3M™ Scotchkote™ Epoxy Coating 162HB

Data Sheet and Application Guide

Product Description

3M™ Scotchkote™ Epoxy Coating 162HB has been specifically developed as a 100% solids lining for the internals of pipes, tanks, vessels and other equipment in contact with fresh water, sea water, raw water, and effluent. The product can also be used on externals of pipes where an abrasion-resistant system is required. Scotchkote coating 162HB is designed for application in a single high build coat of up to 1mm, by plural feed hot airless spray and can be used on both steel and concrete surfaces.

Features

- 100% Solids
- Meets or exceeds the requirements of:
  - AWWA C210 Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
  - AWWA C550 Protective Interior Coatings for Valves and Hydrants

Intended Uses

Internals and externals of pipes, tanks, vessels and other equipment in contact with fresh water, sea water, raw water, and effluent.

Not approved for potable water applications.

Recommended Substrates

Steel, concrete (when used with 3M™ Scotchkote™ Epoxy Sealer SP 810)

Method of Application

Plural feed hot airless spray, brush or roller for small areas

Colors

Gray and Red Oxide

Mix Ratio

2:1 by Volume
2:1 by Weight

Components

Part A: Thixotropic liquid epoxy (gray or red)
Part B: Thixotropic liquid amine (off white)

Solids Content

100% solids

VOC Content

6.5 g/L as calculated

Typical Film Thickness

Wet/Dry 20 mils (500 micron)
Note: The thickness to be applied should be agreed upon between the specifier and the manufacturer dependant on operational performance criteria.

Theoretical Coverage Rate

2 square meters per liter at 500 micron dft.
21.5 square feet per liter at 20 mils dft.

Cure Times at 20°C (68°F)

Pot (usable) Life: 45 min at 104°F (40°C)
Touch Dry: 6 hours
Hard Dry: 16 hours
Full Cure: 7 days

Shelf Life/Storage Temperature

Use within 5 years of manufacture date. Store in original sealed containers at temperatures between 5°C (40°F) and 32°C (90°F).

Packaging

Supplied in 1 liter kits or the Base and Activator supplied separately in 18 and 180 liter units (2 Base to 1 Activator).

Primers

Concrete substrates should be sealed with 3M™ Scotchkote™ Epoxy Sealer 810.

Material Property Data

AWWA C210-07 Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines

Test	Requirement	Result
Adhesion (ASTM D4541 psi (kPa))	800 psi (5,515 kPa), min.	>2900 psi (>20,000 kPa) (>20 MPa)
Thickness, dry film, mils	16 mils (406 µm), min.	20 mils (500 µm)
Immersion and vapor phase, 30 days	No blistering or disbondment	
a. Deionized Water	Pass	Pass
b. Sulfuric Acid, 1% by wt	Pass	Pass
c. NaOH, 1% by wt	Pass	Pass
Cathodic Disbondment (ASTM G8)	9.53 mm radius, maximum	<1 mm

AWWA C550-05: Protective Interior Coatings for Valves and Hydrants

Requirements: No disbondment, undercutting or blistering of the coating after a 90-day immersion in the following solutions at 70°C.

Test	Result
Distilled Water Immersion (with a 3" scribed X in the coating)	Pass: No disbondment, undercutting or blistering
Sodium Chloride Immersion (2% by wt)	Pass: No disbondment, undercutting or blistering
Potassium Biphthalate Immersion (pH = 4)	Pass: No disbondment, undercutting or blistering
Sodium Carbonate Immersion (pH = 10)	Pass: No disbondment, undercutting or blistering
Direct Impact (D2794) 20 in·lbf (2.26 J), Minimum	70 in lbf (8 J)

Test	Method	Result
Abrasion Resistance	ASTM D4060	105 mg/1000 cycles CS17
Adhesion	ASTM D4541	>2900 psi (>20,000 kPa) (>20 MPa)
Cathodic Disbondment	ASTM G8	< 1 mm
Dielectric Strength	ASTM D149	400 V/mil
Flexural Stress	ASTM D790	52 MPa
Glass Transition (Tg)	ASTM D7028	56°C (133°F): onset - 26°C (79°F)
Heat Resistance	ASTM D2485	100C Dry, 80C Wet
Humidity Resistance	BS 3900 part F2	No Change 5000 hrs
Impact Resistance	ASTM G14 (modified)	8 J on 1/8" steel plate
Oxygen Permeability	ASTM D3985	0.061 cc/(100in²·day)
Pencil Hardness	ASTM D3363	2H
Salt Fog Resistance	ASTM B117	No Change -10,000 hrs
Scratch Test	BS 3900 E2	No failure with 3 kg load after 96 hrs
Shore D Hardness	ASTM D2240	82
Specific Gravity (average mixed)	–	1.57
Tensile Elongation	ASTM D638	1.4 %
Tensile Strength	ASTM D638	24 MPa
Water Absorption	ASTM D570	0.72 % at 21 days
Water Vapor Permeability	ASTM D1653	1.2gm.mm/m²/24 hours

Chemical/Pressure/Temperature Resistance

Test Conditions	Gas Phase	Organic Phase	Aqueous Phase	Results
Autoclave, 176°F/80°C 96 hours, 15 psi/103 kPa	5% H_2S, 5% CO_2, 90% CH_4	50% kerosene, 50% toluene	5% NaCl	No blistering, cracking, or adhesion loss in the gas, hydrocarbon, and aqueous phases. Excellent resistance to permeability in all three phases.
Autoclave, 203°F/95°C 96 hours, 15 psi/103 kPa	5% H_2S, 5% CO_2, 90% CH_4	50% kerosene, 50% toluene	5% NaCl	No blistering, cracking, or adhesion loss in the gas, hydrocarbon, and aqueous phases. Excellent resistance to permeability in all three phases.

Chemical Resistance Solutions, ASTM D543 (28 day immersion at 23°C)	Visual Observation	Δ Mass %	Δ Dimension %	Δ Shore D Hardness %
Acetic Acid (5%)*	no blistering or delamination, no discoloration	6.31	1.11	-10.79
Ammonium Hydroxide (10%)	no blistering or delamination, no discoloration	0.77	0.55	-0.41
Diesel	no blistering or delamination, no discoloration	0.48	0.41	0.00
Hydrochloric Acid (10%)	no blistering or delamination, moderate discoloration	1.09	0.38	-1.24
Mineral Oil	no blistering or delamination, no discoloration	0.51	0.25	-1.84
Nitric Acid (10%)	no blistering or delamination, severe discoloration	3.77	1.02	-2.48
Sodium Carbonate Solution (20 %)	no blistering or delamination, no discoloration	0.72	0.51	-0.20
Sodium Hydroxide Solution (30 %)	no blistering or delamination, no discoloration	0.56	0.23	0.62
Sulfuric Acid (10 %)	no blistering or delamination, slight color fade	1.33	0.68	-2.24
Sulfuric Acid (30 %)	no blistering or delamination, slight discoloration	2.07	1.00	-1.22
Sulfuric Acid (50 %)	no blistering or delamination, severe discoloration	3.78	0.45	-1.64
Sodium Chloride (26.6%)	no blistering or delamination, slight discoloration	0.38	0.34	0.41
Distilled Water	no blistering or delamination, no discoloration	0.75	0.44	-0.82

Visual observations made on coated steel plates, percent change measurements made on free films.

*Acetic Acid is not recommended for immersion conditions.

Surface Preparation

Steel Surfaces – Coating performance is dependent on the cleanliness of the substrate surface. It must be clean, dry and free of loose rust and scale, paint, etc. Remove all oils, grease, and other contaminants with a suitable solvent. Metal surfaces should be blast cleaned in accordance with NACE No. 2 SSPC-SP 10 ISO 8501:1, Grade SA 2 ½, near white finish using suitable abrasive to a minimum profile of 3 mils (75 microns).

Concrete Surfaces – Concrete surfaces should be lightly abrasive blasted, sponge blasted or mechanically scarified, taking care not to expose the aggregate. All dust and loose residue should then be removed and surfaces then sealed using 3M™ Scotchkote™ Epoxy Sealer 810.

Application Conditions

Do not apply when the relative humidity exceeds 90% or when the surface to be coated is less than 5°F (3°C) above the dew point.

Minimum temperature for application is 40°F (5°C).

Application

Plural Feed Hot Airless Sprayer

Typical Equipment: 2:1 Part A (Base) to Part B (Activator) proportioning pump, fitted with recirculating Part A (Base) and Part B (Activator) lines of sufficient length including ¼" whip end hose to reach all areas of the pipe with equipment located as close as possible to the pipe end. The equipment should have 60 mesh in-line filters, and either drum or in-line heaters or combination of both. The heaters to be capable of providing and maintaining a mixed temperature at the spray gun of 50-60°C. Adequate cover should be provided over the Part A (Base), solvent and Part B (Activator) containers in case of wet weather.

Spray Tip Size: 0.019" – 0.025"

Tip size and fan width will vary depending on caliper requirements and the geometry of the article to be coated. For example, if tanks contain any ancillary equipment the use of the smaller sizes to allow some control over film thickness is recommended.

In-line filters: 60 mesh

Tip Temperature: 122°F - 140°F (50°C - 60°C)

Tip Pressure: Typically 3000 psi
The pressure should only be as high as is necessary for proper atomization and will depend on application viscosity (which depends on material temperature), tip size and hoses sizes/lengths.

Brush and Roller Applications
Good quality brushes should be used for this method of application. Scotchkote coating 162HB should be applied to give a uniform even coating thickness, and best results are achieved when material and substrate temperatures are above 50°F (10°C).

Method of Mixing: Very thorough mixing is crucial for coating performance. For brush and roller application stir the contents of the Base component, continue stirring and gradually add the total contents of the Activator component, continue stirring until a homogeneous mix is obtained.

Touch Up and Repair

All areas to be repaired and the surrounding area of firmly adherent coating should first be degreased thoroughly with detergent solution to remove all dirt, grease and oil, then rinsed off with fresh water and dried.

All areas to be repaired should be examined and all loose flaking material should be removed back to a firm edge. Angle grinders, needle guns or rotary grinders should be used to roughen the bare exposed substrate, and also to abrade 50-75mm of surrounding firmly adherent coating to ensure a good key for the newly applied Scotchkote coating 162HB.

All loose dust and abrasive residue should be removed from the surfaces to be coated using either a brush or air line. Surfaces should be degreased again with detergent solution, fresh water rinsed and then dried immediately prior to coating application.

Scotchkote coating 162HB should be thoroughly mixed together by stirring the contents of the Base component, continue stirring and gradually add the total contents of the Activator component, continue stirring until a homogeneous mix is obtained.

Edges of the cleaned and abraded existing sound coating should be masked off so that only the immediately surrounding clean and abraded coating will be over-coated, thus ensuring a very good adhesive key between the existing coating and the newly applied coating.

Scotchkote coating 162HB should be applied by brush to all cleaned and roughened exposed metal surfaces, and to the abraded surrounding existing coating up to the masking tape.

Scotchkote coating 162HB should be applied to all areas of repair to a wet and dry film build of at least 500 microns. The use of a wet film thickness gauge will assist in ensuring an adequate film build.

As soon as the newly brush applied Scotchkote coating 162HB is touch dry, the masking tape should be removed. At 20°C, the newly applied coating should be touch dry within 6 hours and hard dry within 16 hours.

Coating Procedure for Internals of Field Welded Pipe Joints

All weld areas should be thoroughly cleaned to remove welding spatter and debris, including damaged coating. For pipes with an internal diameter up to one meter, angle grinders rotary grinders can be used to create a coarse profile, for pipes with a diameter of one meter and above, surfaces must be grit-blasted.

The abraded area should extend from the edge of the weld area for 50-75 mm onto surrounding sound Scotchkote coating 162HB helping to ensure the surface of the coating is thoroughly uniformly profiled.

All loose dust and abrasive residue should be removed from the surface by brush or airline. Surfaces should then be degreased with detergent solution to help ensure no oil or grease resulting from the abrading process is present.

Scotchkote coating 162HB should now be thoroughly mixed together by stirring the contents of the Base component, continue stirring and gradually add the total contents of the Activator component, continue stirring until a homogeneous mix is obtained. Apply to the prepared area to the appropriate film thickness specified, typically 1mm for joints.

Ordering Information/Customer Service

For ordering, technical or product information, or to request a copy of the Material Safety Data Sheet, call: + 1(800) 722-6721

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