725-R-741 CURED-IN-PLACE PIPE LINER, CIPP

(Adopted 09-16-21)

Description

This work shall consist of the fabrication, installation, and curing of a tight-fitting, resin-impregnated fabric, cured-in-place pipe liner, hereinafter referred to as CIPP, into existing circular or deformed pipe structures in accordance with 105.03.

Materials

CIPP shall be in accordance with ASTM D5813, Type III, Grade 1, 2, or 3, and shall be UV and abrasion resistant. The manufacturer shall determine the proper grade of the CIPP to be used under the installation and operation conditions that will exist for the location in which the CIPP is to be used. CIPP shall be designed in accordance with ASTM F1216 and Appendix X1 for a fully deteriorated condition.

Right of Entry

If the Contractor desires more working room than the right-of-way provides, the Contractor may elect to pursue rights-of-entry from all necessary adjacent property owners in accordance with 107.14. A temporary fence shall be installed as required to prevent encroachment of the public or livestock into the work area. Upon completion of the work, disturbed areas on private property shall be restored in accordance with 107.14.

QC/QA Procedure

A Type A certification in accordance with 916 and a test report in accordance with ASTM D5813, Section 7.3 shall be provided for each existing structure to be lined.

An independent laboratory shall test field-cured samples from each CIPP installation. Appropriate documentation for the independent laboratory shall be provided prior to installation of the CIPP. Testing results shall be provided to the Department within seven days of receipt.

At each structure to be lined, two flat plate samples shall be field cured and submitted for testing. The samples shall be taken directly from the wet-out tube, clamped between flat plates and cured in the downstream end of the tube. As an alternative, two restrained end samples may be used for CIPPs installed in pipes between 8 and 18 in. in diameter, or equivalent. The field-cured samples shall be submitted to the laboratory within three days of the completion of the installation.

The field-cured samples shall be conditioned, prepared, and tested in accordance with ASTM D5813. The wall thickness and flexural tests need only be performed on the structural portion of the CIPP only.

Maintenance of Drainage

Drainage shall be maintained during the installation and curing operations in a manner that does not damage adjacent property.

Pre-Installation Requirements

Before beginning the CIPP installation operation, three copies of design calculations shall be submitted in accordance with 105.02, and shall certify:

(a) the proposed CIPP thickness was determined in accordance with ASTM F1216,

(b) the required curing pressure,

(c) the proposed waterway opening is as shown on the plans,

(d) the minimum required temperature for the initial cure,

(e) the minimum required temperature and duration for the post-cure, and

(f) the temperature profile and time required for cool down.

The Contractor shall submit a Water Collection Plan to the Engineer for review and acceptance a minimum of 14 days prior to site operations. The plan shall include phasing and implementation of the effluent collection process, storage, accidental spill procedure, transportation and disposal of effluent generated during the curing or washing process. The Contractor shall provide to the Engineer proof of disposal of effluent and documentation from a State authorized facility receiving the effluent. Copies of any test results required by the disposal site shall be submitted to the Engineer. An IC 203 shall be submitted to cover the disposal site, in accordance with 203.08.

Prior to installing the CIPP, a video inspection of the structure shall be performed. This inspection is to identify cavities in the structure that need to be repaired, and the connecting structures that shall be perpetuated. The video shall become the property of the Department. Cavities adjacent to the existing structure shall be filled in accordance with 725.05. Existing jagged edges or other deformities that impact the CIPP operation or function shall be repaired in accordance with the manufacturer's recommended procedures. All foreign material shall be removed from the existing structure in accordance with the ASTM specifications for the installation method and disposed of in accordance with 203.10.

Installation Requirements

The CIPP shall be installed by the inversion method or the pulled-in-place method. Inversion installation of the CIPP liner shall be in accordance with ASTM F1216. Pulled-in-place installation of the CIPP liner shall be in accordance with ASTM F1743.

If the Contractor elects to use polyester resin, all condensate water and all water in contact with the inside or outside of the CIPP during the curing and cleanup process shall be collected. If the Contractor washes the inside of the CIPP after curing has occurred, then that water shall also be collected.

The Contractor shall monitor and record the temperatures during the initial cure, post-cure, and cool down periods. Remote temperature sensors shall be placed between the existing pipe and the liner in the bottom of the existing pipe at locations as directed by the Engineer. A continuous monitoring system utilizing a fiber optic cable sensing system may be used in lieu of individual sensors. The minimum curing time is the sum of the initial and post curing times. Post-curing time shall be added for any deviations from the recommended post-curing temperature levels. A copy of these records shall be provided to the Engineer.

All CIPP installations shall be performed in dry conditions.

Prior to the liner installation, the Contractor shall place an approved impermeable catchment immediately upstream and downstream of the existing pipe. The impermeable catchment shall work in conjunction with cofferdams to create an impermeable basin to trap contaminated effluent. Any spillage of raw resin during the installation shall also be captured.

The liner shall be continuous with no over-laps and leak-free. The Contractor shall ensure there is no loss of impermeability of the inner and outer plastic films or pre-liner during the installation. Any pinholes, gaps and tears in the plastic film or pre-liner shall be properly repaired before proceeding with the liner installation. Where such damaged areas cannot be repaired, the Contractor shall promptly replace the impermeable plastic films or pre-liner before proceeding with the installation. Cofferdams shall remain in place until wastewater collection processes are complete and secured.

Cured CIPP shall be inspected and videotaped for workmanship. Defects in workmanship as defined in ASTM D5813, Section 6.2 shall be repaired or the CIPP shall be replaced so it meets the requirements of these specifications. The repaired or replaced CIPP shall be re-videotaped. The video tape shall become the property of the Department.

The installed CIPP shall be tested for delamination in accordance with the appropriate ASTM specification. The cured CIPP shall be cut within 6 in. of the ends of the existing structure. Where beveled inlets are required, the details shown on the plans shall be followed. Existing connections, including underdrains or another pipe structure, to the structure that was lined shall be perpetuated through the CIPP.

The CIPP shall be permanently marked with a stainless-steel label with a minimum thickness of 0.080 in. located above the structure low water elevation and within 6 in. of the structure end. The information shown on the label shall be at least 1/2 in. tall and shall include the month and year of installation, the CIPP source, and the ASTM material specifications.

Warranty

The CIPP shall be warranted, for a period of five years, against all defects which may adversely affect the integrity or strength of the liner. The Contractor shall repair or replace, at no additional cost to the Department, such defects in a manner mutually agreed upon by the Department and the Contractor.

Method of Measurement

CIPP will be measured by the linear foot, complete in place.

No measurement will be made for debris removal, filling existing voids, or trimming, cutting, jacking, or other corrective measures performed on jagged edges or other deformities of the existing pipe in order to facilitate installation of the CIPP.

Visual or video inspection of the existing pipe and new CIPP will not be measured.

Preparation and submittal of the Water Collection Plan will not be measured.

Collection, storage, transportation, and disposal of water produced by the curing or washout process will not be measured.

Basis of Payment

CIPP will be paid for at the contract unit price per linear foot, for the area or diameter specified, complete in place.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Pipe Liner, Cured-In-Place, _____ area	sq ft.....LFT
Pipe Liner, Cured-In-Place, _____ diameter	in.....LFT

The cost of repairing jagged edge or deformities to existing pipe, filling cavities around the existing pipe with flowable backfill or grout, cleaning and surface preparation of existing pipe, acquisition and restoration of required right-of-entry areas, erection, maintenance, and removal of temporary fence, removal and reattachment of end sections for access, removing foreign material from the existing pipe, maintaining existing water flow, perpetuation of connections to the structure to be lined, warranties and all other incidentals shall be included in the cost of the pay items in this section.

The cost of developing the Water Collection Plan and the collection, storage, transportation, and disposal of water produced by the curing or washout process shall be included in the cost of the pay items in this section.

If the existing pipe or other objects not designated for removal are damaged while performing this work, it shall be considered unauthorized work and shall be repaired or replaced in accordance with 105.11.

There will be no payment for the installation or removal of any liner that cannot be successfully installed due to the condition of the existing pipe.