Tapecoat®

Manufacturer's Qualified Application Procedure (MQAP)

1.0 SCOPE

This document contains recommended practices for the application of Tapecoat Epoxy coating systems in order to meet CSA Z245.30 2014. These coatings meet the manufacturer qualification coating test requirements for System FC1 or FC2, liquid applied epoxies with glass transition temperature limitations. Refer to Section 2.0 Materials for specifics system designation. The various epoxy grades discussed in this document are used for the corrosion protection of piping, girth welds, fittings, pipe reconditioning and pipe fabrication for above and below grade environments. For assistance in coating selection, surface preparation, application or inspection, please contact a Chase Representative.

2.0 MATERIALS

a. COATINGS

- TC® 7000 Epoxy - A two part, 100% solids, high temperature coating designed to provide protection against corrosion on pipelines with service temperatures up to 300˚F (149˚C). TC 7000 can be used as an above or below grade standalone coating or as a primer for Tapecoat high temperature tape products. It can be applied by brush, applicator pad or spray. In above grade applications oxidation is expected, but at the recommended coating thickness long term protection will be provided. Meets acceptance criteria for **System FC2**.

- TC® 7025 EZ Flow Epoxy - A two part, 100% solids coating designed to provide protection against corrosion on pipelines with service temperatures up to 165˚F (74˚C). TC 7025 is a below grade, standalone coating that can be applied by brush, applicator pad or spray. Meets acceptance criteria for **System FC1**.

- TC® 7030 High Build Epoxy - A two part, 100% solids, high build, high temperature coating designed to provide protection against corrosion on pipelines with service temperatures up to 300˚F (149˚C). TC 7030 is a below grade, standalone coating that can be applied by brush or applicator pad. Meets acceptance criteria for **System FC2**.

- TC® 7100 Epoxy - A two part, 100% solids coating designed to provide protection against corrosion on pipelines with service temperatures up to 165˚F (74˚C). TC 7100 is an above or below grade, standalone coating that can be

applied by brush or applicator pad to dry and damp surfaces. In above grade applications oxidation is expected, but at the recommended coating thickness long term protection will be provided. The TC 7100 was designed to provide superior adhesion to damp surfaces. Meets acceptance criteria for **System FC1**.

- TC® Wet Bond Epoxy Mastic - A two part, 100% solids coating designed to provide protection against corrosion on pipelines with service temperatures up to 165˚F (74˚C). Wet Bond Epoxy Mastic can be used below or above grade on dry to wet surfaces. In above grade applications oxidation is expected, but at the recommended coating thickness long term protection will be provided. It is a high build, standalone coating that can be applied by brush or applicator pad. The Wet Bond Epoxy Mastic was designed to provide superior adhesion to wet and fresh water submerged surfaces. Meets acceptance criteria for **System FC1**.

b. SUPPORTING PRODUCTS (OPTIONAL)

- TC® Reinforcing Mesh – A mesh reinforced nonwoven used during the application of the epoxies to increase the impact and abrasion resistance.

c. OUTWRAP (OPTIONAL)

- Tapecoat Terra Shield® - A 3/8" thick closed cell polyethylene foam rock shield with ¼" perforations. Protecting the pipe coating by cushioning the impact of the backfill as it is reintroduced into the ditch and keeping deleterious backfill from direct contact with the pipe coating after the ditch has been closed.

3.0 APPLICATION REQUIREMENTS (Per CSA Z245.30-14, Section5.3.2)

a. Items required for hand application of Tapecoat Epoxies include solvent resistant brushes or applicator pads. Airless or air-assisted spray equipment may also be utilized for application of Tapecoat Epoxies. Refer to section k-iii Two Part Spray Application for equipment type. Not all epoxies can be sprayed, please refer to section 2.0 Materials for product details on spray capability.

b. The Steel and adjacent coatings shall be cleaned with acetone, isopropyl alcohol (IPA), xylene, toluene or other fast drying solvents that do not leave any residue. Mineral spirits should not be used.

c. The pipe cleaning must meet SSPC-SP 10/NACE No. 2/ SA 2 ½. The surface profile must be 2-4 mils. All substances that will impede bond or otherwise be detrimental to the performance of the coating system must be removed prior to the coating application. This includes all loose surface material, rust, dirt, dust, moisture, grease, oil, sharp edges, burrs, mill scale, welding splatter and shop lacquer. Important to note: Clean the grit or shot off the pipe surface after blasting. The coating must be applied as soon as practical after cleaning to keep dirt and rust bloom from re-

contaminating the pipe surface. Before coating application the surface must be dry. Preheating the surface can aid in drying the surface, but care must be given to not exceed 150˚F. Be cautious not to damage the existing coating during this step by always keeping the torch moving. Common items and tools used to aid in pipe cleaning include solvent, scrapers, files, wire brushes, power brushes, grinders, and commercial blasting equipment.

d. The surface preparation of adjacent anti-corrosion coatings must meet SSPC-SP 1 at a minimum for new FBE. For newly cured epoxies, the surface must be abraded so that it has a surface profile of 2-4 mils. For repair or reconditioning applications over existing epoxy or FBE the cleaning must meet SSPC-SP 2 or SSPC-SP 3 at a minimum, but SSPC-SP 6/NACE No.3 can also be used.

e. Tapecoat Epoxies are compatible with FBE and epoxies.

f. Preheating of the substrate is not normally required. If the substrate temperature is below the range stated below it can be heated using a wide mouth torch until the substrate is within the stated range, but care must be given not to exceed 150^0F (66^0C). Preheating can be used for removing moisture present on the pipe surface should it exist.

g. The substrate temperature range for surface preparation, application and during cure shall be between 45F to 120F (7C-49C).

h. The temperature of the substrate must be 5˚F (3˚C) above the dew point temperature.

i. The epoxy is supplied in kits to allow for the correct ratio between the Part A and Part B. Do not make any changes to the mix ratio. Do not add thinner to the epoxy.

   Pour the Part B (Hardener) into Part A (Resin). Scrape the part B container to make sure as much of the material as possible is used. For kits smaller than 1 gallon mix the combined parts using a stir stick for 3 minutes. For kits that are 1 gallon and larger a drill with a mixing blade should be used for 3 minutes.

   After the mixing is complete pour some of the material back into the Part B container. Mix with a stir stick and add the material back to the Part A container. Mix for an additional 30-60 seconds.

j. For coating thickness range please see chart below.

Epoxy	Maximum Thickness per Coat	Target Thickness for Most Applications
TC 7000	25 mils	25 mils
TC 7025	25 mils	25 mils
TC 7030	40 mils	25 mils

TC 7100	25 mils	25 mils
TC Wet Bond Mastic	60 mils	40 mils

* Above data is at 70°F (21°C) and 50% RH. Site conditions can increase or decrease the pot life and recoat window.

k. The application methods for Tapecoat Epoxies listed below are hand and spray applications. All epoxies can be hand applied, but not all can be sprayed. Please refer to section 2.0 Materials for product details on spray capability.

i. Brush or Applicator Pad Application

I. Using a solvent resistant brush or applicator pad apply a coat that has a maximum wet film thickness (WFT) as detailed in Appendix A. A WFT gauge should be used to verify the coating thickness. Be sure to touch up the marks left by the gauge before the coating cures. The Tapecoat epoxies are all 100% solids so the dry film thickness (DFT) measurement will be the same as the WFT.

II. If multiple coats are required or for increased protection, allow the first coat to dry to a light touch before application of the second coat. Apply a second coat of epoxy as described in Section 4.1.4. Never exceed the pot life or recoat window listed in Appendix A. If the recoat window has been missed the surface must be prepared as listed in Section 3.

III. For added impact and abrasion resistance TC Reinforcing Mesh can be applied between coats or over the final coat before the final coat dries. When coating a pipe the Reinforcing Mesh should be applied spirally using light tension. When coating fittings or other structures the Reinforcing Mesh can be cut to length and laid into the wet epoxy. Use a brush or applicator pad to smooth the Reinforcing Mesh and allow it to wet out.

ii. Spray Cartridge Application

I. Cartridges should be warmed to 90-110°F for 1-2 hours to allow for an even spay pattern. Do not exceed 120°F as this will affect the integrity of the spray cartridge.

II. Remove the retaining nut, compression disc and end cap from the cartridge nozzle.

III. Seat the static mixer tip onto the cartridge and tighten the retaining nut securely onto the cartridge threads.

IV. Insert the cartridge into the pneumatic gun housing.

V. Attach the atomization airline to the static mixer tip. Attach the airline hose to an air supply.

VI. To achieve on ratio mixing, point cartridge assembly up and slowly dispense material into the static mixer tip. Dispense the first 6 inches of unmixed material into a waste container. Repeat this procedure for each new or partially used cartridge.

VII. Adjust the air pressure (gauge near the bottom of the gun) to 90-100psi. Adjust the fluid pressure (dial at the end of gun) as needed to obtain a good spray pattern.

iii. Two Part Spray Application

I. Airless or air assisted type spray equipment available from several manufacturers may be used. The following procedures have provided satisfactory results, but alternatives may be equally successful.

Delivery Flow Rate	1 GPM
Fluid Pressure at tip	3,500 psi
Tip Opening	Graco 331 for up to 12" pipe Graco 431 for larger pipe

II. Follow all safety instructions listed by the maker of the spray equipment.

l. For Tapecoat curing schedule in relation to temperatures please see chart below

Epoxy	30-40°F	50-60°F	70-80°F	90-100°F	110-120°F	130-140°F	Pot Life*	Maximum Recoat Window*
TC 7000	>6 hours	2-3 hours	2-3 hours	1-2 hours	30-45 minutes	30 minutes	15-20 minutes	6 hours
TC 7025	>12 hours	5-6 hours	4-5 hours	2-3 hours	1-2 hours	45 minutes	25-30 minutes	6 hours
TC 7030	>6 hours	2-3 hours	2-3 hours	1-2 hours	30-45 minutes	30 minutes	10-15 minutes	6 hours
TC 7100	>12 hours	5-6 hours	4-5 hours	2-3 hours	1-2 hours	45 minutes	25-30 minutes	6 hours
TC Wet Bond Mastic	>12 hours	5-6 hours	4-5 hours	2-3 hours	1-2 hours	1 hour	15-20 minutes	6 hours

Above data is at 70°F (21°C) and 50% RH. Site conditions can increase or decrease the pot life and recoat window.

m. All damaged and loose coating must be removed. After removal the surface must be prepared as discussed in Section c and d.

Apply the epoxy as detailed in Section k. The new epoxy coating should overlap the existing coating by a minimum of 1" on all sides.

n. For backfill times on Tapecoat Epoxies, refer to chart below.

Epoxy	30-40˚F	50-60˚F	70-80˚F	90-100˚F	110-120˚F	130-140˚F
TC 7000	>6 hours	2-3 hours	2-3 hours	1-2 hours	30-45 minutes	30 minutes
TC 7025	>12 hours	5-6 hours	4-5 hours	2-3 hours	1-2 hours	45 minutes
TC 7030	>6 hours	2-3 hours	2-3 hours	1-2 hours	30-45 minutes	30 minutes
TC 7100	>12 hours	5-6 hours	4-5 hours	2-3hours	1-2hours	45 minutes
TC Wet Bond Mastic	>12 hours	5-6 hours	4-5 hours	2-3 hours	1-2hours	1 hour

Note: Determined by the time to reach a Shore D Harness reading of 75. Epoxies were stored and mixed at 70°F.

o. Tapecoat Epoxies handling and storage requirements are as follows:

i. Stored between 45ºF-120ºF (7ºC-49ºC).

ii. Humidity will not affect this material.

iii. Should be stored in their original, unopened containers away from the elements (snow, rain) and out of direct sunlight.

iv. Should be stored in their original, unopened containers away from possible contaminants (dust, water, chemicals).

v. Should be used on first in, first out basis. Should be used prior to their expiration date (18 months from manufacturer).

vi. Should be stored in their original, unopened containers and protected from all forms of physical damage.

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