

# CEILCOTE® COROCRETE® SERIES

## *Polyester, reinforced, trowel applied linings*

Installation procedures contained in this bulletin are as specific as possible, but cannot cover all variations in field conditions. Therefore, supervisors experienced in installing Master Builder materials may sometimes deviate slightly from the published procedures. This is done to give a better installation by using the most up-to-date methods to fit specific field and service conditions.

Other Master Builders data sheets which may be required are Construction Specification CS-10- Quality of Concrete Surfaces, Recommended Construction Practice CP-11- Repair and Preparation of Concrete for Lining, Recommended Construction Practice CP-14- Surface Preparation of Concrete Floors, Recommended Construction Practice CP-17- Constructing Floors to Receive Master Builder Monolithic Flooring and Linings, and NACE Specification RP 0178-89 for Tanks and Vessels to be lined.

### **EQUIPMENT:**

#### **For Surface Preparation:**

- Abrasive blasting Equipment
- Blastrac (for horizontal concrete surfaces)
- Scarification or other mechanical means

If none of these methods are available, consult Master Builders.

The following list of equipment is essential for a typical lining or topping installation using CEILCOTE CEILCRETE material.

#### **For Mixing:**

- Volume measure for liquid 1 qt or 1 gal (.95 or 1 liter)
- Volume measure for Hardener (cubic centimeters or ounces)
- 5 gal (18.9 liter) pail if mixing with a drill
- 5 gal (18.9 liter) pail for mixing saturating liquid
- 1/2" drill motor
- Plaster whip for mixing
- Scale (in pounds for measuring powder)

#### **For Application:**

- Shears or utility knife for cutting glass cloth
- Cement finishing or plastering trowel
- Marginal Trowel 2" x 5" (5.08 x 12.7 cm)
- Wallpaper brush (for dry pressing glass cloth before saturating)
- Smoothing brush - good grade horsehair, nylon (6"), and/or short nap mohair paint roller (for topcoat)
- Paint roller covers (short nap mohair or equivalent) and frames
- 1 gal (3.78 liter) pail for smoothing liquid
- 1 gal (3.78 liter) pail for cleaning solvent

### **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 if the surface temperature is less than 5% above the dew point of the air in the working area.

### **SURFACE PREPARATION:**

#### **A. Steel**

1. Welds must be continuous and ground to remove sharp edges, laps, undercuts and other surface irregularities. Weld spatter must be removed. Sharp edges should be rounded to a 1/8"(3mm) radius.
2. Steel must be blasted to "White Metal" as defined by SSPCSP5-89 or NACE Specification No. 1 with a 3 mil (minimum profile. Prime with CEILCOTE 370 Primer.

Refer to Spec. CPT-2 for full details of constructing steel tanks to receive Ceilcrete.

#### **B. New Concrete**

**Walls** - The surface of most formed concrete contains holes from air entrapment. The best preparation is to lightly sandblast to open holes covered with cement and to roughen the surface. If lining work must be done in direct sunlight, the holes should be filled after priming using the lining primer mixed with filler (S-11 Powder). The trowel should be used as a squeegee, stroking in several directions to completely fill the holes and leave only a thin film (10 mils) on the surface. If the wall is not in sunlight, the base coat will sufficiently fill the holes; no filling prior to lining is necessary.

**Floors** - The new concrete floors should preferably be cured for at least 28 days, then mechanically abraded by abrasive blasting or scarification to remove laitance and surface contaminants.

Master builder's Recommended Construction Practice for floors is found in Bulletin CP-17 (CPT-2). Complete Recommendations for Surface Preparation are found in Bulletin CP-14.

#### **C. Old Concrete**

**Walls** - Remove contamination and old coating by gritblasting. Prime all concrete surfaces. Old concrete walls may require filling and patching as with new concrete.

**Old Concrete, continued**

**Floors** - The entire surface should be prepared by abrasive blasting, blastrac, chipping, scarifying or scabbling. Acid etch is normally not recommended. Detergent cleaning is necessary for oil, grease etc... contaminated concrete. Scrub a small area with strong detergent (Johnson Wax Company's "J-Shop 600"). Wash with water. For weak and or contaminated concrete removal of damaged surface is necessary with the use of a chipping hammer, chisel, or bush hammer.

**PRODUCT PREPARATION:**

**Storage** - CEILCOTE liquids, primer liquids and hardeners should be stored in a cool place and away from flames, Most liquids may gel after 3 - 6 months from date of manufacture when stored at 70°F (21°C), faster at higher temperatures. CEILCOTE 6650 liquid within 1 month. Expiration dates are printed on the containers. Powders are stable indefinitely at all temperatures if kept dry.

**Batch Sizes** - The size of batch will depend somewhat upon the ambient temperature. A typical batch size of basecoat should be sufficient to do two strips of glass cloth each approximately 4' wide by 5' (1.22 x 1.52 cm) long. A chart giving the ratios on mixing hardeners to liquids is contained below and on container labels.

**MIXING PROPORTIONS**

Product	Base coat	Saturant	Topcoat
<b>CEILCOTE 2500 CEILCRETE</b>			
CEILCOTE 2500/25 Liquid	1 gal	1 gal	1 gal
Hardener #3C	2 fl. oz	2 fl. oz	2 fl. oz
S-1 Powder (2500S)		20 - 24 lbs	20 - 24 lbs
B-4 Powder (2500B)		14 - 18 lbs	14 - 18 lbs
S-9AR Powder (2500AR)	*		22 - 26 lbs

**CEILCOTE 6400 CEILCRETE**

CEILCOTE 6400/ 64 Liquid	1 gal	1 gal	1 gal
Hardener #3C	2 fl. oz	2 fl. oz	2 fl. oz
S-1 Powder (6400S)		20 - 24 lbs	20 - 24 lbs
B-4 Powder (6400B)		13 - 16 lbs	13 - 16 lbs
S-9AR Powder (6400AR)	*		22 - 26 lbs

**CEILCOTE 6640 CEILCRETE**

CEILCOTE 6640 liquid	1 gal	1 gal	1 gal
Hardener #2C	2.5 oz	2.5 oz	2.5 oz
S-1 Powder (6640S)		20 - 24 lbs	20 - 24 lbs
S-9AR Powder (6640AR)	*		22-26 lbs

**CEILCOTE 6650 CEILCRETE**

CEILCOTE 6650/74 Liquid	1 gal	1 gal	1 gal.
Hardener #2C	2.5 oz.	2.5 oz	2.5 oz
S-1 Powder (6650S)		20 -24 lbs	20 - 24 lbs
B-4 Powder (6650B)		13 - 17 lbs	13 - 17 lbs
S-9AR Powder (6650AR)	*		22 - 26 lbs

\* Use S-1 powder in basecoat of "AR" systems (20 - 24 lbs. per gal.)

**CEILCOTE 695 CEILCRETE Base coat**

CEILCOTE 6640 Liquid	1 gal	1 gal	
Hardener #2C	2.5 oz	2.5 oz.	
S-1 Powder	20 - 24 lbs	20 - 24 lbs	

Product	Basecoat	Saturant	Topcoat
<b>CEILCOTE 695 CEILCRETE Topcoat</b>			
CEILCOTE 6650/74			
Liquid	1 gal		
Hardener #2C	2.5 oz	2.5 oz	2.5 oz.
S-1 Powder (695S)		20-24 lbs	20-24 lbs
B-4 Powder (695B)		14-18 lbs	14-18 lbs
S-9AR Powder (695AR)			22-26 lbs

**NOTE:**

1. When using B4 Powder in a carbon filled system, the Hardener level should be double the amount used for a "S" filled system using S-1 Powder.
2. CEILCOTE 6650/74 Liquid is packaged in 3/4 gal., 4 gal., and 40 gal. units and have a two month shelf life at 77°F (25°C).

**Mixing Procedures:**

1. Always add hardener to liquid and mix well before adding powder.
2. More or less powder may be added as required.
3. Use within 15-30 minutes after adding hardener. Working life is approximately 40 minutes at 70°F (21°C).
4. Only mix 1 gallon unit at a time.

**Coverage Factors**

	Primer	Coverage
<b>For steel:</b>	CEILCOTE 370	250-300 ft <sup>2</sup> /gal. (6.1-7.4 m <sup>2</sup> /liter)
<b>For concrete:</b>	CEILCOTE 380	150-175 ft <sup>2</sup> /gal. (3.7-4.3 m <sup>2</sup> /liter)

Liquid (Lbs./Ft <sup>2</sup> ) (includes appropriate hardener)	Powder (Lbs./Ft <sup>2</sup> )		
	S-1	S-9AR	B-4
<b>CEILCOTE 2500S CEILCRETE</b> (CEILCOTE 2500/25 resin)	1.0	--	--
<b>CEILCOTE 2500B CEILCRETE</b> (CEILCOTE 2500/25 resin)	—	--	0.80
<b>CEILCOTE 2500AR CEILCRETE</b> (CEILCRETE 2500/Lining 25 resin)	0.50	0.60	--
<b>CEILCOTE 6400S CEILCRETE</b> (CEILCOTE 6400/64 resin)	1.0	—	--
<b>CEILCOTE 6400B CEILCRETE</b> (CEILCOTE 6400/64 resin)	—	--	0.80
<b>CEILCOTE 6400AR CEILCRETE</b> (CEILCOTE 6400/64 resin)	0.50	0.60	--
<b>CEILCOTE 6640S CEILCRETE</b> (CEILCOTE 6640 resin)	1.0	—	--
<b>CEILCOTE 6640AR CEILCRETE</b> (CEILCOTE 6640 resin)	0.50	0.60	--
<b>CEILCOTE 6650S CEILCRETE</b> (CEILCOTE 6650/74 resin)	1.0	—	--
<b>CEILCOTE 6650B CEILCRETE</b> (CEILCOTE 6650/74 resin)	—	--	0.80
<b>CEILCOTE 6650AR CEILCRETE</b> (CEILCOTE 6650/74 resin)	0.50	0.60	--
<b>CEILCOTE 695S CEILCRETE base coat</b> (CEILCOTE 6640 resin)	1.0	--	--
<b>CEILCOTE 695S CEILCRETE topcoat</b> (CEILCOTE 6650/74)	0.50	--	--
<b>CEILCOTE 695AR CEILCRETE topcoat</b> (CEILCOTE 6650/74)	—	0.60	--
<b>CEILCOTE 695B CEILCRETE</b> (CEILCOTE 6650B resin)	--	—	0.40

## **APPLICATION:**

### **Environmental Conditions**

For all application steps, the surface temperature, air temperature and material temperature should be between 50 and 110 degrees F (10 and 43 degrees C).

Do not apply if the relative humidity is more than 90% of the surface temperature is less than 5% above the dew point of the air in the working area.

### **Primer:**

**Concrete** - Mix CEILCOTE 380 Primer liquid and catalyst, roll, brush or spray primer onto concrete at approximately 1 - 4 wet mils. Airless or air spray may be used. Consult Master Builders Tech Data sheet No. 1.2 T for equipment required. CEILCOTE 380 Primer surface must be base coated within 4 weeks (2 weeks if exposed to direct sunlight), to assure proper adhesion of basecoat to primer. If time period is extended, consult Master Builders.

**Metal** - Mix P-370 Primer liquid and catalyst. Roll, brush or spray onto metal substrate at approximately 1-4 wet mils. Airless or air spray may be used. Consult Master Builders Tech Data sheet No. 1.2T for equipment required. Surfaces should be base coated within 8 weeks (2 weeks if exposed to direct sunlight), to assure proper adhesion of basecoat to primer. If time period is extended, consult Master Builders.

\* CEILCOTE 695 Base coat (CEILCOTE 6640) is utilized as the primer for the CEILCOTE 695 system.

**Base coat** - The base coat 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. Base coat should be approximately 1/16" (40 to 80 mils) thick and mixed as listed in the mixing proportion section of this bulletin.

In hot weather, it is best to apply CEILCOTE base coat in areas sufficient for only one section of glass cloth approximately 4' wide x 5' long (10.16 x 12.70 cm).

### **Irregular Areas :**

**Angle Braces, Welds, etc.** - Cover braces first with base coat and cloth, 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 base coat so that the cloth will not bridge over an empty space.

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

**Outlets, Flanges** - For outlets over 2" (5.08 cm) in diameter the cloth may be cut as follows:

- A. Slit to flange width
- B. 1" (2.54 cm) lap on inside tank
- C. Length outlet plus flange plus lap
- D. Circumference of outlet plus lap

The outlets should be covered first before any glass cloth is put on the interior of the tank. After the glass cloth has been put on the outlet, the interior of the tank is covered to the outlet. Then after the glass cloth on the interior of the tank has set up, a 2" (5.08 cm) strip of cloth is cut to apply around the circumference of the outlet, 1" (2.54 cm) extending along the tank wall, 1" (2.54 cm) 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 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 base coat mix for easier covering with glass cloth.

**Pitted Steel** - Pits must be filled as a separate operation after priming. Use CEILCOTE 380 Primer mixed to a paste with S-11 Powder. 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.

### **Cloth**

**Cutting and Placement** - Measure the area to be base coated. This area will vary with application rate. Typically, 4" wide by 5' (1.22 x 1.52 cm) long Remove a strand from the inside of glass section to be cut to form a line for cutting.

The glass is best cut with scissors, following the line along the missing strand of glass. After cutting, one or two edge strands are pulled off to prevent unraveling. Roll the section(s) tightly for easier handling.

When the cloth is applied, a minimum lap of 1" (2.54 cm) is required over adjacent cloth.

It is necessary to press the glass cloth 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 cloth firmly into corners.

### **Saturating**

The saturating coat is mixed as described in the Mixing Section of this bulletin. Saturating should be done before the troweled basecoat has hardened. Only in cases where the glass cloth is being applied over head is it permissible to press the cloth into the basecoat and allowed to harden before saturating.

Roll or brush the dry cloth until the basecoat starts to come through. The saturating liquid is best applied with a roller or large brush. At overlap, the top lap of cloth 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. Saturation is complete when all the areas of the glass cloth have lost their whiteness and have become slightly translucent.

#### **Topcoat**

The topcoat should be mixed in proportions as described in the Mixing Section of this bulletin.

Prior to application of the topcoat, the saturated cloth must be examined for air pockets which must be cut out and patched and all protrusions, laps, etc., ground down with a sander or grinder.

The topcoat is best applied by trowel to large areas and by brushing to more intricate areas such as flanges and outlets. The topcoat should be applied approximately 1/16" thick (40 to 80 mils), troweled as evenly as possible, and then smoothed lightly with a brush or short nap roller dampened with Styrene Smoothing Liquid.

#### **Curing**

CEILCOTE CEILCRETE Series systems should be allowed to cure for 24 - 48 hours before being placed in service for maximum physical and chemical properties. CEILCOTE 695 CEILCRETE system should be allowed to cure for 5 days at 70°F (21°C), two days in sunlight, or seven days at 50°F (10°C) following application before being placed in service.

#### **Inspection and Testing**

After initial hardening of topcoat (approximately 16 hours at 70°F (21°C)) on metal surfaces used in immersion service, test with a 15,000 volt spark tester. Pinholes must be ground down to glass cloth and then filled with top coat mixture. When used on concrete, Ceilcrete 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 C Primer) may be used.

#### **CLEANING:**

After lining with CEILCOTE CEILCRETE Series materials, tank interiors shall be thoroughly washed with water and cleaned appropriately before being placed in service.

#### **SAFETY:**

CEILCOTE CEILCRETE Series systems contain polyester resin and styrene monomer. The hardener is an organic peroxide. Observe the following health, physical and storage precautionary measures before using products:

#### **HEALTH PROTECTION INFORMATION:**

Wear gloves, eye protection and appropriate work clothing to avoid contact with components. Ventilation is required with special consideration for enclosed or confined areas. Air movement must be designed to ensure turnover at all locations in work and adjacent areas to avoid build-up of heavy vapors. Styrene vapor concentration above 100 ppm requires the use of an organic vapor cartridge respirator or a self-contained breathing apparatus.

Refer to Material Safety Data Sheets (MSDS) for specific health information of each product.

#### **PHYSICAL HAZARDS:**

Master Builders system components and solvents are flammable. Heat, sparks and flames or any source of ignition must be kept at least 50 feet from working area. Use grounded nonsmoking tools in work area. Empty containers containing residues may ignite explosively.

Heavy vapors, if allowed to concentrate, can reach explosive level in tanks or enclosed areas. Continue ventilation after application until product is cured (recommended 24 hours at 70°F (21°C)).

#### **STORAGE SAFETY:**

Observe safe storage practices by separating resins from hardeners, by keeping solvents in a cool area free of sources of ignition, and by observing a special CEILCOTE warning on **RED** and **YELLOW** labeled products. The CEILCOTE **RED** label represents amine type chemicals, and the CEILCOTE **YELLOW** label represents organic peroxide type chemicals which should not be stored adjacent to each other or mixed together because of possible violent reaction between them.

Hardeners #2 and #3 organic peroxides must be stored at temperatures below 100°F (38°C) to avoid decomposition and below 140°F (60°C) to avoid ignition from sparks or flame.

#### **GENERAL:**

Fumes from the application of CEILCOTE CEILCRETE Series may impart taste or odor to foods or other materials. Consult Master Builders, Inc. for procedure on handling CEILCOTE Series Ceilcrete in areas containing foods.

#### **FOR INDUSTRIAL AND PROFESSIONAL USE ONLY**

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