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PURCHASING AGENT



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CITY OF WARWICK

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To: All Prospective Bidders

From: Francis M. Gomez, Purchasing Agent

Date: February 9, 2024

Re: **Bid2024-372 Cedar Swamp Pump Station Rehabilitation**

Addendum #1

=====

Please be advised that the information provided comprises of Addendum #1.

The Bid Date has been extended through Tuesday, February 20, 2024

Attachments:

1. Addendum and Lining Specifications
2. Bid with modified price sheet: price now broke out with grit tank infilled costs and grit tank cleaned, prepared, and lined.
3. Details guide to application of epoxy in specific circumstances
4. Epoxoline Series 141 document

Thank you for your interest in this project.

Notice to Perspective Bidders:
The bid date has been extended February 20, 2024.

During the mandatory pre-bid meeting on-site, several parties offered suggestions regarding the original scope of work provided in Bid 2024-372. Particularly, concerns were raised regarding the adequacy of the film specifications outlined in bullet points 4 and 5 under "Coatings Work". The original bid suggested coating to be applied at 18 mil DFT would be Tnemac Series 141 (self-priming). In light of the suggestions / opinions offered during the pre-bid meeting, the WSA has generated a **Lining Specification** (listed below) pertaining to the scope of work under "Coatings Work" in the original bid. This will allow bidders to review the proposed coating system and submit their own system that is equal to or greater than our reference. Should an alternative coating be selected, bidders will submit a revised scope of work to reflect any changes from the original specifications.

Mentioned during the pre-bid meeting was that the influent channel was also to be sandblasted and coated, see bullet #5 under "Coatings Work".

Question:

"There is a main staircase to enter the lower level of the pump station that is bolted to the wall in several locations. The Contract calls to rehab and epoxy coat all interior surfaces with in the structure. Is it the intent to remove the staircase to properly coat the walls behind the bolted sections of the stairs and then reinstall the stairs?"

Answer:

The WSA will drill a test hole through the support structures of the staircase where they are anchored into the wall. If significant corrosion is found behind the support, the staircase must be dismantled or temporarily relocated to properly treat the walls. Other structures, such as the spiral staircase, may also need to be similarly tested to ensure all specified surfaces are sound.

We have altered the pricing page to reflect the following:

Regarding bullet point 3 under "Infill the existing obsolete Grit Tank as follows". The WSA Administration would like to see if there would be a significant cost savings if the Grit Tank walls were to be prepped and coated instead of infilling the Grit Tank. Therefore, we are requesting the quote have the Grit Tank broken out into two options:

- A. Grit Tank being infilled as in the original bid
- B. Grit Tank being cleaned and walls prepped and coated.

The approximate area of the Grit Tank walls is 1,036 sq. feet and the base is approximately 340 sq. feet.

Should the tank be infilled, isolation of the well must include the influent channel grit tank gate as well as the overflow wall.

The bypass influent channel that abuts the main channel as it enters the station must be infilled and a new floor be poured in place 6-inch SOG with WW6 x 6 x 1.4 wire mesh to surrounding finished floor level with ¾" 4000 psi concrete. (Broom finish)

Tnemec Perma-Shield H₂S Lining Specification Cedar Swamp Pump Station Rehabilitation Warwick, RI.

PART 1 - GENERAL

1.1 DESCRIPTION:

This section covers all workmanship, materials and quality requirements for concrete resurfacing and lining work. Provide and apply resinous (epoxy) resurfacing materials as specified.

PART 2 - PRODUCTS FOR THE RESURFACING AND LINING OF THE INFLUENT CHANNEL AND THE WET WELLS.

2.1 MANUFACTURERS

- A. Materials specified are those that have been evaluated for the specific service. Products of the Tnemec Company, Inc. are listed to establish a standard of performance and quality. Equivalent materials of another manufacturer may be submitted.
- B. Requests for substitution shall include manufacturer's literature for each product giving name, product number, generic type, descriptive information, solids by volume, recommended dry film thickness and certified lab test reports showing results to equal the ASTM performance criteria of the products specified herein, including ASTM G210 Testing (minimum 84% retention and no less than 93% loss of tensile adhesion after 28-day period). In addition, a list of projects shall be submitted in which each product has been used and rendered satisfactory service.
- C. Any material savings shall be passed to the owner in the form of a contract dollar reduction.

2.2 MATERIALS

A. Epoxy Lining System

- 1. The following list specifies the material requirements for resurfacing and lining system. The approved products are as follows:
 - a. Surfacing: Tnemec Series 217 MortarCrete or, Tnemec Series N218 MortarClad used to re-surface prepared concrete. Apply surfacer in a continuous manner to fill voids, depressions, holes, etc., a minimum 1/16" over exposed aggregate.
 - b. Lining: Tnemec Series G435 Perma-Glaze H₂S @ 80.0 mils dft. applied via airless spray method.

PART 3- EXECUTION

3.1 SURFACE PREPARATION REQUIREMENTS

A. General:

- 1. All specified surface preparation shall be performed in accordance with the latest version of the SSPC, NACE, ICRI and other standards referenced in this section.
- 2. Concrete surfaces shall be prepared in accordance with SSPC-SP 13/ NACE 6. Reference ICRI CSP 5 visual standards for appropriate surface profile. pH testing is to be performed once every 100 sq. ft. on prepared concrete surfaces. Acceptable pH values shall be between 9.0 and 11.0. This preparation will be followed by vacuum cleaning to remove all dust, dirt or friable substances leaving clean, dust free surfaces for resurfacing.

3.2 SPECIFIC SURFACE PREPARATION REQUIREMENTS

- A. In addition to the Section 3.02 requirements, the Contractor will follow the requirements of this section.
- B. Where the coating is specified to be terminated, the Contractor shall prepare and apply materials as outlined in Tnemec Drawing in Details Guide (included).
- C. For applications around penetrations and/or drains, the contractor shall prepare and apply coatings as detailed on Tnemec Drawing in Details Guide (included).
- D. The Contractor shall notify the WSA should jobsite conditions prevent the above operations and/or applications.

3.3 ACCEPTANCE CRITERIA

- A. Acceptance Criteria for Surface Preparation Work:
All surfaces shall be prepared in accordance with the specification and referenced standards therein.
- B. Acceptance Criteria for Coating System Application Work
 - 1. Acceptable coating work will be based upon the following:
 - a. No pockmarks, trowel marks, depressions, unconsolidated areas, waviness or ridges, pinholes, or holidays in either size or frequency.
 - b. No inter-coat bond failures between lifts.
 - c. Proper curing of coatings.
 - 2. The WSA or WSA Representative shall, at their discretion, inspect the following:
 - a. Profile and degree of cleanliness of substrate.
 - b. Thickness of materials/coverage rate confirmation.
 - c. Ambient temperature and humidity requirements and substrate temperature.
 - d. Curing and recoat times.
 - e. Proper curing of the resurfacing materials.
 - 3. Rework required on any holidays or any other inadequacies found by the WSA or the WSA representative in the quality of the coating work should be marked. Such areas shall be recleaned and reworked by the Contractor according to these specifications and the manufacturer's recommendations at no additional cost to the Owner.
 - 4. The Contractor is responsible for keeping the WSA informed of all progress so that inspection for quality can be achieved.
 - 5. The Contractor is ultimately responsible for the quality performance of the applied materials and workmanship. Inspections by the WSA or their Representative do not limit this responsibility.

PART 4 - PRODUCTS FOR THE RESURFACING AND LINING OF THE WALLS, FLOOR, AND CEILING.

4.1 MANUFACTURERS

- B. Materials specified are those that have been evaluated for the specific service. Products of the Tnemec Company, Inc. are listed to establish a standard of performance and quality. Equivalent materials of another manufacturer may be submitted.
- C. Requests for substitution shall include manufacturer's literature for each product giving name, product number, generic type, descriptive information, solids by volume, recommended dry film

thickness and certified lab test reports showing results to equal the ASTM performance criteria of the products specified herein, including ASTM G210 Testing. In addition, a list of projects shall be submitted in which each product has been used and rendered satisfactory service.

D. Any material savings shall be passed to the owner in the form of a contract dollar reduction.

4.2 MATERIALS

A. Epoxy Lining System

1. The following list specifies the material requirements for resurfacing and lining system. The approved products are as follows:
 - a. Surfacing: Tnemec Series 217 MortarCrete or, Tnemec Series N218 MortarClad used to re-surface prepared concrete. Apply surfacer in a continuous manner to fill voids, depressions, holes, etc., a minimum 1/16" over exposed aggregate.
 - b. Lining: Tnemec Series 141 Epoxoline @ 16.0-18.0 mils dft. applied via airless spray method.

PART 5- EXECUTION

5.1 SURFACE PREPARATION REQUIREMENTS

A. General:

1. All specified surface preparation shall be performed in accordance with the latest version of the SSPC, NACE, ICRI and other standards referenced in this section.
2. Concrete surfaces shall be prepared in accordance with SSPC-SP 13/ NACE 6. Reference ICRI CSP 5 visual standards for appropriate surface profile. pH testing is to be performed once every 100 sq. ft. on prepared concrete surfaces. Acceptable pH values shall be between 9.0 and 11.0. This preparation will be followed by vacuum cleaning to remove all dust, dirt or friable substances leaving clean, dust free surfaces for resurfacing.

5.2 SPECIFIC SURFACE PREPARATION REQUIREMENTS

1. In addition to the Section 3.02 requirements, the Contractor will follow the requirements of this section.
2. Where the coating is specified to be terminated, the Contractor shall prepare and apply materials as outlined in Tnemec Drawing in Details Guide (included).
3. For applications around penetrations and/or drains, the contractor shall prepare and apply coatings as detailed on Tnemec Drawing in Details Guide (included).
4. The Contractor shall notify the WSA should jobsite conditions prevent the above operations and/or applications.

5.3 ACCEPTANCE CRITERIA

A. Acceptance Criteria for Surface Preparation Work:

All surfaces shall be prepared in accordance with the specification and referenced standards therein.

B. Acceptance Criteria for Coating System Application Work

1. Acceptable coating work will be based upon the following:
 - a. No pockmarks, trowel marks, depressions, unconsolidated areas, waviness or ridges, pinholes, or holidays in either size or frequency.
 - b. No inter-coat bond failures between lifts.
 - c. Proper curing of coatings.
2. The WSA or WSA Representative shall, at their discretion, inspect the following:
 - a. Profile and degree of cleanliness of substrate.
 - b. Thickness of materials/coverage rate confirmation.
 - c. Ambient temperature and humidity requirements and substrate temperature.
 - d. Curing and recoat times.
 - e. Proper curing of the resurfacing materials.
3. Rework required on any holidays or any other inadequacies found by the WSA or the WSA representative in the quality of the coating work should be marked. Such areas shall be recleaned and reworked by the Contractor according to these specifications and the manufacturer's recommendations at no additional cost to the Owner.
4. The Contractor is responsible for keeping the WSA informed of all progress so that inspection for quality can be achieved.
5. The Contractor is ultimately responsible for the quality performance of the applied materials and workmanship. Inspections by the WSA or their Representative do not limit this responsibility.

5.4 FINAL INSPECTION

Perform a final inspection to determine whether the resurfacing system work meets the requirements of the specifications. The WSA and/or their Representative will conduct final inspection with the Contractor.

5.5 FINAL CLEANUP

Upon completion of work, the Contractor shall remove surplus materials, equipment, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any work-related damage. The surrounding surface areas including roadways and all other surfaces shall be restored to their pre-project condition.

END OF SECTION

CITY OF WARWICK

SPECIFICATIONS

“Bid #2024-372 Cedar Swamp Pump Station Rehabilitation”

Project Location:

Cedar Swamp Pump Station
902 Cedar Swamp Road
Warwick, RI 02888

Definitions:

- CSPS—Cedar Swamp Pump Station
- SSD—Surface Saturated-Dry
- DFT—Dry Film Thickness
- CLSM—Controlled Low-Strength Material
- SOG—Slab-on-Grade/Ground Construction

Specifications:

1. Setting up and dismantling staging at the CSPS:

- Vendor will be required to provide, offload, and erect staging (fully decked off) within the Headworks Screening Room. Approximately 40' x 40' and 15' x 12' x 14' high areas to within 6' of the ceiling level. Ladder access for inspection, repair work, etc.
- Vendor will be required to dismantle and remove staging at completion.

2. Coatings Work:

- Abrasive blast concrete surfaces to be coated.
- Perform final inspections and SSD all concrete surfaces prior to coating if needed.
- No less than (3) three samples will be laboratory tested to confirm the absence of Hydrogen Sulfide.
- Apply selected coating at least to an 18 mil DFT to Degritting Area Concrete Walls & Ceilings.
- Apply selected coating at least to an 18 mil DFT to Degritting Area Concrete Wet Well, and Influent Walls.
- Removal and disposal of all blast media into the abandoned Grit Tank.

3. Infill the existing obsolete Grit Tank as follows:

- Demo all remaining equipment inside of Grit Tank which will be buried in the infill work.
- Infill up to 6-inches of existing Wet Well finished floor level with Flowable Fill (CLSM). Approximately 188 cubic yards.
- Form Grit Tank Overflow wall at Influent Channel to isolate infilled Grit Tank.
- Place 6-inch SOG with WW6 x 6 x 1.4 wire mesh to Wet Well finished floor level with ¾" 4000 psi concrete. (Broom finish)
- Furnish and install new railing between Grit Tank and adjacent wet well.
- Includes pump trucks to install flowable fill and concrete, as needed.

4. Cedar Swamp Pumping Station Approximate Square Footage:
(See attachments A and B which reference the below measurements)

- Chamber front and back walls (combined) 786.6 sq. feet
- Chamber end wall (invert included) 402.6 sq. feet
- Chamber center wall 329.4 sq. feet
- Chamber ceiling not over wet well 1039.5 sq. feet
- Chamber walls near wet wells (combined) 805.2 sq. feet
- Chamber ceiling over wet wells 425.7 sq. feet
- Side wall near wet wells (combined) 314.76 sq. feet
- Wet well #1 walls, front and back (combined) 448.8 sq. feet
- Wet well #1 sides (combined) 340.6 sq. feet
- Wet well #2 walls, front and back (combined) 480 sq. feet
- Wet well #2 sides (combined) 412.8 sq. feet
- Wet wells 1 and 2 base (combined) 425.7 sq. feet

Total Square Footage = 6211.6 feet

5. Pricing:

- Vendor must cite itemized price list for labor and materials to complete scope of work.

6. Warranty:

- Vendor will warranty work for a period of at least 1 year. Should any of the coating or slab fail or crack, not due to physical damage, the vendor will be responsible for labor and materials to repair or replace.

CITY OF WARWICK

BID AND CONTRACT FORM

TITLE OF SPECIFICATION:

Bid #2024-372 Cedar Swamp Pump Station Rehabilitation

WHEREAS, the CITY OF WARWICK has duly asked for bids for performance of services and/or supply of goods in accordance with the above-indicated specifications.

The person or entity below does irrevocably offer to perform the services and/or furnish the goods in accordance with the specifications, which are hereby incorporated by reference in exchange for the bid price below;

This offer will remain open and irrevocable until the CITY OF WARWICK has accepted this bid or another bid on the specifications or abandoned the project.

The bidder agrees that acceptance below by the CITY OF WARWICK will transform the bid into a contract. This bid and contract will be secured by Bonds, if required by the specifications.

Pricing on Following Page

PRICING

Vendor Name _____

**This is a lump sum bid any costs not included in this bid will not be honored by the
Warwick Sewer Authority**

A. Bid to include Grit Tank being infilled

I. BID: In written dollars and cents _____

II. BID: In numerical dollars and cents _____

B. Bid to include Grit Tank being cleaned and walls/floors prepped and coated

III. BID: In written dollars and cents _____

IV. BID: In numerical dollars and cents _____

THIS PAGE MUST BE SUBMITTED WITH YOUR BID

Acknowledgement of Addendum (if applicable)

Addendum Number

Signature of Bidder

COMPANY NAME: _____

COMPANY ADDRESS: _____

BIDDER'S SIGNATURE: _____

BIDDER'S NAME (PRINT): _____

TITLE: _____ TEL. NO.: _____

EMAIL ADDRESS: _____*

CONTRACT COMPLETION DATE:

(In terms of calendar days after award of bid): ____

*Please include your email address. Future bids will be emailed, unless otherwise noted.

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II. AWARD AND CONTRACT:

The CITY OF WARWICK, acting as duly authorized through its Purchasing Agent/Finance Director/Mayor (delete if inapplicable), accepts the above bid and hereby enters into a contract with the above party to pay the bid price upon completion of the project or receipt of the goods unless another payment schedule is contained in the specifications. All terms of the specifications, both substantive and procedural, are made terms of this contract.

DATE: _____

BID #2024-372

PURCHASING AGENT



PRODUCT PROFILE

GENERIC DESCRIPTION Modified Polyamine Epoxy

COMMON USAGE A high-solids lining offering high-build edge protection and long-term durability. Series 141 is abrasion and corrosion-resistant for extended immersion service in crude oil and finished fuels. Used to protect steel and concrete storage tanks, transport tanks, pipelines, and industrial wastewater while increasing service life.

COLORS Available in the following standard industrial colors: 1211 Red, 1253 Gray, 1255 Beige, 1256 Blue and 35GR Black. **Note:** Epoxies chalk with extended exposure to sunlight. Lack of ventilation, incomplete mixing, miscatalyzation or the use of heaters that emit carbon dioxide and carbon monoxide during application and initial stages of curing may cause yellowing to occur. **Important: Due to the product's curing agent chemistry, color variations can be pronounced. However, these changes in color are aesthetic only and will not affect performance or certifications. Contact your Tnemec representative for more information.**

SPECIAL QUALIFICATIONS Conforms to **AWWA C210** (not for potable water contact).

Series 141 conforms to API 652 for lining above-ground storage tanks. Contact your Tnemec representative for additional information.

COATING SYSTEM

PRIMERS **Steel:** Self-priming, 1, 27, 37H, L69, L69F, N69, N69F, V69, V69F, 90E-92, 90G-1K97, 90-97, H90-97, 90G-98, 91-H₂O, H91-H₂O, 94-H₂O, 135, L140, L140F, N140, N140F, 394
Concrete: Self-priming, 27, L69, L69F, N69, N69F, V69, V69F, L140, L140F, N140, N140F, 215, 217, 218
CMU: Self-priming or Series 130, 215, 218, 1254

TOPCOATS **Exterior:** Series 73, 180, 1028, 1029, 1094, 1095, 1096. **Note:** The following maximum recoat time applies when using Series 1094, 1095, 1096: seven (7) days; Series 73, 180: fourteen (14) days. If this time limit is exceeded, Series 141 must be uniformly scarified prior to topcoating.

SURFACE PREPARATION

PRIMED STEEL **Immersion Service:** Scarify the Series L69, L69F, N69, N69F, V69, V69F, L140, L140F, N140, or N140F prime coat surface by brush-blasting with fine abrasive before topcoating if it has been exterior exposed for 30 days or longer and 141 is the specified topcoat.

STEEL **Immersion Service:** SSPC-SP10/NACE 2 Near-White Blast Cleaning with a minimum angular anchor profile of 2.0 mils
Non-Immersion Service: SSPC-SP6/NACE 3 Commercial Blast Cleaning with a minimum angular anchor profile of 2.0 mils. **Note:** Abrasive blast cleaning generally produces the best coating performance. If conditions will not permit this, Series 141 may be applied to SSPC-SP2 or SP3 Hand or Power Tool Cleaned surfaces.

CONCRETE Allow new cast-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes" (relative humidity should not exceed 80%), or D 4263 "Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method" (no moisture present). Prepare concrete surfaces in accordance with NACE No. 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 3 surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.

ALL SURFACES Must be clean, dry and free of oil, grease, chalk and other contaminants.

TECHNICAL DATA

VOLUME SOLIDS 82% ± 2.0% (mixed) †

RECOMMENDED DFT 4.0 to 18.0 mils (100 to 455 microns) in a one-coat application. **Note:** Thickness requirements will vary with the substrate, application method, and exposure. Contact your Tnemec representative.

CURING TIME AT 5 MILS DFT

Temperature	To Handle	To Topcoat	Immersion
75°F (24°C)	3 hours	4 hours ‡	5 days
40°F (4°C)	4 hours	5 hours ‡	14 days

Cure time varies with surface temperature, air movement, humidity, and film thickness.
 ‡ **Note:** Specific application requirements, including cure schedules and environmental conditions, must be followed when topcoating Series 141. Contact Tnemec Technical Service for detailed instructions. **Note:** Maximum recoat time with itself is seven days.

VOLATILE ORGANIC COMPOUNDS EPA Method 24
Unthinned: 0.90 lbs/gallon (107 grams/litre)
Thinned 5% (No. 60 Thinner): 1.21 lbs/gallon (145 grams/litre)
Thinned 10% (No. 4 Thinner): 1.45 lbs/gallon (173 grams/litre) †

HAPS **Unthinned:** 1.27 lbs/gal solids
Thinned 5% (No. 60 Thinner): 1.28 lbs/gal solids
Thinned 10% (No. 4 Thinner): 1.95 lbs/gal solids

THEORETICAL COVERAGE 1,315 mil sq ft/gal (32.2 m²/L at 25 microns). See APPLICATION for coverage rates. †

NUMBER OF COMPONENTS Two: Part A (amine) and Part B (epoxy)

MIXING RATIO By volume: Two (Part A) to one (Part B)

EPOXOLINE® | SERIES 141

PACKAGING		Part A (Partially Filled)	Part B (Partially Filled)	When Mixed
	Large Kit	1-6 gallon pail	1-3 gallon pail	5 gallons (18.9 L)
	Small Kit	1-1 gallon can	1-1 gallon can	1 gallon (3.79 L)
NET WEIGHT PER GALLON	13.33 ± 0.25 lbs (6.05 ± 0.11 kg) †			
STORAGE TEMPERATURE	Minimum 20°F (-7°C) Maximum 110°F (43°C) Prior to application, the material temperature should be above 60°F (16°C). It is suggested the material be stored at this temperature at least 48 hours prior to use.			
TEMPERATURE RESISTANCE	(Dry) Continuous 250°F (121°C) Intermittent 275°F (135°C)			
SHelf LIFE	12 months at recommended storage temperature.			
FLASH POINT - SETA	Part A: 91°F (33°C) Part B: 111°F (44°C)			
HEALTH & SAFETY	This product contains chemical ingredients which are considered hazardous. Read container label warning and Material Safety Data Sheet for important health and safety information prior to the use of this product. Keep out of the reach of children.			

APPLICATION

COVERAGE RATES		Dry Mils (Microns)	Wet Mils (Microns)	Sq Ft/Gal (m²/Gal)
	Minimum	4.0 (100)	5.0 (125)	329 (30.5)
	Maximum	18.0 (455)	22.0 (560)	73 (6.8)

Note: Maximum of 18.0 mils DFT in one coat. Allow for overspray and surface irregularities. Wet film thickness is rounded to the nearest 0.5 mil or 5 microns. Application of coating below the minimum or above maximum recommended dry film thicknesses may adversely affect coating performance. †

MIXING	Mix the entire contents of Part A and Part B separately. Scrape all of the Part B into the Part A pail by using a flexible spatula. Use a variable-speed drill with a PS Jiffy blade and mix the blended components for a minimum of two minutes. Apply the mixed material within pot life limits after agitation. Both components must be above 50°F (10°C) prior to mixing. For optimum application properties, the material temperature should be above 60°F (16°C). For applications to surfaces between 35°F to 50°F (2°C to 10°C) allow mixed material to stand 30 minutes and restir before use. Note: A large volume of material will set up quickly if not applied or lessened in mass. Caution: Do not reseal mixed material. An explosion hazard may be created.
THINNING	Caution: Do not add thinner to Part A prior to mixing with Part B. For airless spray, brush, or roller, thin up to 5% per gallon with No. 4 Thinner or No. 60 Thinner. For air spray, thin up to 10% per gallon with No. 4 or No. 60 Thinner. 2 hours at 77°F (21°C) 1 hour at 90°F (32°C)
POT LIFE	1 hour at 77°F (21°C) 30 minutes at 90°F (32°C)
SPRAY LIFE	1 hour at 77°F (21°C) 30 minutes at 90°F (32°C)

APPLICATION EQUIPMENT

Air Spray

Gun	Fluid Tip	Air Cap	Air Hose ID	Mat'l Hose ID	Atomizing Pressure	Pot Pressure
DeVilbiss JGA	E	765 or 704	5/16" or 3/8" (7.9 or 9.5 mm)	3/8" or 1/2" (9.5 or 12.7 mm)	75-100 psi (5.2-6.9 bar)	10-20 psi (0.7-1.4 bar)

Low temperatures or longer hoses require higher pot pressure.

Airless Spray

Tip Orifice	Atomizing Pressure	Mat'l Hose ID	Manifold Filter
0.017"-0.021" (430-535 microns)	3000-3800 psi (207-262 bar)	1/4" or 3/8" (6.4 or 9.5 mm)	60 mesh (250 microns)

Use appropriate tip/atomizing pressure for equipment, applicator technique and weather conditions.

Roller: Roller application optional when environmental restrictions do not allow spraying. Use 3/8" or 1/2" (9.5 mm to 12.7 mm) synthetic woven nap covers.

Brush: Recommended for small areas only. Use high quality natural or synthetic bristle brushes.

SURFACE TEMPERATURE	Minimum 35°F (2°C) Maximum 135°F (57°C). The surface should be dry and at least 5°F (3°C) above the dew point. Note: For Series 141 cure capabilities below 35°F (2°C), contact Tnemec Technical Services.
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CLEANUP	Flush and clean all equipment immediately after use with the recommended thinner or MEK.
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† Values may vary with color.

WARRANTY & LIMITATION OF SELLER'S LIABILITY: Tnemec Company, Inc. warrants only that its coatings represented herein meet the formulation standards of Tnemec Company, Inc. THE WARRANTY DESCRIBED IN THE ABOVE PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. The buyer's sole and exclusive remedy against Tnemec Company, Inc. shall be for replacement of the product in the event a defective condition of the product should be found to exist and the exclusive remedy shall not have failed its essential purpose as long as Tnemec is willing to provide comparable replacement product to the buyer. NO OTHER REMEDY (INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, ENVIRONMENTAL INJURIES OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL LOSS) SHALL BE AVAILABLE TO THE BUYER. Technical and application information herein is provided for the purpose of establishing a general profile of the coating and proper coating application procedures. Test performance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests or any other tests, accurately represent all environments. As application, environmental and design factors can vary significantly, due care should be exercised in the selection and use of the coating.



DETAILS GUIDE

PERMA-SHIELD LINING STANDARD

TNEMEC COMPANY INCORPORATED

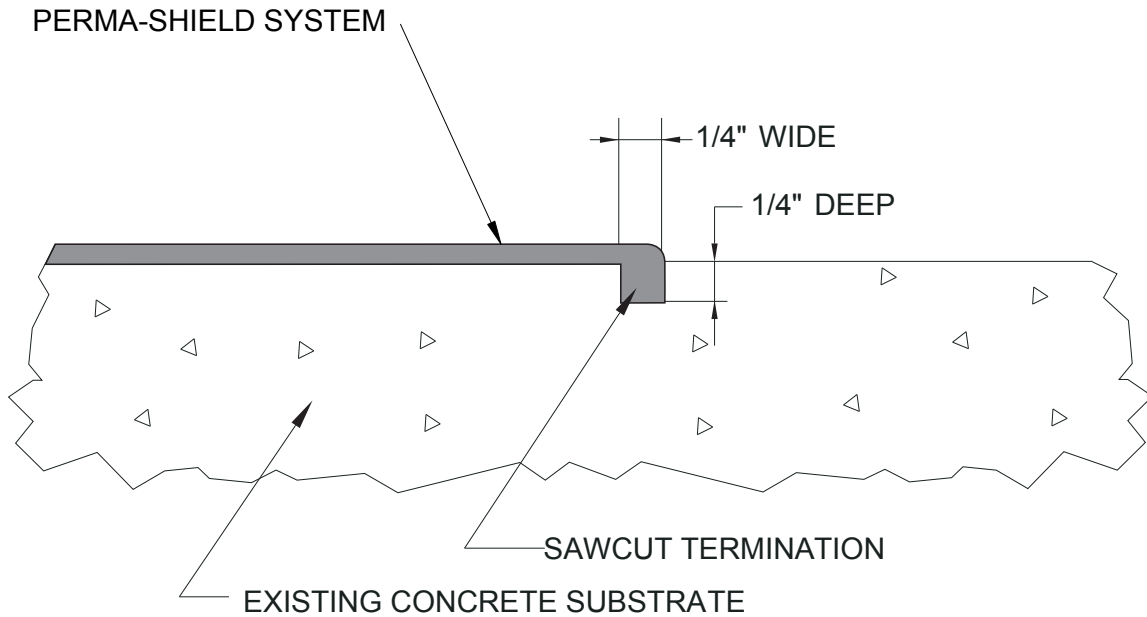
6800 Corporate Drive, Kansas City, MO 64120
1-800-TNEMEC1 www.tnemec.com

Published technical data, instructions, and pricing are subject to change without notice. Contact your Tnemec technical representative for current technical data, instructions, and pricing. Warranty information: The service life of Tnemec's coatings will vary. For warranty, limitation of seller's liability, and product information, please refer to Tnemec's Product Data Sheets at www.tnemec.com or contact your Tnemec Technical Representative. 6/2014

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- PLS-07** New Manhole Installation
- PLS-08** Exposed Rebar Repair
- PLS-09** Wall to Top Slab Transition
- PLS-10** Typical Crack Treatment on Walls or Roof

INNOVATION IN EVERY COAT.™



NOTE:

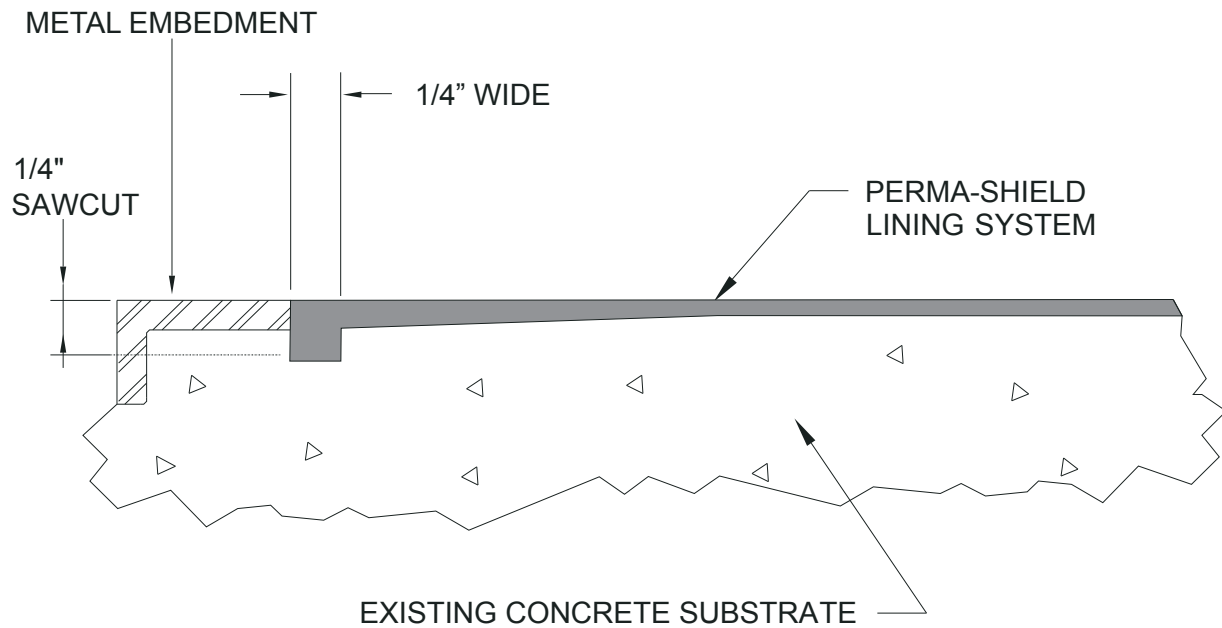
1. BRUSH OR TROWEL SERIES 434, 435 OR 436 INTO SAWCUT TERMINATION
2. ON VERTICAL APPLICATIONS SERIES; 435 WILL REQUIRE SERIES 211 - 211 FUMED SILICA OR APPLIED IN 2 OR MORE COATS TO FILL THE 1/4" SAW CUT.

TNEMEC PERMA-SHIELD STANDARD LINING DETAILS

LEADING EDGE TERMINATION DETAIL

NO. PLS-1

REV. 0



NOTE:

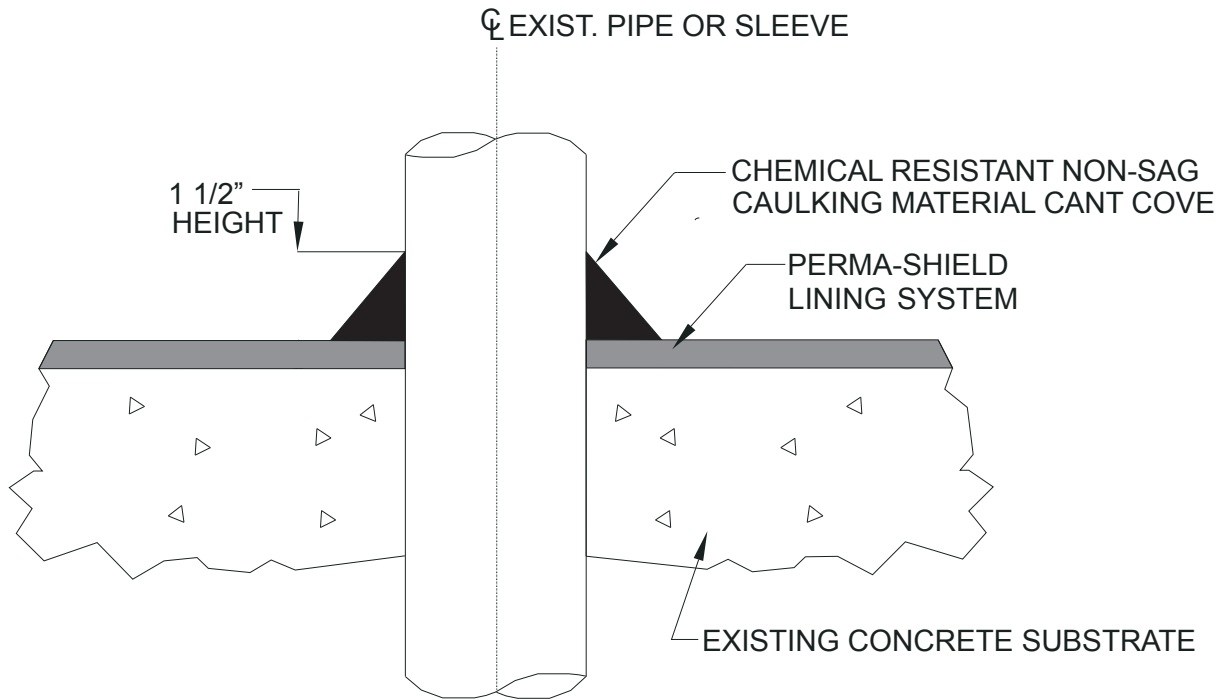
1. IF LINING IS TO BE CARRIED OVER METAL EMBEDMENT, SAWCUT TOE-IN TERMINATION IS STILL REQUIRED
2. ON VERTICAL SURFACES SERIES; 435 WILL REQUIRE 2 OR MORE COATS TO FILL THE 1/4" SAW CUT.

**TNEMEC PERMA-SHIELD
STANDARD LINING DETAILS**

TERMINATION DETAIL FOR EMBEDDED METALS

NO. PLS-2

REV. 0



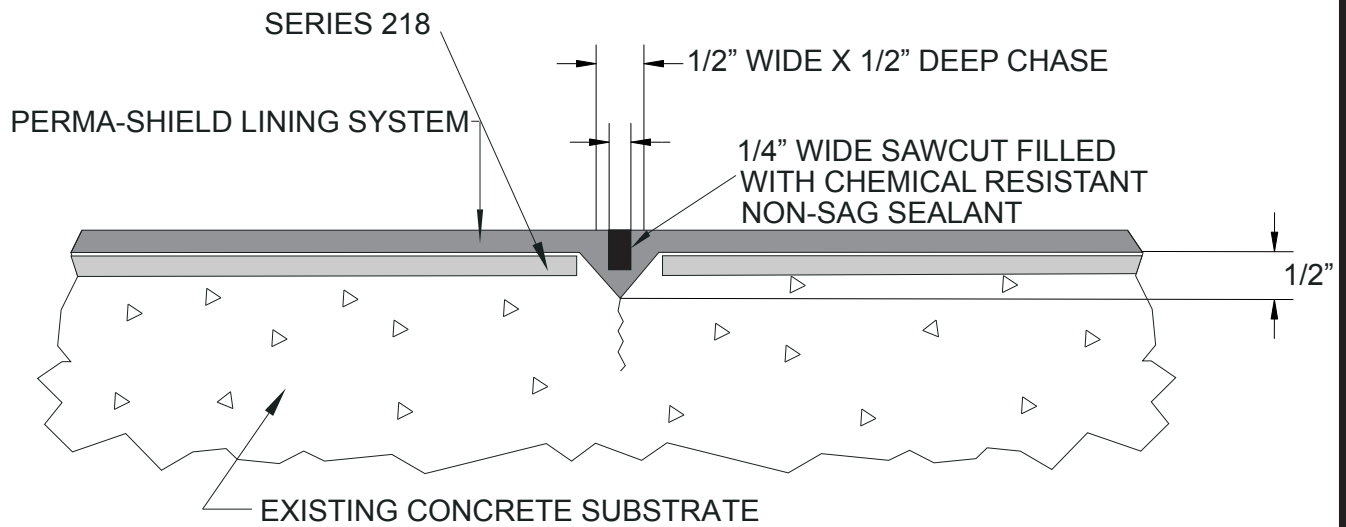
NOTE:
 1. ESTABLISH DEEPER SURFACE PROFILE 1" AROUND O.D. OF PIPE PENETRATION TO LOCK LINING SYSTEM INTO SUBSTRATE

TNEMEC PERMA-SHIELD STANDARD LINING DETAILS

SLEEVED OR NON-SLEEVED PIPE PENETRATION

NO. PLS-3

REV. 0

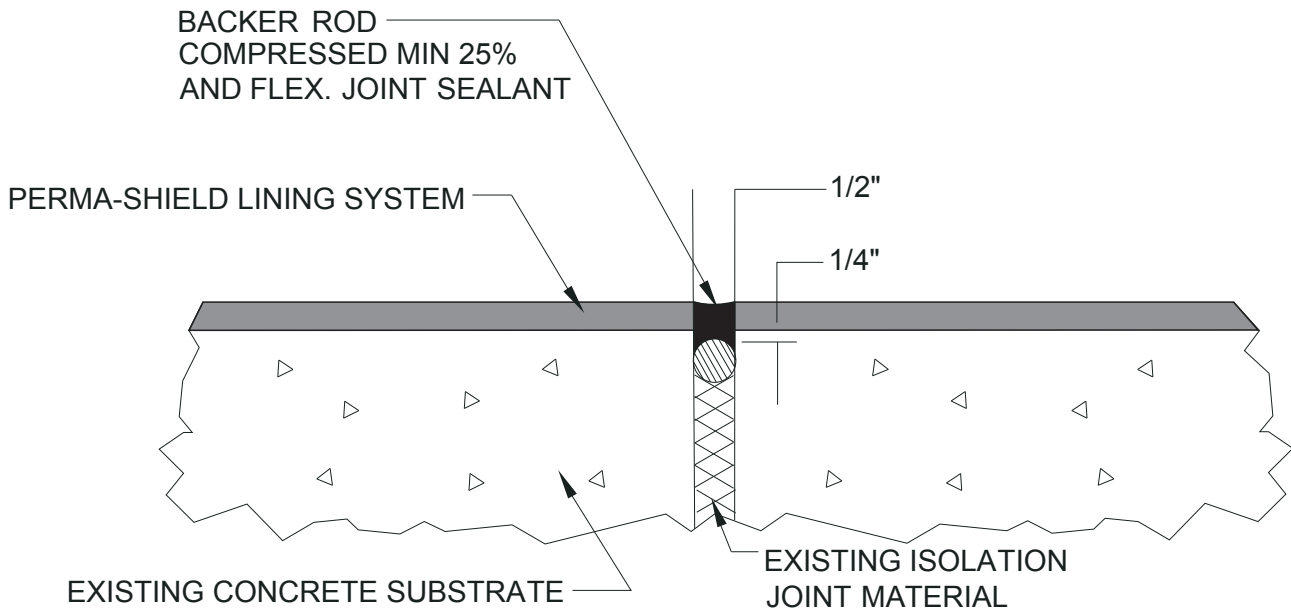


**TNEMEC PERMA-SHIELD
STANDARD LINING DETAILS**

CONTROL OR CONSTRUCTION JOINTS FOR CRACKS

NO. PLS-4

REV. 0



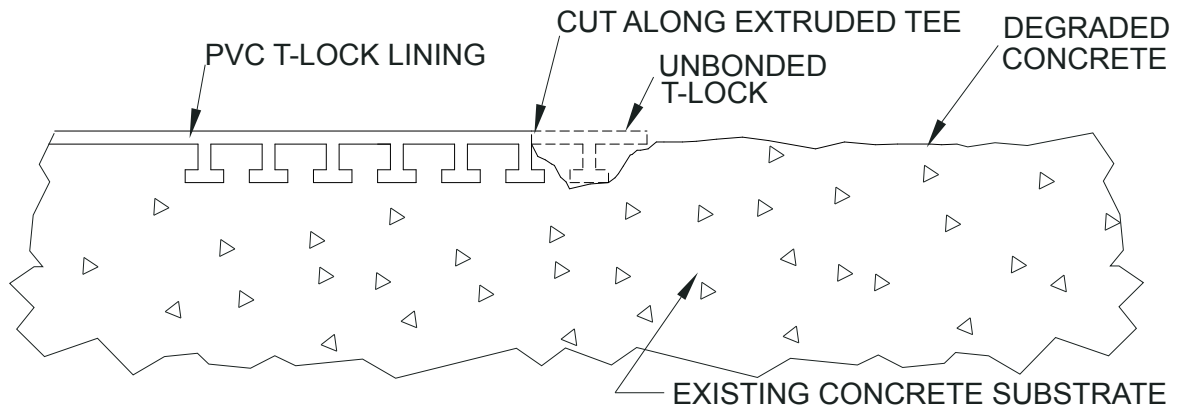
NOTE: FLEXIBLE JOINT SEALANT WIDTH-TO-DEPTH RATIO SHOWN APPROXIMATELY 2:1. DETAIL CAN BE BUILT BY INSTALLING LINING SYSTEM OVER JOINT, RESAWCUTTING, AND INSTALLING BACKER ROD AND SEALANT.

TNEMEC PERMA-SHIELD STANDARD LINING DETAILS

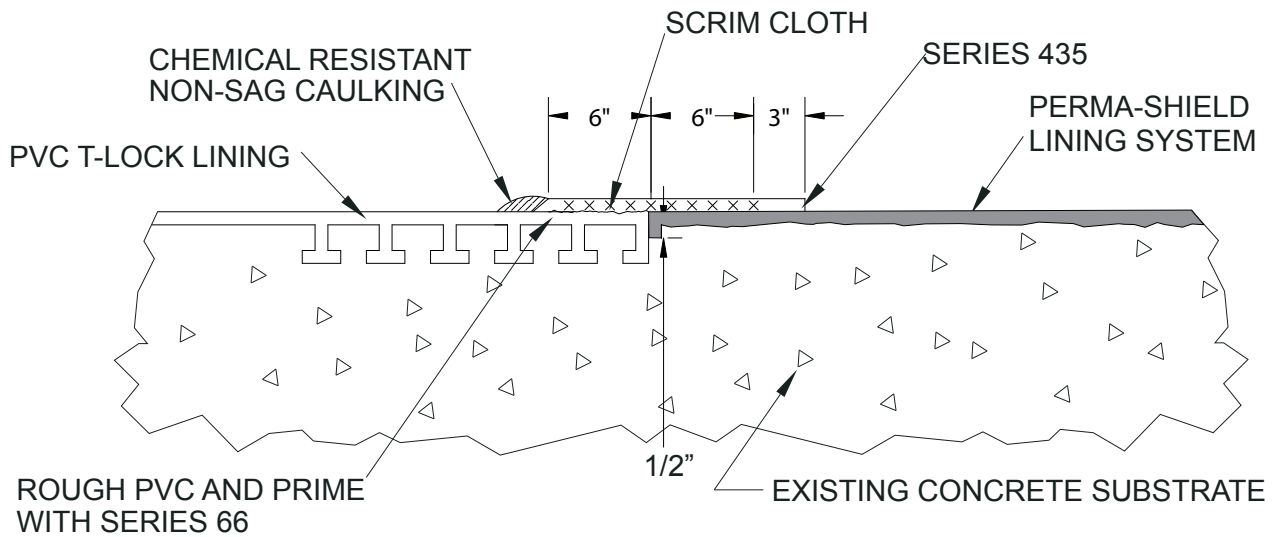
EXPANSION JOINT TREATMENT DETAIL

NO. PLS-5

REV. 0



SECTION - EXISTING T-LOCK LINER



SECTION - TERMINATING PERMA-SHIELD AT EXISTING T-LOCK

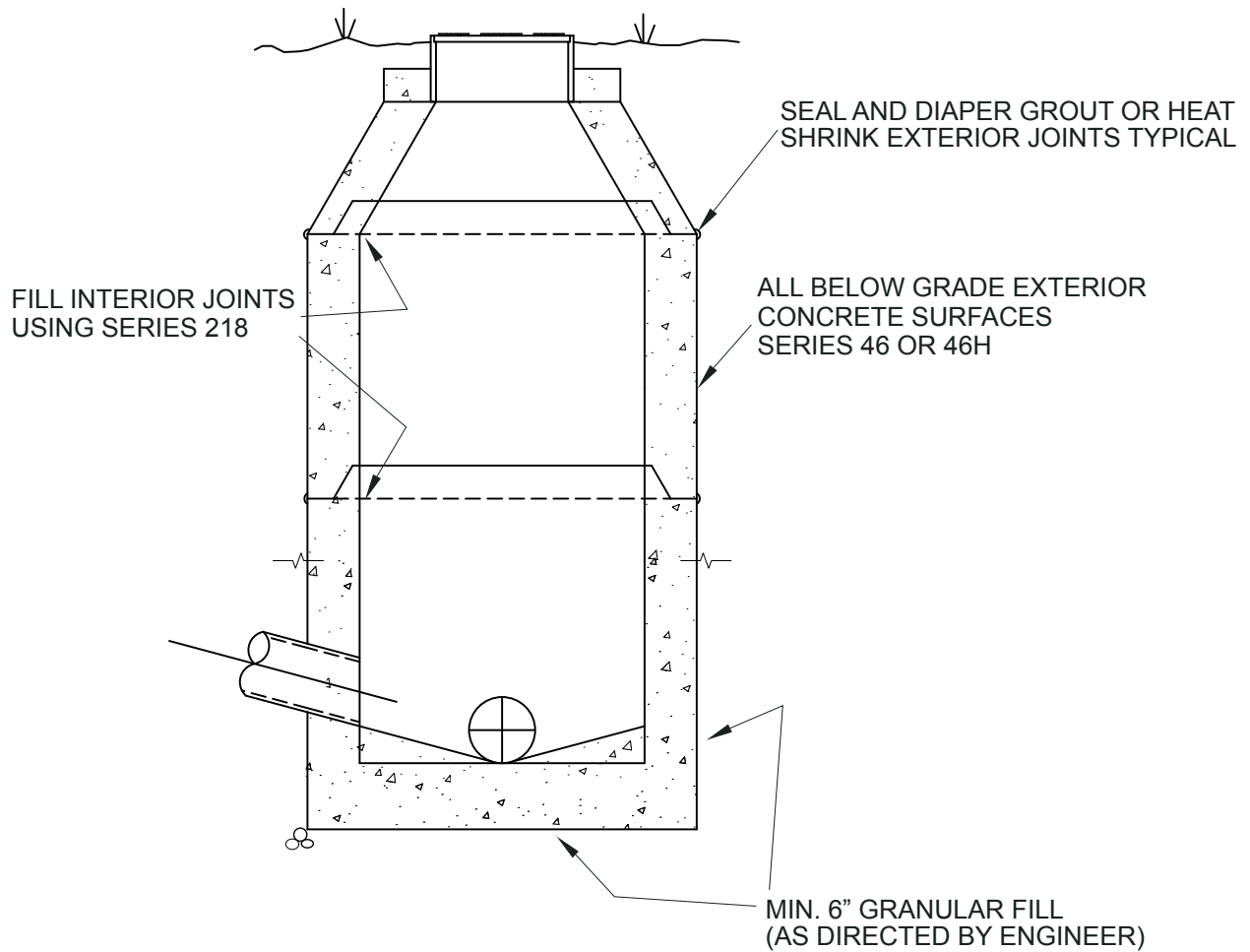
- NOTE:
 1. APPLY 10 MILS OF SERIES 435 AND PRESS VEIL CLOTH REINFORCEMENT INTO IT EXTENDING CLOTH 6" EACH WAY SHOWN.
 2. APPLY ADDITIONAL 10 MILS SERIES 435 TO ENCAPSULATE CEIL CLOTH REINFORCEMENT.

**TNEMEC PERMA-SHIELD
 STANDARD LINING DETAILS**

TERMINATION AT EXISTING T-LOCK LINER

NO. PLS-6

REV. 0



NOTES:

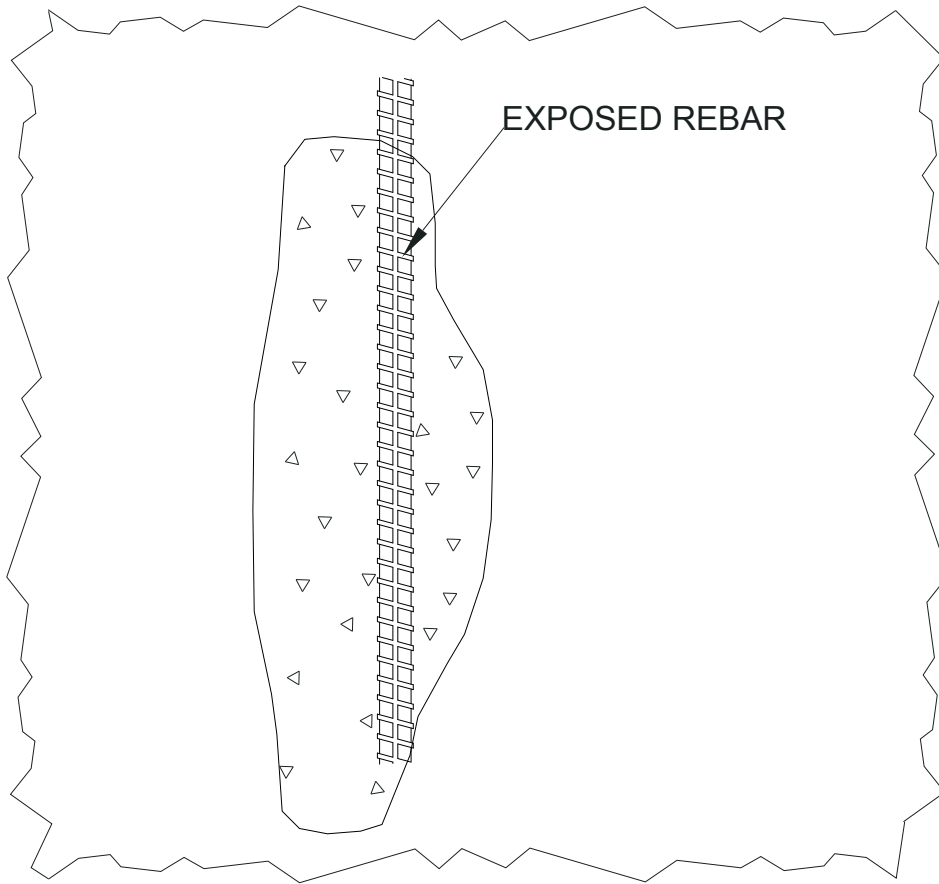
1. ALL EXTERIOR PRE-CAST OR CAST IN PLACE SECTIONS SHALL BE COATED WITH TWO COATS SERIES 46-465 OR 46H @ 8-10 MILS.
2. ALL EXTERIOR JOINTS, LIFT HOLES, INLETS AND OUTLETS TO BE SEALED AND GROUTED.
3. ALL INTERIOR CONCRETE SURFACES PREPARED TO A SSPC-SP13/NACE 6, >ICRI CSP 5.
4. ALL INTERIOR JOINTS, LIFT HOLES, INLETS AND OUTLETS TO BE FILLED WITH SERIES 218.
5. APPLY APPLICABLE PERMA-SHIELD COATING SYSTEM.

TNEMEC PERMA-SHIELD STANDARD LINING DETAILS

NEW MANHOLE INSTALLATION

NO. PLS-7

REV. 0



NOTES:

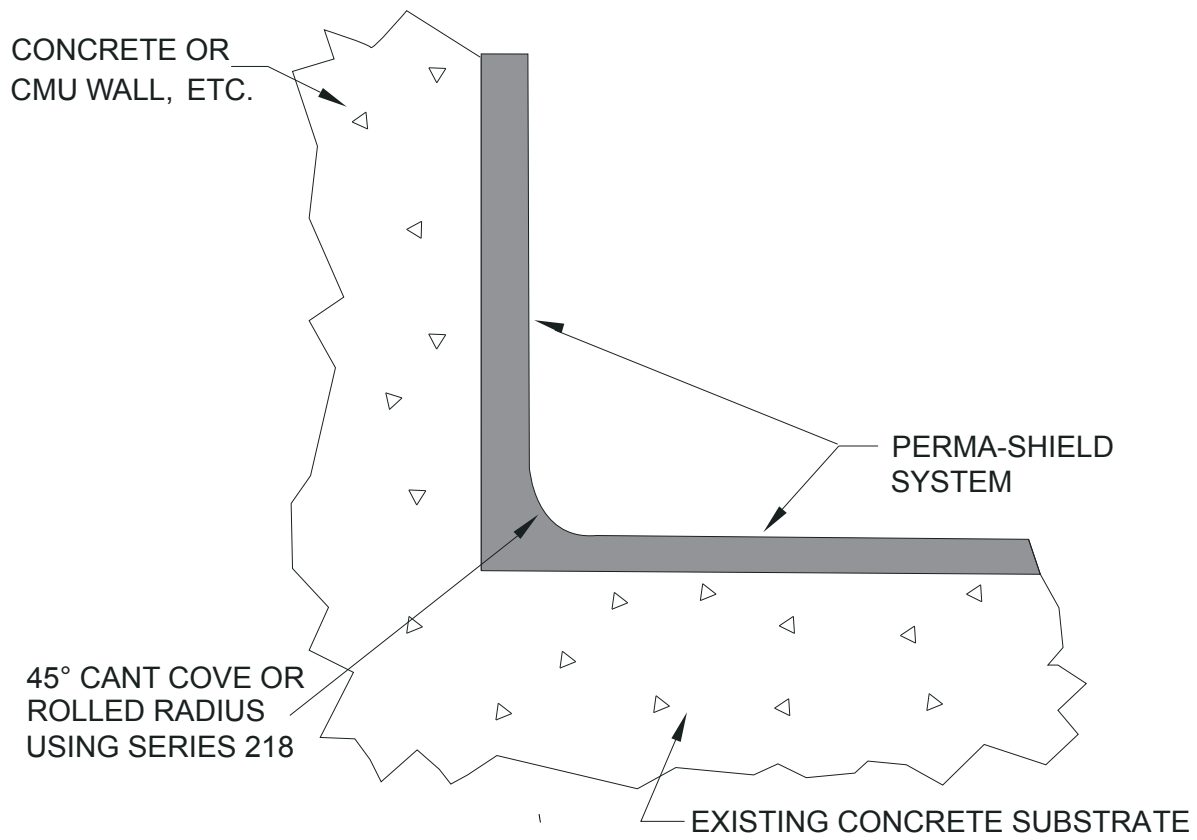
1. REMOVE DETERIORATED OR LOOSE CONCRETE SURROUNDING STEEL REINFORCING BAR (REBAR), INCLUDING 3/4" AROUND ENTIRE CIRCUMFERENCE OF REBAR, IN ACCORDANCE W/ICRI GUIDELINES NO.310.1R.
2. ABRASIVE BLAST TO A SSPC-SP10/NACE NO. 2 OR POWERTOOL CLEAN TO A SSPC-SP11.
3. APPLY 1 COAT OF SERIES 1, 69 (OR SIMILAR). AVOID SPILLAGE OR APPLICATION ONTO THE PARENT CONCRETE.
4. BUILD SUBSTRATE USING SERIES 217 OR 218. DRY PACK FLUSH WITH CONCRETE PLANE.

TNEMEC PERMA-SHIELD STANDARD LINING DETAILS

EXPOSED REBAR REPAIR

NO. PLS-8

REV. 0



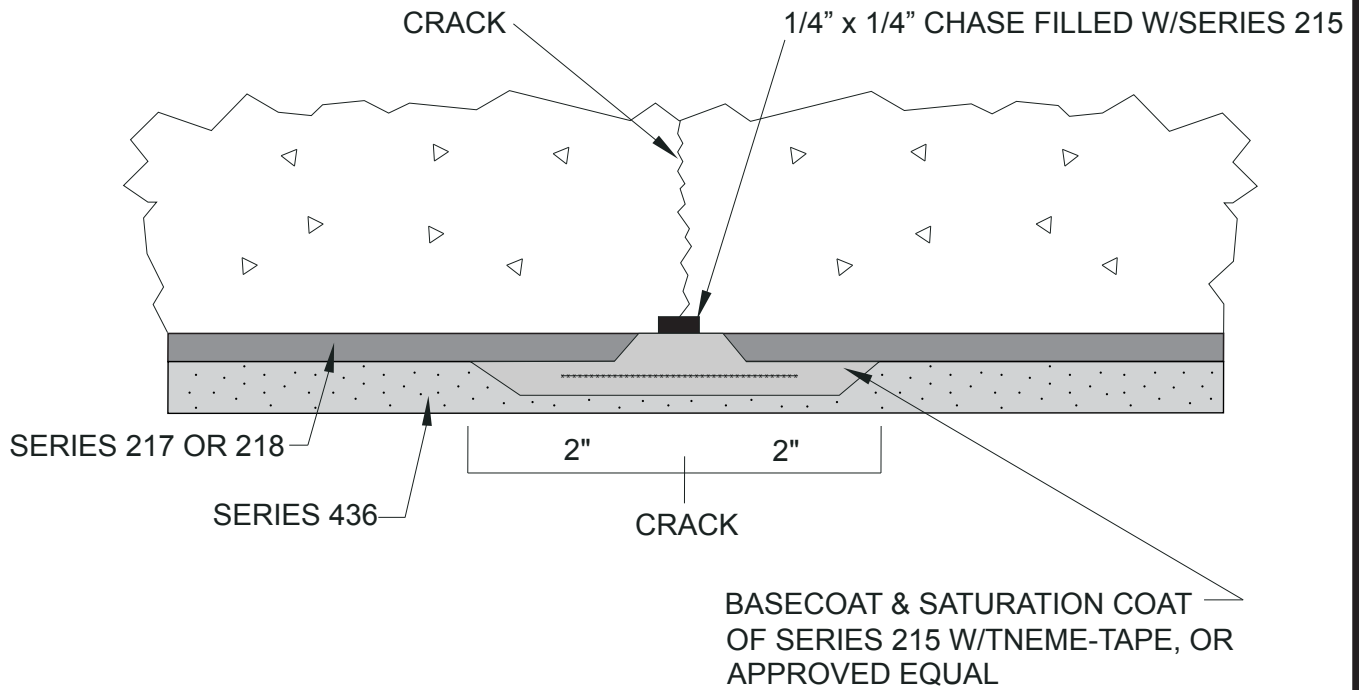
NOTE: SERIES 434 CAN BE USED IN LIEU OF SERIES 218 TO CREATE 1" CANT OR ROLLED RADIUS

TNEMEC PERMA-SHIELD STANDARD LINING DETAILS

WALL TO TOP SLAB TRANSITION

NO. PLS-9

REV. 0



NOTE:

1. ROUTE OUT CRACK 6MM X 6MM CHASE.
2. APPLY SERIES 217 OR 218 HOLDING BACK FROM CRACK
3. FILL CHASE WITH SERIES 215 AND INSTALL BASECOAT OF SERIES 215 AT 8-10 MILS. EMBED SERIES 152 TNEME-TAPE INTO WET 215 BASE COAT.
4. INSTALL SATURATION COAT OF 215 AT 8-10 MILS. TAPE OFF TO MASK.
5. INSTALL SERIES 436 PER SECTION 09920.

TNEMEC PERMA-SHIELD STANDARD LINING DETAILS

TYPICAL CRACK TREATMENT ON WALLS OR ROOF

NO. PLS-10

REV. 0