



**SPECIAL PROVISIONS
FOR
CULVERT LINING**

**Cedar County
BRFN-038-2(33)--39-16**

**Effective Date
December 16, 2014**

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

120232.01 DESCRIPTION.

A. Culvert Lining.

1. Resin impregnated, cured-in-place (CIPP).
2. Centrifugally Cast Cementitious Mortar Liner with Epoxy Seal (CCCML).
3. Centrifugally Cast Fiberglass Reinforced Polymer Mortar (CCFRPM).

B. Rehabilitate existing 6 foot by 4 foot RCB floor/wall to prevent inflow and infiltration, continued corrosion of reinforcing steel, spalling of concrete floor and to reestablish the structural integrity of the culvert. Includes construction of structural and protective liners while maintaining the hydraulic opening area of the structure.

120232.02 MATERIALS.

A. Apply Articles 4147.01 & 4147.02 of the Standard Specifications.

B. The Engineer may allow substitutions. Provide as a minimum the following information for evaluation:

1. Product Information.

- a. Product name.
- b. Year product first available in the United States.
- c. Total footage or number of line segments installed in the United States.
- d. Results of all available product testing, including but not limited to leakage, physical properties, pipe stiffness, chemical resistance, strain-corrosion, external loading, flow

characteristics, infiltration/inflow reductions, structural capacity, and external hydrostatic loading capacity.

- e. Samples of before and after product.
- f. Design method.
- g. Typical lining thickness for culvert sizes included in the project.

2. Manufacturer Information.

- a. Manufacturer name.
- b. Years of experience manufacturing the product.
- c. Country of manufacture of all product components.
- d. Quality control procedures for product manufacture, including inspection requirements, testing procedures, and allowable tolerance levels.
- e. Related ASTM standards, or other nationally recognized standards for product manufacturing.

3. Installer Information.

- a. Installer name.
- b. Completed project list for last 5 years including for each project and year completed, client name/address/contact person/phone number, footages installed by pipe diameter, and number of lateral reinstatements.
- c. Detailed installation procedures, including estimated times for each task, lateral reinstatement methods, number of required excavations, and other items unique to each product.
- d. Video of installation process, if available.
- e. Evidence of properly trained personnel.
- f. Related ASTM standards or any nationally recognized standards for product installation.
- g. Available equipment list.
- h. Detailed procedures for repairing the product in the event of future damage or failure.
- i. Additional information may be required. The submittal of prequalification information in no way implies that the product, manufacturer, or installer will be deemed to be qualified. The Contracting Authority, in its sole discretion, will determine whether a product, manufacturer, or installer does or does not qualify as an approved equal.

120232.03 CONSTRUCTION.

A. Cleaning.

- 1. Clean and remove soil, grit, debris, and obstructions prior to insertion of culvert lining.
- 2. Do not flush debris onto downstream property.
- 3. Deposit removed material at an approved site.

B. Resin Impregnated Cured-In-Place Lining.

- 1. Install according to the manufacturer's recommendations for this lining process and ASTM F 1216 unless noted otherwise.
- 2. Use a resin impregnated tube, hydraulically inverted in place with an approved lubricant, and cured in place according to ASTM F 1216, Section 7.
- 3. Ensure the tube is free of uncured spots, lifts (spots cured away from the culvert), and delaminations. Remove and replace deficient sections.

C. Centrifugally Cast Cementitious Mortar Liner with Epoxy Seal.

1. Surface Preparation.

Prepare according to the manufacturer's recommendations, including the following:

- a. Wash the interior with a high pressure washer.
- b. Plug active leaks with the appropriate sealing material.

2. Mortar Application.

Apply according to the manufacturer's recommendations, including the following:

- a. Apply with a rotating centrifugal casting applicator.
- b. Retrieve the applicator head at the manufacturer's recommended speed to achieve the desired thickness.
- c. Apply to the full required thickness utilizing multiple passes as necessary. Minimize the time between passes so subsequent passes are cast against fresh mortar.
- d. Verify thickness with a wet gage at several locations to ensure proper depth.
- e. Hand-apply high-strength mortar to the floor where appropriate. Thickness may vary from 6 inches to 1/2 inch at the floor and along the wall to provide structural integrity.

3. Epoxy Seal Application.

Seal according to the manufacturer's recommendations, including the following:

- a. Apply with a rotating centrifugal casting applicator or airless sprayer onto the fresh mortar liner.
- b. If the epoxy seal is applied more than 24 hours after application of the mortar liner, or if the mortar liner is contaminated, clean the liner and then apply the epoxy.

D. Centrifugally Cast Fiberglass Reinforced Polymer Mortar.

1. Surface Preparation.

Prepare according to the manufacturer's recommendations, including the following:

- a. Wash the interior with a high pressure washer.
- b. Plug active leaks with the appropriate sealing material.

2. Polymer Application.

Apply according to the manufacturer's recommendations, including the following:

- a. Apply with a rotating centrifugal casting applicator.
- b. Retrieve the applicator head at the manufacturer's recommended speed to achieve the desired thickness.
- c. Apply to the full required thickness utilizing multiple passes as necessary. Minimize the time between passes so subsequent passes are cast against fresh mortar.
- d. Verify thickness with a wet gage at several locations to ensure proper depth.
- e. Hand-apply high-strength polymer to the floor where appropriate. Thickness may vary from 6 inches to 1/2 inch at the floor and along the wall to provide structural integrity.

120232.04 METHOD OF MEASUREMENT.

Measurement for Culvert Lining will be in linear feet along the centerline of the culvert.

120232.05 BASIS OF PAYMENT.

- A. Payment for Culvert Lining will be made at the contract unit price per linear foot for the type of repair.
- B. Payment is full compensation for the preparation of the surface during lining operations and all other costs associated with repair of the culvert to properly complete the installation.