

## NAPCA Bulletin 15-83-94

### EXTERIOR APPLICATION PROCEDURES FOR PLANT APPLIED TAPE COATINGS TO STEEL PIPE

#### 1. **General**

- a. These specifications may be used in whole or in part by anyone 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 these coatings is to provide corrosion protection for buried pipelines. Above ground storage of coated pipe in excess of 6 months without additional Ultraviolet protection is not recommended.
- 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. SSPC - The Steel Structures Painting Council.
  - iv. NACE - NACE International.
  - v. Manufacturer - The company that makes the coating materials which are applied to the pipe.

#### 2. **Scope**

- a. The Applicator shall furnish all labor, equipment and material required, shall prepare all surfaces to be coated and shall apply the coating to all surfaces to be coated.
- b. This specification covers the material and application for in-plant application of cold applied tapes to the exterior of all diameters of steel pipe through mechanical methods.
- c. The total thickness of the system is variable and is achieved through multi-layer build-up of the innerwrap and outerwrap. The ultimate thickness of the coating is dictated by and dependant upon pipe diameter, pipe weight, operating conditions and conditions along the right of way. In some cases, more than one application of the outerwrap may be desired.

#### 3. **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. The pipe surface shall be as free as possible from scabs, slivers and laminations.
- b. Any paint markings or stenciling of the pipe surface shall be of the type and thickness that can be removed easily during normal surface preparation.

#### 4. **Handling of Bare Pipe**

- a. Proper equipment for unloading, handling, and temporary storage of bare pipe shall be used to avoid any damage to the pipe or pipe ends.
- 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 any phases of work covered by this specification. Internal coatings must be capable of withstanding the processing conditions necessary for the application of the external coating.
- c. The Applicator shall visibly inspect the pipe upon receipt for damage such as dents, flat ends, and bevel 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. Any non-visible defects such as slivers, scabs, laminations, burrs, dents, etc. will be observed after the pipe is blast cleaned and at the Company's request, removed as an extra work item.

5. **Material and Workmanship**

- a. 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, surface preparation, coating application, storage and loadout shall be performed under the supervision of and by experienced personnel skilled in the application of protective coating.

6. **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.

7. **Coating Material**

- a. All coating materials, including repair or patch materials, purchased or used under these specifications, shall be packaged in suitable and approved containers. The containers shall be plainly marked with the name of the Manufacturer, type of material and batch or lot number where applicable. Bulk shipments shall be allowed provided the above information is included in the bill of lading.
- b. The coating material shall be packaged in containers suitable to keep the contents clean and dry during handling, shipping and storage. Storage and handling conditions shall be in accordance with the Manufacturer's recommendations.
- c. Precautions shall be taken during the handling, shipping and storage of all materials to prevent damage to the containers that would result in contamination of the coating materials. All contaminated, or otherwise damaged materials shall be discarded.
- d. The tape system shall be composed of the following components.
  - i. Primer supplied in liquid form consisting of solid ingredients carried in a solvent. The primer shall be compatible with the inner and outer wraps. The function of the primer is to provide a highly effective bonding medium between the pipe surface and the corrosion protection innerwrap.
  - ii. Corrosion Protection Innerwrap Tape consisting of a polyethylene backing and a butyl rubber adhesive supplied in suitable thicknesses in roll form. The innerwrap is applied after the primer and prior to the outerwrap. The

main function of the innerwrap is to serve as the corrosion protective coating.

- iii. Mechanical Protection Outerwrap Tape consisting of a polyethylene backing and an adhesive mass composed of the same types of materials used in the innerwrap adhesive and is supplied in suitable thicknesses in roll form. The function of the outerwrap is to provide mechanical protection to the innerwrap and to protect the system from environmental hazards.

## 8. **Surface Preparation**

- a. Before blasting, all oil, grease, mill lacquer and other deleterious material on the surfaces of the metal to be coated shall be removed by suitable means.
- b. In cold weather or any time when moisture tends to collect on the steel, the pipe shall be uniformly warmed for sufficient time to dry the pipe prior to cleaning. The pipe temperatures shall be maintained at least 5 degrees F above the dew point during the cleaning and coating operations. Pipe temperature shall not exceed 160 degrees F as a result of preheat.
- c. Pipe surfaces shall be blast cleaned to a Commercial Blast metal finish in accordance with SSPC-SP-6 or NACE #3 requirements.
- d. NACE, Swedish Pictorial, SSPC or other mutually agreed upon standards shall be used to judge the degree of cleaning.
- e. A consistent abrasive working mix shall be maintained by frequent additions of small quantities of new abrasive commensurate with consumption. Infrequent large quantity additions of abrasive shall be avoided.
- f. Following cleaning and prior to coating the pipe, abrasive remaining on the outside and loose contamination on the inside of the pipe shall be removed by air blast, vacuum or other suitable methods. If air is used, the air should be dry and free of contaminants, and all particles removed from the surface shall be collected in such a manner as not to contaminate clean pipe.
- g. Following cleaning and prior to coating, the pipe surface shall be inspected for adequate cleaning and surface condition. Pipe not properly cleaned shall be rejected and recleaned.
- h. Blast cleaned pipe surfaces shall be protected from conditions that would allow the pipe to flash rust before coating. If flash rusting occurs, affected pipe shall be recleaned.

## 9. **Coating Application**

- a. If specified, prior to application of the coating materials, each longitudinal weld seam may be covered with a 4 inch (minimum) wide strip of innerwrap tape, or suitable alternative.
- b. The coating application should be a continuous three step operation starting with a properly prepared pipe surface. The three steps following one after the other consist of: 1) priming; 2) application of innerwrap tape directly onto the primed pipe surface; and 3) application of outerwrap directly over the innerwrap.
- c. The outerwrap overlap should not coincide with the innerwrap overlap.
- d. The above materials should be applied within the temperature range

- recommended by the Manufacturer.
- e. Application of Primer
    - i. The primer shall be applied in a uniform thickness.
    - ii. The primer shall be thoroughly mixed and agitated as needed during application to prevent settling.
    - iii. The primer must coat the entire exterior pipe surface.
    - iv. The primer coat on the pipe shall be uniform and free of floods, runs, sags and drips. The primed surface shall be free of any foreign substances.
  - f. Application of Tape Innerwrap
    - i. The innerwrap shall be applied directly onto the primed pipe surface with appropriate dispensing and tensioning equipment.
    - ii. The innerwrap shall be spirally applied with overlap widths and application tensions required and/or recommended by the Manufacturer. The minimum overlap shall not be less than 1/2-inch. The minimum overlap at the end of a roll of tape shall be 6 inches or more.
    - iii. The applied innerwrap shall conform tightly to the pipe surface, shall be free of voids and wrinkles and shall be smooth.
    - iv. When a new roll of tape is started, the end lap of the splice shall overlap the previous roll. This splice shall be smooth and placed so as to maintain the continuity of the innerwrap coating.
  - g. Application of the Tape Outerwrap
    - i. The outerwrap is applied directly over the innerwrap using the same type of mechanical tape tensioning equipment.
    - ii. The overlap of the outerwrap shall not be applied directly over the lap of the innerwrap under any circumstances.
    - iii. The outer layer may be applied at the same time as the inner layer.
  - h. Cutbacks shall be as specified by the Company.

10. **Inspection and Testing**

- a. The entire procedure of applying the protective coating material as herein specified will 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.
- d. Although the principal purpose of the coating inspection by the Company and Applicator is to insure compliance of the coating with these specifications, such inspection shall also include examination for previously undetected defects in the pipe, pipe surface or on 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 do not involve fault on the part of the Applicator shall be done at the Company's expense.

- e. When Company's Representative exercises Company's right of approval at the Applicator's plant, the Company's Representative shall conduct final inspection on the Applicator's out-bound rack. Accepted pipe shall be presumed to be produced as specified unless test results indicate a discrepancy.
- f. Coating Thickness Measurements
  - i. An appropriate film thickness gauge, calibrated to the National Bureau of Standards' Certified Coating Thickness Calibration Standards shall be used to perform coating thickness measurement.
  - ii. The coating thickness shall meet or exceed the agreed upon minimum coating thickness. All joints which fail to meet the minimum coating thickness test shall be recoated or repaired.
- g. Electrical Inspection
  - i. Holiday inspection of the entire coating surface shall be performed with an approved high voltage Holiday Detector to indicate any flaws, holes, breaks or conductive particles in the protective coating.
  - ii. The Holiday Detector shall have sufficient D.C. voltage and be equipped with a positive signaling device. The search electrode shall be made of conductive rubber, or other applicable material. The Holiday Detector shall be operated in such a way as to audibly and/or visually detect the presence of all holidays.
  - iii. The minimum testing voltage for a particular coating thickness shall be within 20 percent of the value determined from the following formula:

$$1250 \times (\text{square root of coating thickness(mils)})$$

## 11. **Repair Procedures**

- a. All defects disclosed by the Holiday Detector and other obvious defects shall be repaired by the Applicator.
- b. Holidays which are the result of slivers, scabs, laminations, or other steel conditions beyond the control of the Applicator shall be repaired at the Company's expense.
- c. Areas of repair to the coating shall be holiday inspected by the Applicator on a 100 percent basis.
- d. Production Line Repairs
  - i. All holidays detected, such as flaws or mislapses, shall be repaired prior to application of the outerwrap tape.
  - ii. The flawed or mislapped area shall be cleared of all affected material and reprimed, if necessary.
  - iii. The area should be recoated with inner wrap tape, being careful to cover the entire area and overlapping onto the surrounding inner wrap coating by at least 2 inches.
  - iv. The affected area should then be rechecked with a Holiday Detector.
- e. Field Repairs
  - i. All holidays detected such as damaged or flawed areas shall be repaired by peeling back and removal of the outer and inner layers from the damaged area.

- ii. The holiday area shall then be brushed with primer and a patching tape with a polyethylene backing and butyl adhesive should be applied directly to the defective area in the manner specified by the Manufacturer.
- iii. The minimum lap at the damaged area shall be 4 inches all around.
- iv. The repaired area shall be tested with a Holiday Detector after the repair is completed.
- v. The repaired area may be covered in cigarette wrap fashion with the outerwrap to a minimum lap of 4 inches beyond the patching tape.

12. **Coated Pipe Handling, Storage, and Loading Requirements**

- a. Pipe shall be stored, handled and transported in a manner to prevent damage to the pipe walls, beveled ends and the coating.
- b. Storage racks shall be so designed as to protect the coated pipe from standing water, direct soil contact, and sharp or hard objects that might damage the coating.
- c. The coated pipe shall be shipped using sufficient and proper dunnage to adequately protect the pipe and coating.
- d. All pipe shipped by rail shall be loaded in accordance with API Specifications RP5L1, Latest Edition.

13. **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.
- d. Method of shipment from the mill.
- e. Approximate shipping date to the destination.
- f. If pipe is to be stored, the approximate length of time it is to be stored.
- g. Length, style and post preparation of cutback.
- h. Minimum weight per car or truck required to protect lowest outbound rate.
- i. Name and type of carrier.
- j. Stacking and/or loading instructions.