

# 3M™ Scotchkote™ Liquid Epoxy Coating 323+

## Spray Application Guide for External Protection of Steel Pipes

---

### Product Description

3M™ Scotchkote™ Liquid Epoxy Coating 323+ is a two part liquid epoxy coating designed to protect steel pipe and other metal surfaces from corrosion. 3M™ Scotchkote™ Liquid Epoxy Coating 323+ is shipped in premeasured kit; 2 parts of A (base) to 1 part of B (activator). The individual parts A and B are available separately.



---

### Safety, Handling and Storage

Consult with the appropriate safety officer for the PPE requirements for particular situation.

Additional information of exposure controls and personal protection is provided in the Product Safety Data Sheets

Keep in original container at 40°F (4°C) - 100°F (38°C) in temperature controlled storage. Protect containers from damage during storage and transportation.

### Disposal of Coating Containers

Dispose of waste product material in a facility permitted to accept chemical waste. Since regulations vary, consult applicable regulations or authorities before disposal. Allow mixed material to harden before disposal.

Follow applicable regulations for disposal of spilled material. Refer to MSDS in Further Accidental Release Measures section.

---

### Manufacturer's Qualified Application Procedure per CSA Z245.30

*Product qualified to meet FC1& FC3 Coating systems as described in CSA Z245.30*

*This MQAP is applicable to product manufactured after 09/01/2017.*

### Tools, consumables, and equipment required to apply the coating system

\*Proper calibration and working condition of all tools and equipment is expected to be validated prior to use.

**General Notes on Spray Equipment:** 3M™ Scotchkote™ Liquid Epoxy Coating 323+ offers a wide processing window in terms of tip sizes, whip hose lengths/diameters and temperatures. Depending on the size of the project to be coated, the applicator may choose to spray with a 427 tip, ¼ inch (6.4 mm) x 20 ft (6 m) whip. Equipment adjustments can be made to accommodate specific conditions that may be encountered (eg. pipe diameter, fitting dimensions, configurations and application efficiencies).

## 3M™ Scotchkote™ Liquid Epoxy Coating 323+ Spray Application Guide for External Protection of Steel Pipes

Temperature for part A in either the drum or supply tank should be approximately 38°C-43°C (100°F-110°F). The preheat temperature for Part B should be approximately 32°C-38°C (90°F-100°F). The applicator can adjust the temperature in order to balance part A and B pressures. Cavitation shall not be allowed in the spray equipment.

- 1) Heating Sources:
  - a) Induction heating coils
  - b) Infrared heaters
  - c) Indirect heating
  - d) Direct flame
    - i) Liquid or gas propane only
- 2) Compressed Air
  - a) Filter and oil separator capable of providing clean air as visually inspected using a blotter test
  - b) Desiccant air dryer capable of drying the compressed air supply
- 3) Inspection:
  - a) Surface contact thermometer
  - b) Infrared (IR) thermometer; may on be used on coated surfaces only with the device emissivity set to 0.95
  - c) High Voltage holiday detector with spring, conductive rubber, or wire brush attachment
  - d) Dry Film Thickness (DFT) gauge
  - e) Wet Film Thickness (WFT) gauge
  - f) Shore D hardness tester
  - g) Thermometer used to measure ambient temperature
  - h) Application Documentation kit– items used to document inspection and measurements taken during the coating process
  - i) Sling or Digital Hygrometer
  - j) Surface roughness gauge
    - i) Replicate tape
    - ii) Profilometer
  - k) Potassium Ferrocyanide Paper or other method(s) to analyze chlorides and soluble salts contamination residing on the steel surface. Refer to ISO 21809-3 or project specification for level of acceptable contamination.
  - l) Surface preparation written standards and supplemental visual standards or comparators.
- 4) Steel Surface Preparation
  - a) Dry abrasive blasting equipment able to produce > 90 psi at the nozzle
  - b) Blast media capable of producing an anchor profile of 51 µm – 114 µm (2.0 mils – 4.5 mils) and surface cleanliness of at least near white metal finish per NACE No.2 / SSPC SP-10, or ISO 8501-1 SA 2½.
- 5) Application Equipment:
  - a) Plural feed hot airless spray unit
    - i) Must be capable of pumping, mixing, and atomizing high viscosity 100% solids coatings
  - b) Suggested Spray Tips
    - i) Size: 6.4 mm to 7.4 mm (0.25 inches to 0.29 inches)
    - ii) Fan Pattern: 15.2 cm to 35.6 cm (6 inches to 14 inches)
  - c) Tip Pressure: 2,500 – 3,000 psi

## 3M™ Scotchkote™ Liquid Epoxy Coating 323+ Spray Application Guide for External Protection of Steel Pipes

- d) Applicators are encouraged to determine optimum preheat temperatures based on ambient and application conditions. Recommended starting point ranges for this system are shown below:
  - i) Preheat Part A: approximately 38°C-43°C (100°F-110°F)
  - ii) Preheat Part B: approximately 32°C-38°C (90°F-100°F)
- e) Mix Ratio A:B: 2:1
- 6) Cleaning
  - a) Rags and brushes
  - b) Non-Oily solvents such as Methyl Ethyl Ketone, Xylene, Ethanol, Isopropyl Alcohol, or Acetone
- 7) Repair
  - a) 80 or 120 grit sand paper
  - b) Clean lint free dry cloth

### Surface preparation of the steel



- 1) Blasting media: dry grit abrasives, preferably glass beads, steel grit, sand or equivalent media that can produce an angular anchor profile of 50.8–114.3 µm (2.0-4.5 mils) and a surface cleanliness of at least near white metal finish per NACE No.2/SSPC SP-10, or ISO 8501-1 SA 2 ½
- 2) Visible oil and grease contamination to be removed by means of non-oily solvents or other agreed upon cleaning method.
- 3) Soluble salts to be removed using agreed upon cleaning method
- 4) No moisture on the surface coming from snow, ice, rain or condensation
- 5) Brush blast the factory applied coating on the overlap areas using a feathering technique removing the gloss from the factory applied coating. Overlap the factory applied coating 5 cm – 7.6 cm (2 inches -3 inches) unless otherwise specified.

### Compatibility with other 3M Anti-Corrosion Coatings

The coatings shown below are all compatible. Other coating systems may be compatible. Consult with 3M for more information.

- 3M™ Scotchkote™ Liquid Epoxy Coating 323+
- 3M™ Scotchkote™ Liquid Epoxy Coating 323
- 3M™ Scotchkote™ Liquid Epoxy Coating 327
- 3M™ Scotchkote™ Liquid Epoxy Coating 328
- 3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 6233P
- 3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 226N
- 3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 6352
- 3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 6352HF

### Preheat Methods Prior to Coating Application

- 1) Induction heating (Preferred method).

**3M™ Scotchkote™ Liquid Epoxy Coating 323+  
Spray Application Guide for External Protection of Steel Pipes**

- 2) Infrared heaters
- 3) Indirect heating or direct flame



**Surface temperature range during surface preparation, application, and cure**

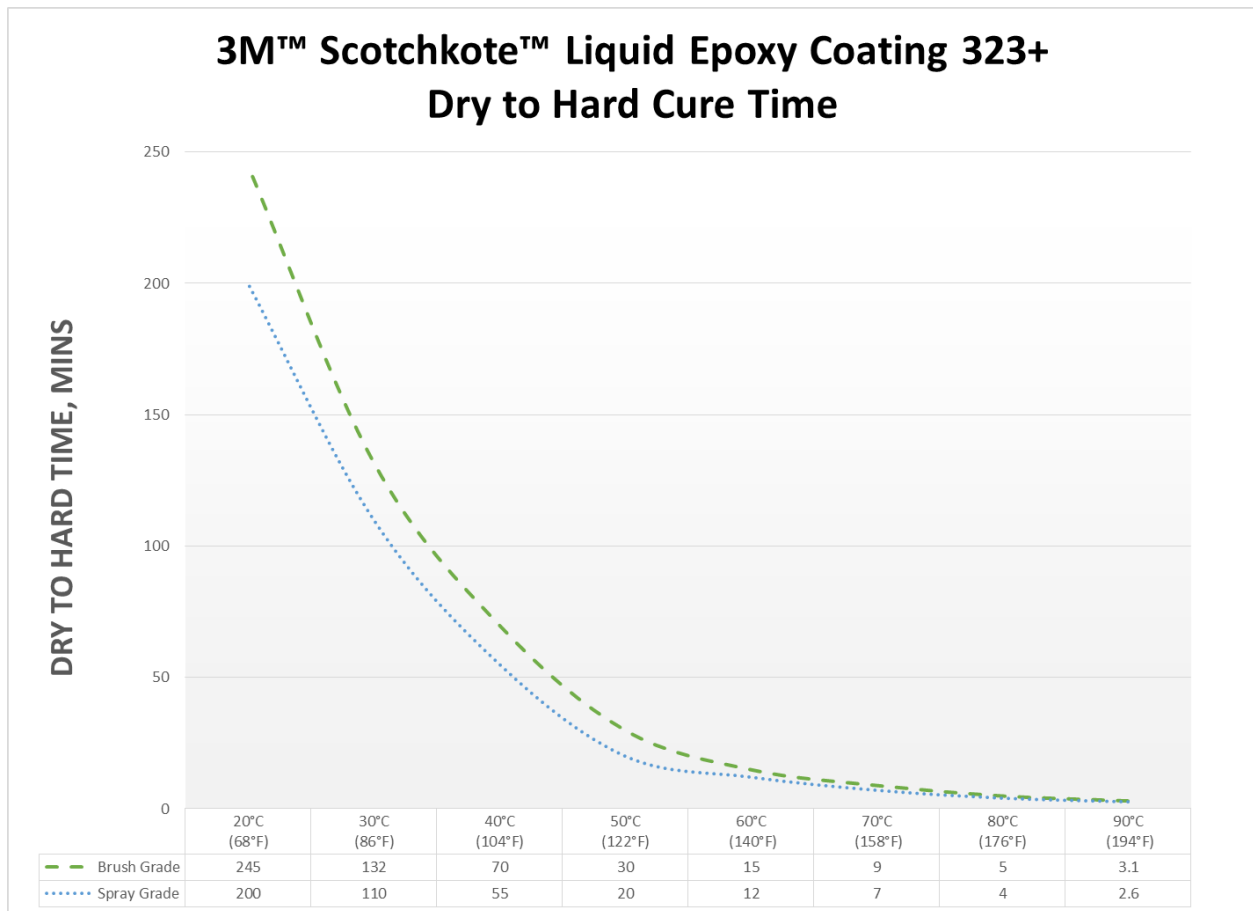
- 1) Pipe preheat temperature is; 10°C-90°C (50°F-194°F) and always at least 3°C (5°F) above the measured dew point
  - a) Preheating shall not damage the mainline coating or the coating being repaired or
  - b) Raise the temperature of the pipe above 150°C (302°F)
- 2) Drying property guide for Scotchkote Coating 323+

<b>Product Temperature</b>	<b>Pot Life</b>	<b>Dry To Touch Time</b>	<b>Back Fill Time</b>	<b>Recoat Window</b>
5°C (41°F)	40 minutes	2-3 hours	11-13 hours	5 hours
15°C (59°F)	22 minutes	1-2 hours	5-7 hours	4 hours
25°C (77°F)	15 minutes	45-105 mins	3.5-4.5 hours	3 hours
35°C (95°F)	11 minutes	30-50 minutes	2-3 hours	2 hours
45°C (113°F)	8 minutes	20-40 minutes	90 - 150 minutes	1 hour

**Note\*** because of variations of temperature the above table only provides a reference, therefore the actual time to backfill shall be determined by a Shore D durometer test. Shore D value should be at least 80.

- 3) Post-curing Scotchkote Coating 323+ may be required when the ambient conditions hinder the coating from reaching a Shore D hardness of 80. These conditions include but are not limited to, temperatures below 10 °C (50°F) and high winds. Post curing may be required to achieve proper Shore D, apply induction heating, infrared heating, or indirect heating methods. Direct flame methods are not acceptable in this case. Raise the temperature of the coating, at the weld, to a maximum of 90 °C (194°F). After obtaining this temperature remove the heat source and allow coated area to air cool before inspecting shore D hardness.

**3M™ Scotchkote™ Liquid Epoxy Coating 323+  
Spray Application Guide for External Protection of Steel Pipes**



**Ambient conditions**

- 1) Scotchkote Coating 323+ shall not be applied when the relative humidity exceeds 90% or when the steel surface to be coated is less than 3 °C (5°F) above the measured dew point

**Coating Mixing Process**

- 1) Mixing
  - a) Power pedals, agitators, or mixing drill suitable for continuously stirring the coating in drums or other usable containers.
  - b) Caution must be taken while stirring to avoid a vortex in the coating by excessive speed on the paddle or drill. This may result in foaming or air pocket entrapment in the coating.
  - c) Minimize actions which induce air entrapment; including moving the mixer top to bottom and overmixing.
  - d) Drums or recipients must be heated to proper temperature.
  - e) Thinning of coating is not allowed.

**Coating Thickness**

Scotchkote Coating 323+ has been designed to enhance sag resistance during a single pass. Conditions and application parameters will determine the amount of material to be applied during a single pass.

- 1) Mainline rehabilitation or girth welds; optimum thickness is 508 µm-1016 µm (20-40 mils) targeting 635 µm (25mils) based on maximum allowable operating temperature of 95°C

## 3M™ Scotchkote™ Liquid Epoxy Coating 323+ Spray Application Guide for External Protection of Steel Pipes

(203°F). Maximum allowable thickness is 70 mils (1778 µm). Consideration for reduced flexibility should be made prior to coating outside the optimal thickness range. Refer to the table above for recommended recoat window, if additional thickness is required.

- 2) Horizontal Directional Drilling applications (HDD): 1016–1778 µm (40–70 mils) targeting 1397 µm (55 mils).

\*Note: The pipeline owner's specification is the default requirement for the allowable thickness

### Coating Application

- 1) Validate surface is meeting the requirements of NACE No.2/SSPC SP-10, or ISO 8501-1 SA 2 ½ and the surface profile requirements
  - If flash rusting is observed, the steel surface shall be re-blasted before application
- 2) Using masking tape or other means to define coating overlap area
- 3) Purge applicator from solvent to coating into a container
- 4) Direct applicator onto surface to be coated then trigger
- 5) With horizontal movement, apply Scotchkote Coating 323+ in sections
- 6) Verify coating thickness with a wet film gauge before moving to next section
- 7) Confirm a minimum of 5 cm (2 inch) overlap between sections.
- 8) When thickness is obtained and coating is complete purge applicator spray head with solvent;
- 9) Protect coating until moisture and other contaminants such as dust, insects and airborne particulates do not contaminate the finished coating
- 10) If used, remove masking tape when coating is dry to touch

### Repair Methods

1. Repair Method A - Holidays or damaged areas less than 2 mm (0.08 inches) in diameter
  - a) Remove oil, grease, and loosely adhering deposits
  - b) Abrade the coating surface with coarse sandpaper (80-120 grit) using a circular motion
  - c) Ensure that the surrounding coating is abraded (remove gloss) one inch beyond the defect on all sides
  - d) Ensure abraded surface is cleaned of any sanding debris with compress air or a lint free cloth
  - e) With surface temperature between 10°C (50°F) and 95°C (203°F), brush apply 3M™ Scotchkote™ Liquid Epoxy Coating 323+ to a minimum thickness of approximately:
    - i) Standard single layer coating applications: 508 µm (20 mils).
    - ii) Horizontal Directional Drilling applications: 1016 µm (40 mils).
2. Repair Method B – Damaged areas revealing bare metal up to 25 cm<sup>2</sup> (4 in<sup>2</sup>) in size
  - a) Remove oil, grease, and loosely adhering deposits
  - b) Abrasive blast as outlined in this application guide, or by power tool cleaning in accordance with SSPC SP 11 to remove dirt, scale, rust, damaged coating and any other foreign material to a bare metal condition and retain or produce the surface profile required.
  - c) Continue with the same steps “c”, “d” and “e” as in Method A
3. Repair Method C – Damaged areas revealing bare metal larger than 25 cm<sup>2</sup> (4in<sup>2</sup>) in size
  - a) Remove oil, grease, and loosely adhering deposits
  - b) Abrasive blast as outlined in this application guide
  - c) Continue with the same steps “c”, “d” and “e” as in Method A

---

### Holiday Detection

Test coating using high voltage holiday detector per CSA Z245.20 (125 volt/mil or 5 volts/µm)]

**3M™ Scotchkote™ Liquid Epoxy Coating 323+  
Spray Application Guide for External Protection of Steel Pipes**

**Document References**

**3M™ Scotchkote™ Liquid Epoxy Coating 323+** Product Data Sheet.

---

**Customer Service**

For ordering technical or product information, call:  
1-800-722-6721 in the United States  
1-800-265-1840 in Canada

For further information or technical documents:

**[www.3m.com/corrosion](http://www.3m.com/corrosion)**

3M and Scotchkote are trademarks of 3M Company.

---

**Important Notice**

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product, which are not contained in 3M's current publications, or any contrary statements contained on your purchase order, shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.

**Warranty; Limited Remedy; Limited Liability**

This product will be free from defects in material and manufacture at the time of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any direct, indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**

---

**Electrical Markets Division**

6801 River Place Blvd.  
Austin, TX 78726-9000  
800.722.6721  
FAX: 877.601.1305  
[www.3M.com/corrosion](http://www.3M.com/corrosion)

Please recycle  
© 3M 2018 All rights reserved  
78-9237-0960-0 Rev A