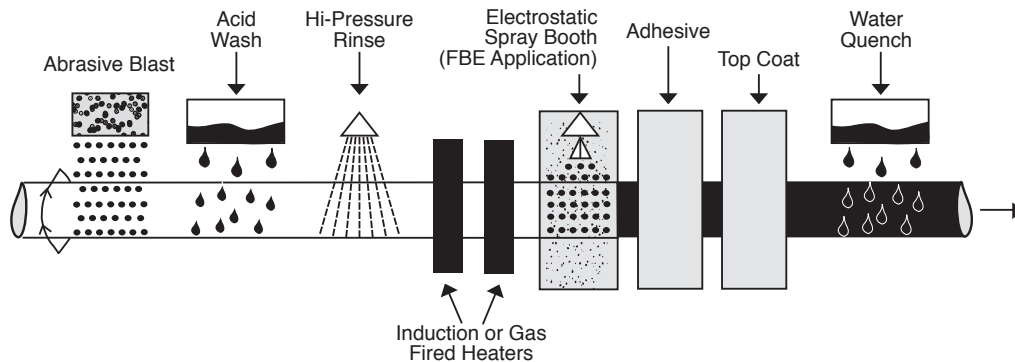


3M™ Scotchkote™

Fusion-Bonded Epoxy Coating 626-140

For Multi-Layer Polyolefin Systems

Application Guide



General

This document provides guidance for the plant application of 3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 626-140 when used as a primary coating for multilayer polyolefin systems. These systems include a base coating of fusion-bonded epoxy, a secondary adhesive layer and a topcoat of polypropylene.

The work includes the furnishing of all plant, labor, materials, tools and equipment; and the performance of all operations and incidentals necessary for the coating, handling, storing and shipping of plant-coated line pipe.

Coating materials shall be handled, stored, and applied in accordance with the manufacturer's specifications, or as directed by an authorized representative of the coating manufacturer. All references to SSPC shall be interpreted as Society for Protective Coatings. All references to NACE shall be interpreted as National Association of Corrosion Engineers.

Surface Preparation

Prior to blast cleaning, surfaces shall be inspected and pre-cleaned according to SSPC-SP1 to remove oil, grease and loosely adhering deposits. Visible oil and grease spots shall be removed by solvent wiping. Only approved safety solvents that do not leave a residue shall be used. Mill lacquer or other protective coating must be removed prior to beginning the following blast cleaning process.

Prior to blast cleaning, the pipe shall be pre-heated to a temperature sufficient to remove all moisture. The exterior pipe surface shall be abrasive blast-cleaned to NACE No. 2/SSPC-SP10 ISO 8501:1, Grade SA 2 1/2 near-white finish. To obtain optimal performance, two blast machines are recommended. The first machine may use shot or grit. The second machine, or lone blast machine, shall use steel grit with a hardness of Rockwell C ≥ 53 . The size shall be selected to achieve an anchor pattern profile of ≥ 2 mils/ $51 \mu\text{m}$ to ≤ 4.0 mils/ $110 \mu\text{m}$. Near-white finish is interpreted to mean that all metal surfaces shall be blasted to remove all dirt, mill scale, rust corrosion products, oxides, paint and other foreign matter. Very light shadows, very light streaks or slight discolorations shall be acceptable; however, at least 95% of the surface shall have the uniform gray appearance of a white-metal blast-cleaned surface. Standards for comparison shall be made available by the contractor.

For consistent surface finish, a stabilized working mix of the cleaning media shall be maintained by frequent small additions of new grit commensurate with consumption; infrequent large additions shall be avoided.

The cleaning-media working mix shall be maintained clean of contaminants by continuous and effective operation of blasting-machine scalping and air-wash separators.



Any raised slivers, scabs, laminations or bristles of steel remaining on the newly cleaned surface shall be removed using abrasive grinders or by hand filing. This cleaning operation must minimize damage to the anchor pattern.

Prior to coating, the cleaned pipe shall be inspected to ensure that all cleaning steps have been adequately performed. Presence of contaminants indicates a malfunction of the cleaning equipment, which shall be corrected immediately.

Remove cleaning media or other loose contaminants that may have entered the interior of the pipe. Use clean, dry, oil-free air in a manner that shall not affect the other clean pipe or pipe to be coated.

The cleaned pipe surfaces shall be protected from conditions of rainfall, or surface moisture. Flash rusting shall not occur prior to heating the pipe.

Surface Preparation in Brief

Before blast cleaning

- Remove mill lacquer, paint, or other protective coatings
- Remove visible oil and grease
- For optimal performance, use two blast machines

- In the first, use either grit or shot
 - In the second, use steel grit of Rockwell C hardness of ≥ 53 of a size that provides an anchor pattern profile of ≥ 2 mils/ $51 \mu\text{m}$ to ≤ 4.0 mils/ $110 \mu\text{m}$

Maintain blast equipment to continuously clean media.

Maintain an operating mix.

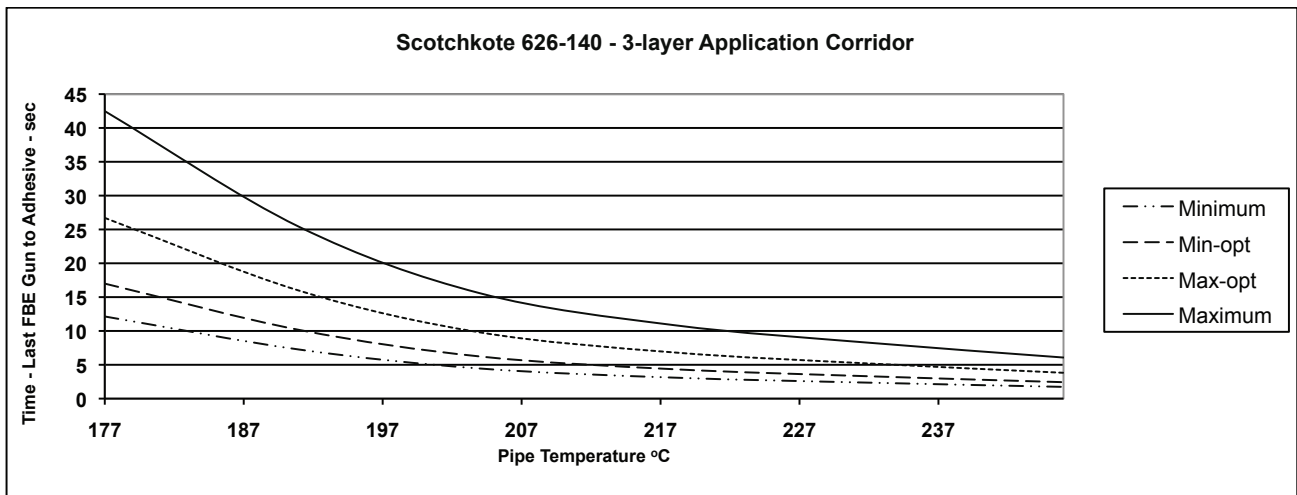
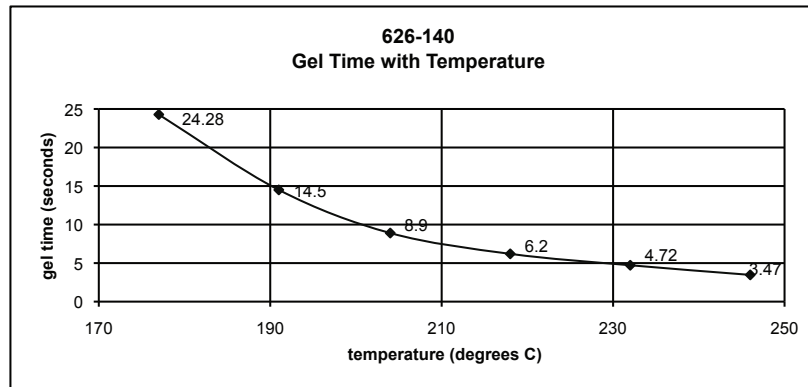
A higher degree of cleaning than standard coatings is recommended. To attain this, the use of Phosphoric acid pre-treatment is suggested.

Phosphoric acid wash and rinse ($\leq 50 \mu\text{Siemens}$ conductivity) to remove remaining acid, salts, and organic materials.

The pH of water after rinse should be the same as the rinse water before exposure to the acid wash process.

Coating Application

Pipe which has been cleaned shall be pre-heated so the pipe temperature at the entrance of the coating station is between $425^\circ\text{F}/218^\circ\text{C}$ and $450^\circ\text{F}/232^\circ\text{C}$ that results in minimum specified bond strength between FBE and polyolefin adhesive. The heat source shall not leave a residue or contaminant on the pipe surface. Graduated Tempilstik crayons may be used



to measure the temperature. Only a small spot of pipe shall be touched with the Tempilstik crayon. 3M™ Scotchtrak™ Optical Pyrometers or equivalent sensing device may be used in conjunction with Tempilstik crayons or contact pyrometers. All temperature measurement devices must be calibrated and in good working order.

Apply Scotchkote fusion-bonded epoxy coating, polyolefin adhesive and top coating to the specified thickness. Application timing of the adhesive layer shall meet the application corridor of the specific Scotchkote product used (see Figure 1). Gel time is determined by pipe pre-heat temperature; consult the gel time curves in Figure 2. Apply top coating in accordance with the coating manufacturer's recommendations.

The Scotchkote coating must be fully cured to provide maximum adhesion of the polyolefin adhesive. Polyolefin overcoatings provide insulation during the coating process which significantly reduces heat loss. The prolonged heat enables fusion-bonded epoxy to cure at lower application temperatures.

After the Scotchkote coating has cured, pipe lengths shall be cooled with air or water spray to a temperature not to exceed the softening point of the polyolefin top coat for inspection and repair. During the period of coating and curing, the pipe shall be handled so as to avoid damage to the coating. A suitable cutback shall be provided at each end of the pipe.

Inspection

Upon completion of the coating operation, but prior to storage, the coating shall be inspected for continuity. The search electrode shall be steel spring or conductive rubber.

The thickness of the coating shall be checked with properly calibrated gauges and shall have a minimum thickness as specified.

Coating Repair

Pipe requiring limited repair due to scars, slivers, coating imperfections and other minor defects shall be repaired as follows:

Areas of pipe requiring small spot repairs shall be cleaned to remove dirt and damaged coating using surface grinders or other suitable means. All dust shall be wiped off. If bare metal is exposed, blast the area and apply on the metal area a coat

of 10 mils to 20 mils (250 μ to 500 μ) of 3M™ Scotchkote™ Liquid Epoxy Coating 323. If no bare metal is exposed, heat the pipe surface to a minimum of temperature of 430°F/220°C using an induction heating system or a hot-air blower. Then apply the adhesive material by extrusion or using a sheet of binder. Make sure the adhesive coat fills the defect area and extends a few inches (cm) over the surrounding sound coating. Alternatively, use a flame spray process to apply the adhesive layer. Apply a layer of topcoat over the adhesive layer or use a flame spray to build to the minimum 3-layer coating thickness. If the topcoat is applied by sheet or extrusion, overwrap with PTFE tape and a fabric tape to tightly maintain the polyolefin patch during post heating. Heat the area to 430°F to 465°F (220°C to 240°C) to weld the patch to the parent coating. The patch shall be allowed to cool before handling.

Pipe with major coating defects, such as partially coated joints, unbonded coating or inadequate film thickness, shall be set aside for a decision by purchaser to accept, repair or reprocess.

Storage, Handling and Shipping

Pipe shall be handled and stored in a manner to prevent damage to pipe walls, beveled ends and coating. Pipe or coating damaged in handling or other operations shall be satisfactorily repaired.

Stacking in the yard shall be in accordance with good safety practices or in accordance with purchaser's specifications. Sufficient spacers and padding shall be used to prevent damage to coating.

Pipe will be transported from the coating yard to the job site by truck, rail or barge as specified in the purchase order. Pipe shall be shipped using sufficient dunnage to adequately protect the pipes and their external coating. Chains or wire rope shall not be used without sufficient padding to prevent damage to the coating.

Trucks and trailers used for hauling coated pipe shall be equipped with fenders and gravel guards to prevent road gravel or slag damage to the coating.

Pipe shall be loaded for shipping in compliance with existing shipping standards and regulations.

Handling and Safety Precautions

Read all Health Hazard, Precautionary and First Aid, Material Safety Data Sheet, and/or product label prior to handling or use.

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