

INSTALLATION PROCEDURE

Ceilcote® 652 Lining

Reinforced Vinyl Ester Lining

Description

Installation information contained in this procedure is as specific as possible but cannot cover all variations in field conditions. If anticipated conditions do not permit following these guidelines, do not hesitate to call your CEILCOTE Representative.

Materials Required

The materials used for application and installation consist of :

- a. Primer – CEILCOTE 380 Primer
380 Primer Resin and #2 Hardener
(add C-1 powder for conductive primer)
- b. Basecoat – CEILCOTE 652 Lining
652 Lining Resin and #2 Hardener
- c. Reinforcement – 1½ oz mat (2 layers) and C mat (surface veil)
- d. Topcoats – CEILCOTE 652 Lining Resin (3) topcoats (resin & hardener only) with the last (third) topcoat containing thin film curing aid

Equipment

For Surface Preparation:

- Abrasive blasting
- Blastrac (Horizontal)
- Scarification or other mechanical means

For Mixing:

- Volume measure for liquid (1qt. or 1 gal)
- Volume measure for Hardener (cubic centimeters or ounces)
- Measuring bucket (1 gal)
- 3 or 5 gal pail if mixing with drill
- Heavy duty ½" (1.27 cm) drill motor
- Plaster whip for mixing
- Scale (in pounds for measuring powder)

For Application:

- Shears or utility knife for cutting glass cloth/mat
- Plaster or cement finishing trowel (generally 4"x12")
- Marginal trowels 2" x 5" or 2" x 8"
- Wallpaper brush (for dry pressing glass cloth/mat before saturating)
- Paint roller covers (short 3/8" nap mohair or equivalent) and frames
- Steel or aluminum ribbed roller
- 1 gal (3.78 liter) pail for cleaning solvent
- Clean Pails -3 or 5 gal (minimum 3 required for mixing, cleaning solvent and for styrene)
- Surface thermometer for environmental monitoring
- Psychrometer for determining air temperature, relative humidity, and dew point
- Surface comparator for steel profile
- Wet film thickness gage
- Disc sander
- Cleaning rags
- Scoop for powder

SURFACE PREPARATION

Steel

Grit blast the surface to "White Metal" in accordance with Steel Structures Painting Council specification SSPC SP5 or NACE No. 1, using a clean and dry blasting abrasive of such mesh size that will give a 3 mil minimum profile. SSPC 10 or NACE #2 for fumes and dry environments.

The air supply for each blasting nozzle should be at least 250 CFM continuous input volume at 100 psi. Separators and traps should be used to assure both a dry abrasive and dry air at the nozzle. Proper blasting hoods and gloves are recommended.

Remove dirt, dust and abrasives by vacuuming, air blowing or careful brushing.

All metal surfaces must be primed with Ceilcote 380 before contamination or rust deterioration can occur. Primer may be sprayed or rolled to yield 1-4 wet mils. Average coverage of CEILCOTE 380 Primer is 300 sq. ft. per gal. Catalyze with 2 ½ oz. Hardener No. 2 per gallon of primer.

Refer to **Specification CPT-2** for full details of constructing steel tanks

Concrete

New

New concrete must be thoroughly cured. All form oils, curing solutions and laitance must be completely removed by Blastrac or grit blasting. Concrete should be abrasive blasted to a texture similar to 40-60 grit sandpaper. Prepared surfaces must be clean, dry and firm.

Use ASTM D 4263 to determine if the concrete is dry enough to apply the primer. Test several areas. Tape an 18" x 18" square of polyethylene or other clear film to the floor. Leave in place for 16 hours. If condensation appears on the underside of the film or if the concrete becomes visibly damp, it is not dry enough to place the primer. Retest until no moisture appears.

Existing

Previously coated or heavily contaminated surfaces should be abrasive blasted to provide a clean, dense surface. New or uncontaminated surfaces must be prepared, by grit or abrasive blasting, blastrac or scarification. All concrete surfaces can be primed with CEILCOTE 380 Primer. When spark testing is required, use 380 Primer with C-1 Powder.

All oils, grease, dirt, old coatings, or chemical contaminants must be removed by surface preparation. Contaminated concrete may require multiple detergent and/or solvent cleaning, abrasive blasting, or in some instances may be unsuitable for coating. If this is determined, consult CEILCOTE.

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CAUTION: Concrete “gassing” or “breathing” may occur when the surface temperature is rising due to sunlight or increasing ambient temperature. This can cause bubbles or holes in the applied floor, lining or coating. When this problem occurs it is necessary to shade the surface from sunlight and/or apply the material in the cooler evening or at night so that initial cure can take place without air escaping from the concrete. Consult CEILCOTE for more detailed recommendation.

Concrete Repair

All surface irregularities (i.e., bug holes, voids), should be filled. An epoxy mortar can be used by mixing 1 gal. of catalyzed CEILCOTE 380 PRIMER and adding 18-22 pounds of Type S-1 powder or 2 1/2 gals (approximately 9-10 lbs.) of CEILCOTE S-11 Powder to make a thick paste. Adjust working thickness by adding more or less powder. For a premixed filler, use CEILCOTE 310 Ceilpatch. Fill voids and allow to cure hard (4-8 hrs). Refill shrinkage cracks if necessary. Allow to cure 8 hours before coating.

Refer to **Specification CPT-1** for full details of constructing concrete structures to receive CEILCOTE 652 Lining.

MIXING PROPORTIONS

To ensure safe working, the safety precautions listed on the labels as well as the information provided in the MSDS Sheets must be observed. The individual components must be mixed completely and thoroughly.

- **Primer**

Mix 380 Primer resin and #2 hardener thoroughly and apply the Primer to the substrate by spray or roller.

Mixing Ratio	By Volume
<u>CEILCOTE 380 Primer</u> 380 Primer Resin #2 Hardener	1 gal 2.5 oz
<u>CEILCOTE 652 Lining</u> 652 Lining Resin #2 Hardener	1 gal 2.5 oz

HANDLING PROPERTIES

All times are approximate

Working Time	380 Primer	652 Lining
50°F (10° C)	60 min	60 min
70°F (21° C)	45 min	45 min
90°F (32° C)	20 min	20 min

Recoat	380 Primer	652 Lining
50°F (10°C)	5 hrs	12-24 hrs
70°F (21°C)	2 hrs	4-8 hrs
90°F (32°C)	1 hr	3-4 hrs

To ensure proper intercoat adhesion, Ceilcote 652 Lining basecoat should be recoated within seven days when shaded from sunlight and four hours if exposed to direct sunlight

Time to Place in Service	
50°F (10° C)	48 hrs
70°F (21° C)	24 hrs
90°F (32° C)	12 hrs

Coverage

CEILCOTE 380 Primer on concrete	160 - 200 ft ² /gal
CEILCOTE 380 Primer on steel	6520 - 300 ft ² /gal
CEILCOTE 380 Primer with CEILCOTE C#1 Powder (For holiday testing)	140 - 160 ft ² /gal
Ceilcote 652 Lining	7 to 8.5 ft ² /gal
S#1 Powder	100-120 ft ² /bag
1.5 oz mat	2.2 x total ft ²
C Veil or Nexus Synthetic Veil	1.1 x total ft ²
Thin Film Curing Aid	0.001 lbs/ ft ²

Packaging

The following standard packages are available

CEILCOTE 380 Primer	1, 5 & 30 gal units
C#1 Powder	5.2 lb bag
CEILCOTE 652 Lining	1, 5 & 53 gal units
Type S-1 Powder	50 lb bags
1.5 oz mat	ft ²
C Veil or Nexus Synthetic Veil	ft ²
Thin Film Curing Aid	1 gal

ENVIRONMENTAL CONDITIONS

- For all application steps, the surface temperature, air temperature and material temperature should be between 50°F (10°C) and 110°F (43°C).
- Do not apply if the relative humidity is more than 90% or the surface temperature is less than 5° above the dew point of the air in the working area.
- Dehumidification (DH) air conditioning and/or heating equipment may be necessary to control environmental conditions.

APPLICATION

Primer

Mix CEILCOTE 380 PRIMER liquid and catalyst, Roll (short nap roller), brush or spray primer onto concrete at approximately 2-5 wet mils. Airless or air spray may be used. Consult Ceilcote Quick Reference for Spray Equipment Chart for equipment required. CEILCOTE 380 PRIMER surface must be base coated within 4 weeks (1 week if exposed to direct sunlight), to assure proper adhesion of basecoat to primer.

For longer exposure, confirm recoatability by wiping with Styrene monomer. If surface becomes “tacky”, adhesion is acceptable. If not softened by Styrene, surface must be abrasive blasted or mechanically abraded to provide a non-glossy, abraded surface. For additional questions, consult CEILCOTE.

Basecoat

1. Pour the accurately measured 2 ½ ounces of #2 Hardener into the center of the CEILCOTE 652 Lining resin material.
2. Immediately mix thoroughly for one minute. Use a 1/2" electric drill with a mortar type paddle or a jiffy type mixer. Plaster or mortar type (rectangular) blade works best.

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3. Add appropriate powder (weighed) slowly to desired texture. Powders will vary in amount a slightly due to temperatures of materials. To test texture before all powder is added, use a trowel and dip into bucket and see if material will stay on the underside of the trowel (holding upside down) for at least five (5) seconds.
4. If material doesn't fall off your done, if it does, add more powder and re-check. Note a small amount of powder makes a big change at this point.
5. Remove mixer from bucket and using a long (8 in) margin trowel scrape the sides and bottom of the bucket.
6. Re-mix until all powder is wetted out and there are no gray spots remaining.
7. Pot life (working time) is about 40 minutes at 77°F (25°C).
8. Use within 15-30 minutes after adding hardener. Smaller batches can be made to square off areas. Measurements must be accurately measured.

The basecoat, is best applied to large surfaces with a trowel. For outlets, flanges, angles and other more intricate parts of the tanks, it may be best to use a brush. Basecoat should be approximately 1/16" thick and mixed as listed in the mixing proportion section of this procedure.

In hot weather, it is best to apply CEILCOTE 652 Lining basecoat in areas sufficient for only one section of glass mat (approximately 4' wide x 5' long)

Irregular Areas

Angle Braces, Welds, etc. - Cover braces first with basecoat and mat, lapping out at least one inch on adjacent areas. The change in elevation where a brace has been welded onto a flat surface must be filled with the basecoat so that the mat

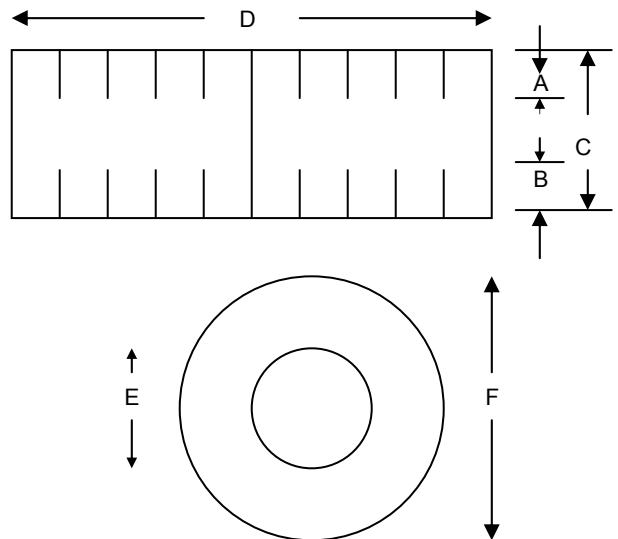


will not bridge over an empty space.

Corners - When the basecoat is applied the corner should be rounded by filling in with basecoat and finishing off with a small pointing trowel. This will assist in eliminating bridging at this point. When rolling the cloth/mat work toward the corner to avoid bridging.

Tank Lining Outlets, Flanges - For outlets, over 2" in diameter the cloth/mat may be cut as follows:

- A. Slit to flange width
- B. 1" lap on inside tank
- C. Length outlet plus flange plus lap
- D. Circumference of outlet plus lap
- E. Nozzle diameter
- F. Flange diameter



The outlets should be covered first before any glass cloth/mat is put on the interior of the tank. After the glass cloth/mat has been put on the outlet, the interior of the tank is covered to the outlet. Then after the glass cloth/mat on the interior of the tank has set up, a 2" strip of cloth/mat is cut to apply around the circumference of the outlet, 1" extending along the tank wall, 1" extending into the outlet.

To produce a smooth flange face apply the topcoat slightly mounded around center circumference of the flange. Wax thoroughly a piece of plywood and clamp it on with c-clamps to the fresh topcoat, making certain it is flat on the face of the flange. From inside the tank reach into outlet and remove excess material squeezed from under the form.

Rivets - The line of rivets must be smoothed with basecoat mix for easier covering with glass cloth/mat.

Pitted Steel - Pits must be filled as a separate operation after priming. Use CEILCOTE 380 PRIMER mixed to a paste with S-11 Powder. For a pre-mixed filler, use CEILCOTE 310 Ceilpatch. Trowel in several directions using the trowel as a squeegee.

Tank Bottoms - For small tanks, it is a good idea to turn the tank over on its side to do the bottom. For large tanks, the bottom is done last. The tank floor, should be protected to keep it clean while lining the walls.

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Mat

Cutting and Placement - Measure the length desired (equal to the area to be base coated). This area will vary with application rate. The glass, is best cut with scissors or shears. Roll up the cut piece of mat tightly for easier handling.

When the mat is applied, a minimum lap of 1" is required over adjacent mat.

It is necessary to press the glass mat firmly into the basecoat so that no hollow areas remain. This may be done with the hands, a dry trowel, a dry wall paper brush or a paint roller. It is necessary to be especially careful to press the glass mat/cloth firmly into corners.



Saturating

The saturating coat is mixed as described in the Mixing Section of this procedure. Immediately press the glass mat into the basecoat. Roll or brush the dry mat until the basecoat starts to come through. The saturating liquid is best applied with a roller or large brush. Saturate the mat by dipping the paint roller or brush into the saturating resin and roll or brush until the mat has lost its white color. Saturation is complete when all the areas of the glass cloth/mat have lost their whiteness and have become slightly translucent.

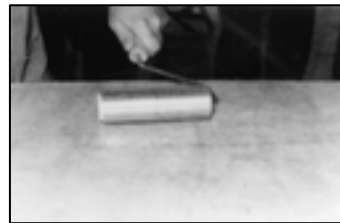


At overlap, the top lap of mat should be lifted so that saturating liquid can be applied to the bottom layer. The top layer is then pressed on the bottom layer and saturated.

Use only the minimum amount of resin necessary to saturate the mat.

The chopped strand mat must be rib rolled immediately after saturation to remove entrapped air. It is very important to roll out all possible air from the lining.

Immediately place another layer of glass mat on the wet surface, dry roll and then saturate as with first layer. Roll the second layer with the ribbed roller to remove trapped air. The second layer of mat must be placed so that the adjoining second layer is lapped at a different place than the first layer. All joints must be lapped at least one inch.



Before the glass mat layer has hardened, lay on the surface "C" mat and roll it. Usually it will saturate without adding any more saturating resin.



Inspection and Testing

After the lining has hardened, spark test with a 15,000 to 20,000 volt spark tester. Any pinholes must be repaired by grinding down as small an area as possible at the pinholes and patching with mat and resin plus hardener. Allow the patches to harden before proceeding with the next step.

When used on concrete, 652 Lining systems may be visually inspected for voids or spark testing may be performed. To increase the visibility of the spark a conductive primer (CEILCOTE 380 PRIMER and C-1 Powder) may be used.

After the lining has been tested, sand off bumps, loose fibers, etc., then brush or roll on an even, heavy coat of the saturant as the 1st topcoat. Allow this to harden approximately 16 hours.

Apply the 2nd topcoat containing a thin film curing aid. Let harden 24 hrs. at temperatures above 75°F or 48 hrs. between 60° and 75°F

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Curing

652 Lining systems should be allowed to cure for 24-48 hours at 70°F (21°C) before being placed in service for maximum physical and chemical properties.

CLEAN UP

Equipment and tools may be cleaned with T-410, MEK or lacquer thinner before the CEILCOTE 652 Lining has hardened. After the CEILCOTE 652 Lining has hardened, the best way to remove it from tools is with methylene chloride.

SAFETY

Store in cool, dry area [50°- 90° F (10° - 32° C)] away from direct sunlight, flame or other hazards.

CEILCOTE 652 Lining contains polyester resins and MEK peroxide catalyst. The product's components have been formulated to optimize physical characteristics such as filling capacity, abrasion, moisture and chemical resistance while minimizing hazardous physical and health factors encountered during application. A concerted effort is made to be aware of the latest chemical toxicological information and to apply this knowledge in a responsible manner to insure product safety.

During application of CEILCOTE 652 Lining materials, always wear gloves and appropriate work clothing to minimize contact. Ventilation is required with special consideration for enclosed or confined areas. Air movement must be designed to insure turnover at all locations in work area and adjacent areas to avoid buildup of heavy vapors. Use caution when handling flammable liquids, eliminate sources of ignition from work area and containers with residues.

Observe safe storage practices by separating resins from hardeners, by keeping solvents in a cool area, free of sources of ignitions.

Product Material Safety Data Sheets are available and should be consulted when handling products. These products are for industrial and professional use only; application directions must be followed.

MAINTENANCE

Periodically inspect the applied material and repair localized areas as needed. Consult your CEILCOTE representative for additional information.

Important Note

The information in this data sheet is not intended to be exhaustive; any person using the product for any purpose other than that specifically recommended in this data sheet without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at their own risk. All advice given or statements made about the product (whether in this data sheet or otherwise) is correct to the best of our knowledge but we have no control over the quality or the condition of the substrate or the many factors affecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability at all for the performance of the product or for (subject to law) any loss or damage arising out of the use of the product. WE HEREBY DISCLAIM ANY WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. All products supplied and technical advice given are subject to our Conditions of Sale. You should request a copy of this document and review it carefully. The information contained in this data sheet is liable to modification from time to time in the light of experience and our policy of continuous development. It is the user's responsibility to check with their local International Paint representative that this data sheet is current prior to using the product.

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