield, or pipeline felt as recommended by the Integrity Department Personnel.

Buried pipe that extends above grade shall be coated to at least one and a half (1.5) foot above grade and below grade with a Denso 7200 or Denso 7125 two part epoxy below grade coating. Then coat one (1') foot above and below with Poly Guard RD-6. Contractor shall paint over the above grade piping to match the paint color applied this will protect against atmospheric corrosion and ultraviolet rays.

Prior to selection of a repair coating (from the tables in this standard), Contractor shall review the operating temperature range for any given pipeline segment.

For application of liquid epoxy product coatings, Contractor shall prepare application surface to a near-white cleanliness and 2 mils or more anchor pattern. Contractor shall prepare surface by blasting with required abrasive grit media to a white metal surface, and roughen the surface to a white metal finish (using 80-grit abrasive sandpaper or hand power equipment with an 80-grit disk). Contractor shall apply coating to a thickness specified by the Manufacturer and in the tables of this standard. Contractor shall apply by pouring, brushing, rolling, spraying, or daubing as specified by the Manufacturer's recommendations.

## Coating Field Welds, Valves, and Fittings

Contractor shall coat all field welds, valves, and fittings for un-coated fabrications with the specified coating in conformance with Manufacturer's recommendations. Pre-coated valves shall be inspected and all coating defects repaired with a compatible coating systems applied in conformance with Manufacturer's specifications. Note: Coating system applications for flanged joints used for buried service may vary significantly from pipe coating systems.

Bare surfaces of pipe, valves, flanges, fittings and appurtenances shall be thoroughly cleaned, dried, and free of all foreign substances (such as oil, grease, dirt, rust, welding residue, knurls, burrs, moisture, mill scale and all other foreign matter), and in a condition approved by the Company Representative before coating application. Coating shall not be performed during rainy, damp, or frosty weather.

For epoxy spray coating applications, Contractor shall use personnel trained and pre-qualified by the coating Manufacturer.

Contractor shall paint all above grade supports and specified appurtenances in conformance with the painting specifications of Oneok NGL's Painting Specifications.

Only valves with a Company-approved coating shall be installed below grade. Bare valves and tie-in welds in below grade applications shall be coated. Contractor shall test and repair the coating.

Contractor shall coat all below grade flanges with Company-specified coating material after installation and prior to backfill.

## Coating Protection

At locations where weights will be installed, rock shield shall be used. Saddle weights may be supplied with blanket liners in lieu of rock shield.

Contractor shall install Company-approved rock shield under weights, concrete piers, clamps, etc., where warranted by the condition of backfill materials (e.g. cobbles, gravel, or frozen lumps of soil) and where shown on the drawings.

Contractor shall affix rock shield firmly around pipe using nonmetallic banding. Band spacing shall not exceed 16-inches. Rock shield shall completely encircle the pipe with a minimum of 6-inch lap-over unless otherwise approved by the Company Representative.

Contractor shall provide additional protection to the coating where needed during backfilling by using clean earth padding, rock shield, or pipeline felt.

## Coating Inspection and Repairs

The Contractor shall repair all damaged coating in conformance with these standards and as required by the Oneok Company Corrosion Representative.

When coating defects result in regularly occurring holidays, the Oneok NGL Company Corrosion Representative shall suspend coating application and/or handling operations until the problem root-cause has been identified and corrected.

## Holiday Detection and Pipe Coating Repairs

Contractor shall inspect the entire pipe coating for pinholes using an electronic holiday detector. Contractor shall repair any detected defects or damage to the pipe coating. Contractor shall make a test holiday in the coating to confirm the holiday detector is working properly.

Contractor shall provide holiday detectors equipped with visual as well as audible warning systems. Contractor shall also provide equipment to move the detectors along the pipeline. Contractor shall use a DC-type detector capable of producing the specified voltage for each coating type and thickness inspected. The holiday detector voltage shall be set at the Manufacturer's specifications for a minimum volts per mil of nominal coating thickness. Contractor shall refer to coating Manufacturer's specifications for specific details and approved voltages.

All coating systems shall be bonded to metal surfaces in conformance with the Manufacturer's recommendations. Buried coated facilities shall pass both a visual and electrical holiday detector test as the pipe is lowered into the ditch.

The pipe metal and ground terminal of holiday detectors shall be grounded before holiday testing begins. Note: Contractor shall adjust test voltage while the inspection electrode is in normal operating position to compensate for electrical losses due to capacitance or resistance. Contractor shall recalibrate the holiday detector when changes in humidity or detection problems are suspected, or when directed by the Company Representative.

Contractor shall verify voltage of holiday detectors.

When holiday detection is used for non-standard shapes (e.g., valve bodies), a wet sponge-type wand may be used.

For coal-tar-coated pipe, Contractor shall provide a high-voltage electronic holiday detector approved by the Company Representative, equipped with visual as well as audible warning systems to indicate any flaws, holes, breaks or reduced thickness areas in the protective coating. Voltage shall be set to produce an arc between the electrode and bare pipe equal to three times the total coating thickness but at no time shall the voltage be set at less than 12,000 volts.

Pinholes or small holidays (less than 0.5 square-inches) shall be repaired with a Company-approved repair coating compatible with the pipe coating system.

To repair pinholes in epoxy coatings, the original coated surface shall be thoroughly cleaned and lightly abraded with sandpaper (approximate area 0.5-inch radius around pinhole). All dust shall be removed before applying a patch stick. The cleaned pipe surface shall be heated until the patch stick begins to melt when rubbed over the heated area. Material shall be applied to obtain a minimum thickness of 15 mils over the entire abraded area.

Holidays larger than 0.5 square-inches shall not be repaired using patch sticks. Contractor shall use coatings specified for large area repairs and apply coating in conformance with Manufacturer's recommendations.

The Company may conduct a survey to verify pipe coating integrity. When conducted, survey shall be conducted after pipe has been lowered-in and backfilled and shall be performed after regular tie-ins are completed.

## Approved Pipeline Coatings

Specific number designations for coatings and primers are critical. Substitutions are not allowed. Unless otherwise approved, 'Denso/Protal 7200, 7125 Products' or 'TYCO/Powercrete J', Nap Gard 7-2501, 7-2514 or 3m Scotchkote 6233 as specified in Table 9 of this document shall be used for new construction.

Contractor shall apply the coating repair with a protective coating compatible with the original protective coating as detailed in the applicable table below.

Coatings for special applications may not be listed in this standard. Before using coatings not listed in the following

tables, contact the Corrosion Manager. Submissions of new coatings (for evaluation) shall be directed to the Corrosion Manager.

The following tables define the Company-approved coatings for various applications:

- Table 9 is a guideline for Approved Repair Coatings for Below Grade Structures.
- Table 10 is a guideline for Coating Repair Material for Underwater Structures.
- Table 11 is a guideline for Compatible Generic Repair Coatings for Joining same or Dissimilar Coatings. Reference this table for selection of Company-approved repair coatings. (For Operational use only. Do not use this table for construction/Contractor purposes.)
- Table 12 is a comprehensive listing of all Company-Approved Pipeline Coating Names and Generic Specifications. (For Operational use only. Do not use this table for construction/Contractor purposes.)

## Approved Repair Coatings for Below Grade Structures (Table)

| Generic Type | Manufacturer | Coating Name | Max. Serv. Temp. | Holiday Detector Voltage | Foot-notes | Remarks |
|---|---|---|---|---|---|---|
| Epoxy | DENSO NORTH AMERICA | Protal 7200 Fast Cure Epoxy - Brush Grade | 185° F | 2000V | a, b, d, e | Two-part mixture. High build fast cure liquid epoxy hand applied in one coat to 25 to 30 mils dry film thickness (D.F.T.) High moisture tolerance. Surface temperatures below 50° F must be preheated. Pot life @77° F is 6 minutes; handling time @77° F is 60 minutes. Interfaces and bonds to coal tar enamels and asphalts. Shelf life is 24 months. |
| Epoxy | DENSO NORTH AMERICA | Protal 7125 Epoxy Fast Cure Low Temperature | 150° F | 2000V | a, b, d, e | Specifically designed for cold pipe surface and ambient conditions. Fast cures at -4° F. Two-part mixture. One coat brush, roller, or spray application to 25 to 30 mils D.F.T. Cure time varies from 7 minutes to 120 minutes with various substrate and ambient temperatures. Trace amount of styrene in product limit bonding strength to coal tar asphalt enamels. Shelf life is 6 mos. |
| Epoxy Based Polymer | TYCO POWER LONE STAR | Powercrete J | 130° F | 4000V | a, b, e | Coating may be used as a joint coating or also as a repair or joint coating for Powercrete applications. Coating must be |

| Generic Type | Manufacturer | Coating Name | Max. Serv. Temp. | Holiday Detector Voltage | Foot-notes | Remarks |
|---|---|---|---|---|---|---|
| Concrete | | | | | | applied in two 15 mil coats at least 20 minutes apart to achieve a D.F.T of 30 mils. Bonds well to coal tar and asphalt enamels. Preheat if pipe temperature is ≤ 50° F. |
| Epoxy Based Polymer Concrete | TYCO POWER LONE STAR | Powercrete J-Fast Cure | 130° F | 125V/ mil | a, b, e | Two-part epoxy applied at temperatures as low as 40° F without requiring heat during the application and cure. Apply using hot airless equipment or manual application. Yellow in color. Minimum 20 to 25 mils D.F.T. Bonds well to coal tar and asphalt enamels. |
| Epoxy/ Butyl Rubber | TYCO POWER LONE STAR | Powercrete JP | 130° F | 485 Volts per mil | a | Coating for girth welds on polyethylene and polypropylene coated pipe. Two-part application: 1) Apply the butyl rubber adhesive as a tape, overlapping the abraded mainline coating and the clean, bare steel.<br>2) Apply Powercrete J over the butyl rubber adhesive manually or spray to a minimum total D.F.T. of 25 to 30 mils. |
| Epoxy | DUPONT NAP-GARD | NAP-GARD Patch Compound #7-2501 or NAP-GARD Patch Compound #7-2514 | 180° F | 125V/mil | a, b, e | For repair to all fusion bond epoxy coatings, field coating girth welds and wet pipe surfaces. Rough surface with 80 or 100-grit sandpaper or power disk and brush apply one coat at 25 mils thickness by trowel, knife, etc. Pot life 60 minutes @ 77° F, cure time 5 hours to handle. |
| Epoxy | 3M COMPANY | Scotchkote #323 Brush and Spray | 230° F | 125V/mil | a, b, d, e | For repair to all fusion bond epoxy coatings, bare girth welds or pipe rehabilitation projects. Application to 45 mils D.F.T. in one application using cartridge, brush, roller or plural component spray equipment. Dry to handle time 2 hours - 39 minutes @ 75° F. Preheat pipe if below 50° F. Shelf life is 18 mos. |
| Epoxy | DUPONT NAP-GARD | NAP-GARD Patch Compound #7-1847 | 180° F | 125V/mil | a, b, e | For repair to all fusion bond epoxy coatings, field coating girth welds and wet pipe surfaces. Rough surface with 80 or 100-grit sandpaper or power disk and |

| Generic Type | Manufacturer | Coating Name | Max. Serv. Temp. | Holiday Detector Voltage | Foot-notes | Remarks |
|---|---|---|---|---|---|---|
| | | | | | | brush apply one coat at 25 mils thickness by trowel, knife, etc. Pot life 60 minutes @ 77° F, cure time 5 hours to handle. |
| Epoxy | DENSO NORTH AMERICA | Protal 7200 Repair Cartridge | 185° F | 2000 volts | a, b, e | Repair coating for damaged FBE and other liquid coated pipelines. Also used as coating of cadweld areas. |
| Epoxy Heat Stick | 3M COMPANY | Heat Stick #206P and 226P | 250° F | 125V/mil | b | Single component stick applied with heat for pinhole repairs on all fusion bond epoxy coatings. Roughen surface and preheat pipe sufficiently to melt stick on contact. Apply heat until patch is smooth and glossy. Apply thickness of 25 mils. |
| Epoxy Heat Stick | DUPONT NAP-GARD | Heat Stick #7-1631S Heat Stick #7-1677 | 250° F | 125V/mil | b | Single component stick applied with heat for pinhole repairs on all fusion bond epoxy coatings. Roughen surface, preheat pipe sufficiently to melt stick. Apply heat until patch is smooth and glossy to 25 mils thick. |
| Rubber-ized Mastic | ROYSTON LABORATORIES INC. | Roskote Mastic R28 | 250° F | 125V/mil | a, c | For small repairs of coal tar and asphalt enamel coatings. Thin with toluene for application below 60° F. No primer needed. Clean area to bright metal with 80-grit sandpaper or other means. Stir thoroughly before using. Apply by brush, spray, spatula, or rubber glove. Apply two coats, allowing the first coat to touch dry before applying second coat. Dries to touch in 1/2 hr, sufficient for backfilling in 1-1/2 hrs. Shelf life is one year. |
| Heat Shrink Material | CANUSA | KLON | 150° F | 10,000V | a, c | Wrapid sleeve material (105 mils) is shrunk onto pipe or weld joint with a special propane torch. Different sized sleeves are used for different sized pipes. Pipe must be preheated to 160° F before applying sleeve. **Limited to ≤12-inch pipe**. Compatible with PE, PP, FBE, PU, Coal Tar, Bitumen coatings. Not recommended for bends, tees, fittings, etc. |
| Heat Shrink Material | CANUSA | TBK | 140° F | 10,000V | a, c | Directional Drilling Kit is a high performance system designed to protect welded joints on 2 and 3-layer PE, PP and |

| Generic Type | Manufacturer | Coating Name | Max. Serv. Temp. | Holiday Detector Voltage | Foot-notes | Remarks |
|---|---|---|---|---|---|---|
| | | | | | | FBE coated pipelines in directional drills. Different sized sleeves are used for different sized pipes. Pipe must be preheated to 160° F before applying sleeve. **Limited to ≤12-inch pipe.** |
| Tape | Polyguard | RD-6 | 150° F | 4500 volts | a, b | This tape should be used as part of the interface transition areas and painted to protect from UV rays |
| Epoxy | DENSO NORTH AMERICA | Protal 7125 Repair Cartridge | 150° F | 2000V | a, b, d, e | Repair coating for damaged FBE and other liquid coated pipelines in cold temperatures. Also used as coating of cadweld areas. |
| Wax Tape | Trenton | #1 Wax-Tape | 80° F | 170 Volts per mill | A, b | Rehabilitation and repair of coatings To be use on transitioning from one coating system to another, minimal surface preparation, compatibility with other coatings, and immediate backfill |

**Table 9 - Approved Repair Coatings for Below Grade Structures**

Table 9 Footnotes:

a. Abrasion grit blasted surface preparation to NACE near white and 2 to 3 mil anchor pattern.

b. Roughen the exposed steel and coating around pinholes and small repair areas with 'Carborundum' cloth or 80-grit sandpaper prior to application.

c. Use a protective wrap to protect tape from impact in soil-stress areas when backfill contains rock, caliche, hardened clay or other material that can cut through the tape.

d. Available in repair cartridges.

e. Use 'Mesa Corrosion Control Thermite Weld Caps' (#Weld 50000) or similar product with epoxy products for pipeline test lead or rectifier connections. The Weld Cap is 3-inch x 3-inch square of 20 mil thick, high density polyethylene formed as an igloo. The dome of the cap is filled with epoxy and placed over the thermite weld. The cap is pressed down until epoxy fills the gap between the cap and the pipe surface. The igloo tunnel portion permits the lead wire to exit so the cap surface remains flush to the connected structure.

# Coating Repair Material for Underwater Structures (Table)

For use on underwater structures of limited surface areas, wet pipe surfaces and splash zones:

| Manufacturer | Coating Name | Generic Type | Footnotes | Remarks |
|---|---|---|---|---|
| TYCO ADHESIVES Power Lone Star | Powerdur | Liquid epoxy polymer | a | For repairs in splash zones or pipelines subjected to wet surfaces from condensation. Minimum surface preparation above grade using hand power tools such as needle guns or grinders, water blasting or dry abrasive blasting to yield a firm, granular surface free of loose contamination. Apply with putty knives or straight edge spreaders underwater or above grade to yield 40 mils film thickness. Cures to a hard film within 14 hrs. at ambient temperatures. Cures underwater with retarded cure time. |
| ROYSTON LABORAT-ORIES, INC. | Royston Wet-Set B-822 | Epoxy-Amide | A | Smear on surface by hand. Pot life is 1 hr. below 100° F. Cure time is 2 hrs. @ 80° F, 6 hrs. @ 60° F. Thickness 1/8-inch to 1/4-inch required. Cures underwater with retarded cure time. |
| AMERON INTERNAT-IONAL | Devoe Devclad® 182 Splash Zone Barrier Coating | 100% solids epoxy | a, b | Smear on surface by hand. Pot life is 1 hr. at 77° F. Cure time is relative to thickness and moisture conditions. Minimum time 30 minutes. Thickness 1/8-inch to 1/4-inch required. Cures underwater with retarded cure time. |
| INTERNAT-IONAL PROTECTIVE COATINGS | Interzone® 1000 Glass Flake Epoxy | 92% glass flake solids, high build epoxy. Primers Intergard 269 or 982 recommended. | | All surfaces to be coated should be clean, dry and free from contamination. Abrasive blast to SSPC-SP10, surface profile should be 3 to 4 mils. Airless spray equipment preferred. Aggregate can be added for non-slip applications on decks. Cure time (touch dry) 5 hrs. @ 77° F, 30 minutes cure time for immersion underwater. |
| INTERNAT-IONAL PROTECTIVE COATINGS | Interzone® 954 Modified Epoxy | 85% solids. Primers Intergard 269 or 982 recommended for underwater applications. | | May be applied to reoxidized and slightly damp surfaces. All surfaces to be coated should be clean, dry, and free from contamination. Abrasive blast to SSPC-SP6, surface profile should be 2 to 3 mils. Airless spray equipment preferred. Aggregate can be added for non-slip applications on decks. Cure time (touch dry) 4 hrs@ 77° F, 30 minutes cure time for immersion. |

**Table 10 - Coating Repair Material for Underwater Structures**

Table 10 Footnotes:

a. Abrasion grit blasted surface preparation recommended if practical.

b. In rough weather, apply a spiral wrap of polyethylene, glass fiber, burlap, cheesecloth, or similar material over the freshly applied coating to help hold the coating during the initial curing operation.

# Compatible Generic Repair Coatings for Joining Same or Dissimilar Coatings (Table)

(For Operational use only.) Do not use this table for construction/Contractor purposes.)

| Original Coating | Joining Coating | Repair Coatings (in order of preference) |
|---|---|---|
| Coal Tar Enamel | Coal Tar Enamel | 1) Epoxy, 2) Heat Shrink Material[d], 3) Tape[c] |
| Coal Tar Enamel | Fusion Bond Epoxy | 1) Epoxy, 2) Heat Shrink Material [d] Tape[c] |
| Coal Tar Enamel | Extruded Polyethylene[a] | 1) Powercrete JP, 2) Heat Shrink Material[d] , 2) Tape[c] |
| Coal Tar Enamel | Asphalt Enamel | 1) Epoxy, 2) Tape[c] |
| Coal Tar Enamel | Polyester Epoxy | 1) Epoxy, 2) Heat Shrink Material[d], 3) Tape[c] |
| Coal Tar Enamel | Tape[c] | 1) Tape[c] 2) Epoxy |
| Coal Tar Enamel | Polyurethane/Tar | 1) Epoxy, 2) Heat Shrink Matieral[d], 3) Tape[c] |
| Asphalt Enamel | Fusion Bond Epoxy | 1) Epoxy, 2) Heat Shrink Material[d] , 3)Tape[c] |
| Asphalt Enamel | Extruded Polyethylene[a] | 1) Powercrete JP, 2) Tape[c] |
| Asphalt Enamel | Polyester Epoxy | 1) Epoxy, 2) Tape[c] |
| Asphalt Enamel | Tape[c] | 1) Epoxy, 2) Tape[c] |
| Asphalt Enamel | Polyurethane/Tar | 1) Epoxy, 2) Tape[c] |
| Fusion Bond Epoxy | Fusion Bond Epoxy | PINHOLES: 1) Epoxy, 2) Heat Stick, 3) Powercrete J<br>LARGE REPAIRS: 1) Epoxy |
| Fusion Bond Epoxy | Extruded Polyethylene[a] | 1)Powercrete JP, 2) Tape[c] |
| Fusion Bond Epoxy | Polyester Epoxy | 1) Epoxy, 2) Polyester Epoxy[b], 3) Tape[c], 4) Powercrete J |
| Fusion Bond Epoxy | Tape[c] | 1) Epoxy, 2) Tape[c] |
| Fusion Bond Epoxy | Polyurethane/Tar | 1) Epoxy, 2) Heat-Shrink Material[d], 2) Tape[c] |
| Extruded Polyethylene[a] | Extruded Polyethylene[a] | 1) Powercrete JP, 2) Tape[c] |
| Extruded Polyethylene[a] | Polyester Epoxy | 1) Epoxy, 2) Powercrete JP, 3) Tape[c] |
| Extruded Polyethylene[a] | Tape[c] | 1) Powercrete JP, 2) Tape[c] |
| Extruded Polyethylene[a] | Polyurethane/Tar | 1)Powercrete JP, 2) Epoxy, 2) Tape[c] |
| Tape | Tape | 1) Tape[c] |

**Table 11 - Compatible Generic Repair Coatings for Joining Same or Dissimilar Coatings**

Table 11 Footnotes:

a. Includes coatings such as Pritec and X-Tru-Coat. Does not include polyethylene-backing tapes.

b. Can be used to overlap original coating during field application of polyester epoxy.

c. Tapes are easily damaged by impact. Use a protective wrap in soil stress areas and when backfill contains rock or other material that can cut through the tape. Hot applied tape is limited to repairing pipe 16-inch or less in diameter, operating at temperatures less than 120° F. Tapes are primarily for use on distribution systems.

d. Limit heat-shrink material to 12-inch or less diameter pipelines; primarily for use on distribution systems.

# Pipeline Coating Names and Generic Specifications (Table)

(For Operational use only.) Do not use this table for construction/Contractor purposes.)

| Pipeline Coatings | Generic Specification |
|---|---|
| Barretts (All designations) (no longer available) | Coal Tar Enamel |
| Bitumastic 70B (no longer available) | Coal Tar Enamel |
| Buton (Enjay Chemical Company coating no longer available) Used on segments of KM Tejas 36" | Modified Butadiene-Styrene Copolymer. |
| Enamel "X" (no longer available) | Coal Tar Enamel |
| Flakeline (251 or 252) | Polyester Resin Epoxy |
| Gulf States #434 (no longer available) | Asphalt |
| Hevicote | Concrete over Hot Applied Asphalt Mastic Coating |
| Hot-Service Enamel (no longer available) | Coal Tar Enamel |
| Koppers Bitumastic No. 300M | Coal Tar Epoxy |
| Koppers (All other designations) | Coal Tar Enamel |
| Lilly or Pipeclad (All designations) | Fusion Bonded Epoxy (thin film powder coatings) |
| Lilly 20/40 (Topcoat Abrasive Coating) | Thermoset Polymer |
| Lions (All designations and no longer available) | Asphalt Enamels |
| Nap-Gard (All designations) | Fusion Bonded Epoxy (thin film powder coatings) |
| P/W | Painted with Coal Tar Enamel & Felt Wrap |
| PP&F | Coal Tar Enamel (Primer, Paint & Felt) |
| Pittsburg (All designations) | Coal Tar Enamel |
| Plicoflex Tape | Tape |
| Polyguard Tape | Tape |
| Polyken Tape | Tape |
| Powercrete (Overcoat Abrasive Coating) | Epoxy Based Polymer Concrete |
| Powercrete J (Joint Coating with or without FBE) | Epoxy Based Polymer Concrete |
| Pritel 20/40 | Extruded Polyethylene |
| Protegol UT Coating | Polyurethane/Tar |
| Regular Enamel | Coal Tar Enamel |
| Reilly 230A | Coal Tar Enamel |
| TGF | Coal Tar Enamel with Glass and Felt Wrap |
| TGP | Coal Tar Enamel with Glass & Perforated Polyethylene Tape |
| Scotchkote ( 3 M Company All designations) | Fusion Bonded Epoxy |
| Servi-Wrap | Tape |
| Tapecoat | Tape |
| Valpipe 100 | Urethane |
| Whitcolite A-303E (no longer available) | Asphalt Enamel |
| X-Tru Coat | Extruded Polyethylene |
| XXH Enamel (no longer available) | Coal Tar Enamel |

**Table 12 - Pipeline Coating Names and Generic Specifications**

If the coating name or generic specification cannot be determined or is not listed in this table, contact the Corrosion Manager for assistance.