

NAPCA Bulletin 6-69-94-2

SUGGESTED PROCEDURES FOR COATING OF GIRTH WELDS WITH FUSION BONDED EPOXY

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. These specifications are intended to cover the minimum requirements for application of fusion bonded epoxy resins to girth welds during pipeline construction.

3. 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.
- 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. Time/temperature limitations for FBE Powders shall be in accordance with the Manufacturer's recommendations.

4. **Surface Preparation**

- a. Before cleaning, 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. Pipe surfaces shall be blast cleaned to a Near-White metal finish in accordance with SSPC-SP-10 or NACE #2 requirements.
- c. NACE, Swedish Pictorial, SSPC or other mutually agreed upon standards shall be used to judge the degree of cleaning.
- d. All frayed or loosened coating at the edge of the plant applied coating shall be completely removed.
- e. The plant applied coating shall show light abrading or etching for a minimum of 1/2-inch on each side of the bare weld. This will provide a "key" for the subsequent epoxy application.
- f. 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.
- g. Blast cleaned pipe surfaces shall be protected from conditions that would allow the pipe to flash rust before coating. If flash rusting occurs, effected pipe shall be recleaned.

5. **Application Procedures**

- a. As soon as possible after the cleaning operation, the girth weld area shall be heated to a temperature in accordance with the Manufacturer's recommendation for powder application (normally between 450 and 500 degrees F).
- b. The heat shall be applied by a high frequency induction heating assembly so designed that the girth weld area can be heated to the specified temperature in a period not to exceed five minutes.
- c. Under no circumstances shall open direct flame heating be permitted.
- d. The girth weld area shall be uniformly heated in a circumferential band at least six inches wide; three inches on each side of the girth weld.
- e. Temperature sensitive crayons shall be used to measure the temperature. Only a small spot on the pipe surface shall be touched with the crayon.
- f. The powder Applicator must be placed around the hot girth weld immediately after removal of the induction heater. If any delay causes the pipe temperature to fall below the specified temperature for application, the preheating operation shall be repeated.
- g. The powder shall be applied to a minimum thickness of 16 mils.
- h. The powder Applicator shall be so designed to allow for a minimum of over-spray and to provide a controlled thickness throughout the coated surface.
- i. The coating shall overlap the plant applied coating for a minimum of one (1) inch on each side of the girth weld.
- j. The pipe shall not be handled or lowered into the ditch until the coating has properly cured.

6. **Inspection and Testing**

- a. If the Company designates an Inspector, the Inspector shall be provided free

access at any time during any operation involving the pipe, with the right to inspect and to accept or reject work performed.

- b. 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. All coating thickness readings shall meet or exceed the agreed upon minimum coating thickness reading. All joints which fail to meet the minimum coating thickness test shall be completely cleaned and recoated.
- c. Electrical Inspection
 - i. All coated girth welds shall be tested with an approved high voltage Holiday Detector, equipped with a positive signaling device to indicate any flaws, holes, breaks or conductive particles in the protective coating.
 - ii. Holiday inspection of the entire coating surface shall be performed by the Applicator with an electronic Holiday Detector of sufficient D.C. voltage and 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 visually detect the presence of all holidays.
 - iii. The voltage to be used shall not exceed 125 volts per mil of nominal coating thickness.
- d. Adhesion of the cured coating shall be checked on an occasional basis by pushing a sharp knife blade through the cured coating to the pipe surface. The coating will not strip or peel when the knife is moved in a "whittling" motion against the steel surface, if proper adhesion of the cured coating to the pipe surface has been attained.

7. **Repair Procedures**

- a. All defects disclosed by the Holiday Detector and other obvious defects shall be repaired by the Applicator.
- b. Areas of repair to the coating shall be holiday inspected by the Applicator on a random and occasional basis.
- c. Pinhole type holidays may be patched using the hot melt patch stick method. Abrade the adjacent coating surface with either a hand file or coarse sand paper. The surface to be touched up will be heated with a small torch until the stick starts to melt, then the stick should be rubbed over the heated surface, building up a small puddle of patching compound over the entire area being patched. Such holidays may also be patched by use of a two part, 100% solids, liquid epoxy compound specified by the Manufacturer of the coating material applied to the pipe using the method set forth in the following paragraph. Liquid epoxy repairs of pinhole type holidays shall be considered an extra work item to be performed at a price agreed upon between the Company and Applicator.
- d. Where larger areas of damaged coating are to be repaired and the use of patch sticks is not practical, a two part, 100% solids, liquid epoxy compound specified by the Manufacturer of the coating material applied to the pipe shall be used. The damaged area shall be abraded by hand filing or use of carborundum cloth.

Application shall be made to a minimum thickness of 25 mils (.64mm) and shall overlap the undamaged area a minimum of 0.5 inches (1.27cm).

- e. The liquid patch compounds shall not be applied when the pipe temperature is below 50 degrees F unless provisions are made for heat curing the patch material using methods and temperatures in accordance with procedures recommended by the coating Manufacturer.