

**NAPCA BULLETIN 18-99
APPLICATION PROCEDURES
FOR CONCRETE WEIGHT COATING
APPLIED BY THE COMPRESSION
METHOD TO STEEL PIPE**

GENERAL

- a. These specifications may be used in whole or in part by any party without prejudice, if recognition of the source is included. The National Association of Pipe Coating Applicators (NAPCA) assumes no responsibility for the interpretation or use of these specifications.
- b. The intended use of this coating is to provide protection and/or negative buoyancy for buried or submarine pipelines.
- c. The following definitions apply:
 - i. Applicator - The contractor who applies the coating to the pipe.
 - ii. Company - The purchaser of the coated pipe or the entity for whom the Applicator coats the pipe.
 - iii. NAPCA- National Association of Pipe Coating Applicators.
 - iv. Manufacturer- The company that makes the coating materials which are applied to the pipe.
 - v. ASTM- American Society for Testing and Materials.

Scope

- a. The Applicator shall furnish all labor, equipment and material required, and shall apply the coating to all surfaces to be coated.
- b. Protection and/or negative buoyancy, as provided under this specification, is furnished by the application of concrete weight coating to the exterior of pipe.

Pipe Conditions

- a. Pipe delivered to the Applicator for coating shall be free of protective oils, lacquers, mill primer, dirt or any other deleterious surface contamination which may affect the application of the coating.
- b. Any identification markings or stenciling on the external pipe surface shall be located on the cutback area in a transverse direction or alternatively on the internal pipe surface.

Handling of pipe

- a. Proper equipment for unloading, handling and temporary storage of pipe shall be used to avoid any damage to the pipe, pipe ends or corrosion coating.
- b. If internally coated pipe is received at the Applicator's plant, care shall be taken to avoid damage to the internal coating or the obliteration of the internal pipe markings during all phases of work covered by this specification. Internal coatings must be capable of withstanding the processing conditions necessary for the application of the concrete weight coating.

The Applicator shall visibly inspect the pipe upon receipt for damage such as dents, flat ends, bevel damage, or corrosion coating damage. Any damage observed at this point shall be noted on the inbound tally, and the Company shall be informed within 24 hours of receipt of the pipe.

Materials and Workmanship

All material furnished by the Applicator shall be of the specified quality. All work shall be done in a thorough workmanlike manner. The entire operation of pipe receiving, stockpiling, coating application, storage and loadout shall be performed under the supervision of and by experienced personnel skilled in the application of concrete weight coating.

Equipment

The Applicator's equipment shall be in such condition as to permit the Applicator to follow the procedure and obtain results prescribed in these specifications.

Coating Materials

Cement

All cement shall conform to ASTM C-150, type I/II, latest revision. Cement that has hardened, partially set, or which has become lumpy shall not be used.

Heavy Aggregate

Aggregate shall be clean and free from injurious amounts of salt, alkali, organic impurities or other deleterious substances. It shall conform to the physical characteristics shown in the latest revision of ASTM C-29.

Water

Water for concrete shall be clean and free from injurious amounts of acids, alkalis, oil, sulfates or other deleterious substances. Water from doubtful sources shall be tested

prior to its acceptance as a concrete ingredient, according to the latest revision of ASTM C-94, paragraph 4.1.3.1.

Sand and Gravel

Material shall be clean and free from injurious amounts of salt, alkali, organic impurities or other deleterious substances. Except for specific grading, material shall conform to the latest revision of ASTM C-33. If requested by the customer, notice of the proposed source of supply shall be given in sufficient time to permit the necessary testing of the material.

Reinforcing steel

Reinforcing steel shall be made from the best quality manufactured billet steel formed into galvanized wire fabric type reinforcing in accordance with ASTM A-810. Standard wire mesh shall be in accordance with ASTM A-82 with wires in accordance with ASTM A-185

Surface Preparation of Corrosion Coating

- a. Prior to concrete weight coating, the corrosion coating shall be inspected according to the procedure in paragraph 10-G of the latest edition of NAPCA bulletin No. 13-79-94

Non-Slip Adhesive (Optional)

- a. When requested by the customer, the applicator shall apply, immediately prior to the application of concrete coating, a 100% solids 2-part liquid epoxy meeting the customer's requirements for a non-slip adhesive system.

Coating Application

Ingredients shall be mixed dry in the specified proportions until a homogeneous mixture is obtained. Enough water to make a cohesive grout shall then be added. After a final mixing, this mixture shall then be discharged into the coating head and applied to the pipe with the required reinforcing wire and plastic outer wrap in a continuous rotary manner. The reinforcing wire shall have a minimum overlap of ½" and will be cut flush with the concrete coating cutback. Concrete applied in excess of 2 ¾" thickness shall have a minimum of two layers of reinforcing wire. Concrete applied 2 ¾" or less in thickness shall require one layer of reinforcing wire. Each joint shall be free of concrete for a distance from the bevel, as specified by the customer. In no case shall any grout or concrete be allowed to remain on the inside surface of the pipe. The reinforcing wire shall not contact the corrosion coating and shall not protrude from the outer surface of the concrete coating. The outer circumference shall be smooth and free of undulations and knobs at the ends.

Curing

Concrete coating shall be cured for a period of not less than seven days (or until compressive strengths have achieved their minimum specified values) prior to loading out. The polyethylene outer wrap, which retains all the moisture in the applied concrete and therefore serves as the curing membrane, is to be left on the pipe until it is cured.

Repairs

The continuous concrete coated pipe shall be handled and stored in a manner as to minimize cracking or other damage to the concrete coating. Repairs of defects in the hardened concrete coating shall be made in accordance with the following:

An area of damage in any 5 foot run of pipe, of less than approximately 150 square inches whose depth is less than 25 % of the total concrete thickness may be accepted without repair providing the remaining concrete is sound.

Hairline cracks need not be repaired. Hairline cracks are defined as those being less than 1/16" in width and in depth less than 25% of the coating thickness.

Circumferential cracks exceeding 1/16" in width at the surface and extending more than 180 degrees around the pipe shall be repaired. Repair should be made by chiseling the crack to a width of approximately 1" throughout the length and filling with a material similar to the parent coating. The repairs shall be allowed to remain undisturbed for a period of not less than 36 hours.

Longitudinal cracks exceeding 1/16" in width and 12" in length shall also be repaired.

Inspection and Testing

- a. The entire procedure of applying the concrete weight coating material as herein specified shall be rigidly inspected from the time the bare pipe is received until the coated pipe is loaded on the carrier for shipment.
- b. If the Company designates an Inspector, the Inspector shall be provided free access to the Applicator's plant at any time during any operation involving the pipe, with the right to inspect and to accept or reject work performed.
- c. The Applicator's Quality Control Inspector shall be responsible for stopping operations when conditions develop which could adversely affect the quality of the completed work.

Although the principal purpose of the coating inspection by the Company and Applicator is to insure compliance of the coating with these specifications, such

inspections shall also include examination for previously undetected defects on the pipe surface or the pipe ends. Pipe having such defects shall be set aside for subsequent repair or replacement by the pipe supplier and for any necessary coating repair. Recoating or coating repair that may be necessary by reason of these defects in the pipe, which is not the fault of the Applicator, shall be done at the Company's expense.

When the Company's Representative exercises the Company's right of approval at the Applicator's plant, the Company's Representative shall conduct final inspection on the Applicator's weigh/inspection station. Accepted pipe shall be presumed to be produced as specified unless test results indicate otherwise.

Coating thickness measurements (diameter readings) shall be made on every pipe at 3 equally spaced locations and recorded. All thickness' must lie within +/- 1/4" of the specified thickness.

Applicator shall provide at the worksite, weigh scales of sufficient capacity to accommodate the weighing of the finished concrete coated pipe joint. The weigh scales shall have an accuracy of +/- 0.5%. The weight of each concrete coated pipe shall be within -5% +7 1/2% of the theoretical coated pipe weight in air to meet the company's requirements. Coated pipe weight shall be marked on the inside of one end of the pipe.

Applicator shall provide daily Proctor samples (4" cylinders) of concrete used in the application of the concrete coating to determine the compressive strength of this material and to compare it to the specification for compressive strength. The concrete compressive strength samples will be taken 2 times per shift in accordance with ASTM C-31 and ASTM C-39. Tests shall be conducted at 7 days and 28 days with a minimum compressive strength of 3,000 psi at 7 days.

Coated Pipe Handling, Storage and Loading Requirements

The concrete coated pipe shall be stockpiled either by laying out one high or by nesting on sand windrows. Pipes shall not be stockpiled until such time as all end cleaning and patching, if required, have been completed. Pipe may be stacked directly off the coating machine.

- a. Pipe shall be stored, handled and transported in a manner to prevent damage to the pipe walls, beveled ends and the coating.

Sand windrows shall be so designed as to protect the coated pipe from standing water, and sharp or hard objects that might damage the coating.

If required by Company, Applicator will load out the coated pipe to either truck or barge

(provided by others), but dunnage, strapping, and tie-down will not be Applicator's responsibility.

Supplementary Details Supplied by the Company

When possible, the Company shall supply the following supplemental information.

- a. Length and diameter of pipe.
- b. Grade, wall thickness and/or weight per foot of pipe.
- c. Source and approximate shipping date from the pipe mill, or corrosion coating plant.

Method of shipment from the mill/plant

Type and thickness of corrosion coating.

- f. Thickness, density, and type of reinforcing required.
- g. Company concrete coating specifications, if available.
- h. Approximate date cured concrete pipe is needed for loadout.
- i. If pipe is to be stored, the approximate length of time it is to be stored.
- j. Length, style and post preparation of cutback.
- k. Minimum weight per car or truck required to protect lowest outbound rate.
 - l. Name and type of carrier.
 - m. Stacking and/or loading instructions.