Item No. 21093

Joint Standard

NACE No. 10/SSPC-PA 6
Fiberglass-Reinforced Plastic (FRP) Linings Applied to Bottoms of Carbon Steel Aboveground Storage Tanks

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Foreword

This standard recommended practice specifies the procedures to design, apply, and inspect fiberglass-reinforced plastic (FRP) linings that are applied internally to the bottom of carbon steel aboveground storage tanks (ASTs). FRP linings are used worldwide to prevent the corrosion and deterioration of storage tank bottoms in petroleum, petrochemical, and other services. Experience has shown that the useful life of an FRP lining may exceed 25 years. API[(1)] Standard 653[1] permits a minimum remaining thickness of the tank bottom plate to be 1.25 mm (0.050 in.) when lined with FRP compared to a thickness of 2.5 mm (0.10 in.) if unlined or lined with a nonreinforced coating system and not equipped with a tank bottom leak detection system. This standard will serve as a resource for facility owners preparing specifications to achieve successful lining applications in ASTs in the petroleum/petrochemical industry. The practices described are also useful during preparation of specifications for ASTs in other services.

This joint standard was prepared by the SSPC/NACE Task Group 009 on Fiberglass-Reinforced Plastic Linings for Aboveground Storage Tank Floors. This task group is administered by NACE Specific Technology Group (STG) 80 on Intersociety Joint Coatings Activities, and also sponsored by STG 03 on Protective Coatings and Linings—Immersion/Buried. This standard is published by NACE under the auspices of STG 80, and by SSPC.

[(1)] American Petroleum Institute (API), 1220 L St. NW, Washington, DC 20005-4070.

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Contents

Section 1: General

1.1 Procedures outlined below and detailed in subsequent sections of this standard shall be followed for the successful application of a FRP lining system.

1.1.1 Abrasive blast clean the storage tank bottom and, as a minimum, the lower 60 cm (24 in.) of the tank shell. The owner should confirm that this minimum tank shell height is acceptable. Inspect cleaned surfaces just prior to primer or coating application.

1.1.2 If required, apply primer to the storage tank floor and the lower 60 cm (24 in.) of the tank shell.

1.1.3 Apply caulk to the properly prepared tank floor, deep pits, equipment supports, striker (bearing) plates, and chine angle, as required.

1.1.4 Apply resin and glass reinforcement to the tank bottom and lower shell course. If a two-layer or double laminate system is applied, extend the first layer 45 cm (18 in.) up the tank shell and the second 30 cm (12 in.) up the tank shell. At least 15 cm (6 in.) of blasted and primed shell wall shall be visible above the first coat of laminate.

1.1.5 Repair defects in the laminate prior to the application of the topcoat. (See Section 2.)

1.1.6 Apply a topcoat to the laminate applied to the floor and to the tank shell.

1.1.7 During all phases of the tank lining system application, inspection shall be carried out by the applicator and, when appropriate, by the owner's inspector. (See Section 11.)

1.1.8 The lining applicator shall record all pertinent information concerning the entire tank bottom lining work within *NACE Coating Inspector's Logbook*[2] or equivalent. This logbook shall be available at all times to the owner or owner's inspector.

1.1.9 During all phases of the lining operation, the lining applicator shall comply with the owner's prescribed working procedures.

1.1.10 Do not line storage tank nozzles or coat internal tank equipment, piping, or heating coil supports. Terminate the FRP lining at such supports with a design that ensures leak and corrosion resistance of the applied lining.

1.1.11 All applicable safety regulations must be followed during surface preparation, application, and curing of the lining system.

1.2 For a listing of documents and standards that shall be used in conjunction with this standard, refer to Appendix A.

1.2.1 The lining manufacturer's technical data sheets for coating materials and glass reinforcement; material safety data sheets (MSDS); and application instructions shall be used in conjunction with the documents listed in Appendix A and the requirements contained within this standard.

1.2.2 Any conflict between documents shall be resolved by the owner.

Section 2: Definitions[(2)]

Abrasive Blast Cleaning: Also called abrasive blasting, a surface preparation method that uses an abrasive propelled by air pressure, centrifugal force, or water pressure to clean and usually to profile a surface.

Barcol Hardness: Hardness value obtained by measuring the resistance to penetration of a sharp steel point under a spring load.

Caulk: A heavy putty-like material composed of resin, curing agents, and fillers used to fill pitted areas, contour uneven surfaces, and encapsulate rivets.

Coving: Applying caulk at the intersection of the tank floor plate and shell in concave form.

Curing: Chemical process of developing the intended properties of a coating or other material (e.g., resin) over a period or time.

Dry-Film Thickness (DFT): Depth of cured film, usually expressed in micrometers (millionths of a meter) or mils (thousandths of an inch). For FRP linings, the dry-film thickness may be expressed in millimeters.

[(2)] Some definitions are extracted from *Inspection of Coatings and Linings*,[3] SSPC, 1997, Appendix B – Glossary; *Industrial Maintenance Coatings Glossary*,[4] SSPC 94-16; and *NACE Glossary of Corrosion-Related Terms*,[5] NACE, 2000.