



**Corrosion
Engineering™**

AN ERGONARMOR COMPANY

TECHNICAL INFORMATION

CES-259

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CORROSION ENGINEERING SPECIFICATION FOR INSTALLATION

PENNCOAT® 331 and PENNCOAT 340 LINING

1. SURFACE PREPARATION

1.1 Steel:

- 1.1.1 Steel surfaces should be abrasive blasted in accordance with Steel Structures Painting Council Specification SSPC-SP-5 and/or National Association of Corrosion Engineers NACE #1.
- 1.1.2 The lining's performance is directly related to the anchor pattern profile and cleanliness of the steel. For immersion service conditions, highly corrosive environments and thermal cycling, the steel substrate should be clean, dry and have a minimum anchor profile of 3 mils. For less severe conditions, splash, spillage and no thermal cycling, a 2-3 mil anchor profile is acceptable with a SSPC-SP-10 and NACE #2, near white surface cleanliness.
- 1.1.3 PENNCOAT 331/340 may be applied directly to blasted steel prepared to the above standards without use of PENNTROWEL Vinyl Ester Primer, provided the first coat is installed before the re-appearance of surface rust. Total lining thickness must be a minimum of 30 mils DFT. Either a thin coat of PENNTROWEL Vinyl Ester Primer or PENNCOAT 331/340 (~5-8 mils) should be applied to blasted steel if lining work will not commence before the appearance of surface rust. Total lining thickness over primer must be a minimum of 30 mils DFT.
- 1.1.4 If PENNCOAT 331/340 is to be applied onto concrete surfaces, the use of PENNTROWEL Vinyl Ester Primer is necessary to minimize out-gassing from the concrete substrate.

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1.2 Concrete:

1.2.1 Concrete surfaces should exhibit a minimum surface tensile bond strength of 200 psi when tested in accordance with ACI 503R-89 Appendix A.1. Mechanical methods such as abrasive blasting or scarifying are the preferred methods. Chemical methods such as acid etching and detergents should be utilized to remove laitance, oil and grease or when mechanical methods cannot be utilized. Read and follow manufacturer's MSDS's and safety precautions when handling these chemicals.

1.2.2 Applicable ASTM Standards for surface preparation are:
D4258 - Practice for Surface Cleaning Concrete for Coating
D4259 - Practice for Abrading Concrete
D4260 - Practice for Etching Concrete
D4261 - Practice for Surface Cleaning Concrete Unit Masonry for Coating
D4262 - Test Method for pH of Chemically-Cleaned or Etched Concrete Surfaces
D4263 - Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
D4285 - Method for Indicating Oil or Water in Compressed Air

1.2.3 Do not apply Penntrowel Vinyl Ester Primer, Penncoat 331 or Penncoat 340 on latex-based concrete patching compounds or underlayments. Vinyl ester coatings may dissolve or react with the latex which will result in little or no adhesion to the substrate. Penntrowel Epoxy Primer may have to be applied to latex-based patching compounds before Penncoat 331/340 is applied. Contact Corrosion Engineering for further details.

2. MIXING OF COMPONENTS

2.1 Do not attempt coating application if substrate temperature is within 5 F of dew point or if relative humidity is greater than 95%.

2.2 Since concrete expels air during the day and intakes air during the night, the best time to apply linings is late afternoon or early evening at which time concrete is least likely to expel air. Other precautions such as shading the work area from sunlight to minimize the heating of the substrate will also reduce expulsion of air.

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2.3 PENNTROWEL Vinyl Ester Primer Mixing and Application on Concrete Substrates

2.3.1 Mixing: PENNTROWEL Vinyl Ester Primer Resin should be stirred thoroughly prior to adding CHP Hardener. Add Hardener to Resin portion and mix for a minimum of 5 minutes. Do not thin.

2.3.2 Application: PENNTROWEL Vinyl Ester Primer should be applied with a stiff brush and worked into the surface with a strong scrubbing action so as to emulsify the wetness at the concrete surface, and to penetrate into the concrete. Excess primer should be removed from the surface.

2.3.3 For MR (Mat Reinforced) linings incorporating chopped strand glass mat reinforcing, apply PENNTROWEL Vinyl Ester Primer as above at a rate of no more than 200 sf/gal. While primer is still wet, roll in 1 or 1 ½ oz chopped strand glass mat reinforcing, saturating the mat with catalyzed PENNTROWEL Primer. Smooth out wrinkles and blisters as required.

2.3.4 Allow Primer to cure until dry to touch before proceeding with PENNCOAT 331/340 application.

2.4 PENNCOAT 331/340 Mixing

2.4.1 PENNCOAT 331/340 Resin should be stirred thoroughly prior to adding CHP Hardener. Add CHP Hardener to Resin portion and mix for a minimum of 3 minutes or until uniform color and consistency is obtained. Use 2 fl. oz. of CHP Hardener per gallon of Resin. Do not thin without specific written authorization from Corrosion Engineering. Be certain to check the sides of the mixing container for uncatalyzed resin.

2.4.2 A Jiffy® mix blade, model PS 21, or similar paint mixing blade, should be used, along with a variable speed drill, to ensure proper mixing.

3. APPLICATION

3.1 Penncoat 331

3.1.1 PENNCOAT 331 Lining may be applied by brush, roller or spray.

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For spray instructions, refer to section 3.2.

3.1.2 A natural bristle brush and/or a short nap wool or mohair roller may be used to apply PENNCOAT 331 Lining.

3.2 Penncoat 340

3.2.1 PENNCOAT 340 Lining is applied by spray to insure even uniform results. The recommended equipment for spray application is as follows:

3.2.2 Plural component - Air Atomized: Binks 18C Catalyst side injector external mix or 18NC internal nozzle mix gun. Low pressure 4:1 or 8:1 material pump. Catalyst handled by pressure injector or pump.

3.2.3 Plural Component - Air Assisted Airless: Gun and tip are designed to atomize filled materials at lower pressure through larger orifices than most standard airless guns. Fan shape is adjusted by external air. Binks Portable System 105-1168, B 5, 20:1 material pump, Model 202-755 gun, Super Slave catalyst pump. Glas-Craft 3-WP AAC Portable Spray System, LPA-11-AAC gun, 11:1 material pump, SP-85 Catalyst Slave Pump.

3.3 Pot Life

3.3.1 The pot life or working time of the material is mass sensitive: the larger the volume the shorter the pot life. Do not catalyze more material than can be used within the pot life. Above 90°F ambient temperature, best results are obtained when the catalyzed material is poured into smaller containers reducing the mass. When ambient temperature exceeds 80°F the pot life can be extended by cooling the materials. The materials should be stored between 65°F and 75°F for 24 hours prior to use for optimum handling properties. If plural component application equipment is used, materials are not premixed and pot life is not a factor. Mixing chamber and spray tip must be kept clean and flushed with solvent.

| Temperature | PENNCOAT 331/340 Pot Life |
|--------------|---------------------------|
| 50°F (10°C) | 100 Minutes |
| 70°F (22°C) | 45 Minutes |
| 90°F (30°C) | 25 Minutes |

Pot Life test performed on 200 gm. sample

4. RECOAT AND TOPCOAT LIMITATIONS

- 4.1 The applicator should always plan the work so that the primer and lining are applied within the shortest time possible.
- 4.2 PENNCOAT 331 and Penncoat 340 Lining can be top coated according to the temperature information below; however, if applicator must walk on the basecoat to apply the topcoat this time should be extended.

| Temperature | PENNCOAT 331/340 Minimum Recoat Time | PENNCOAT 331/340 Time to Complete Cure |
|----------------|---|---|
| @ 50°F (10°C) | 8 Hours | 48 Hours |
| @ 70°F (22°C) | 2 Hours | 24 Hours |
| @ 90°F (30°C) | 1 Hour | 16 Hours |

- 4.2.1 In the event it is desirable to accelerate the cure of PENNCOAT 331/340 from the times noted above, the amount of CHP Catalyst may be increased up to 50% (from 1.5% by weight of resin, to 2.25%, or from 2 fl. oz. per gallon of resin to 3 fl. oz. per gallon of resin). The effect on work life and set time will be to roughly reduce these values by 50%, and contractor shall govern his work procedure accordingly. The addition of CHP Hardener beyond 2.25%/wt. (3 fl. oz. per gallon of resin) is not recommended.
- 4.3 If the PENNCOAT 331/340 Lining first coat is left uncoated beyond the time to complete cure, or if there is a need to recoat cured PENNCOAT 331 Lining, the surface must be cleaned and abrasive blasted to promote bonding of the next coat.

5. CURE TIME AND SUBSTRATE TEMPERATURE

- 5.1 The cure time is also dependent on temperature of the substrate. The ambient air temperature may not be the temperature of the substrate, i.e. direct sunlight will heat steel to a higher temperature than ambient air. In winter, steel may be colder than ambient air. The substrate temperature should be measured and dew point calculated prior to coating. Substrate temperatures below 50°F will retard the curing of PENNCOAT Linings.

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6. CLEAN-UP

- 6.1 All mixing equipment, spray equipment, rollers and brushes should be cleaned immediately after use. Solvents recommended for clean-up are methyl ethyl ketone or lacquer thinner. When using these materials read and follow the supplier's material safety data sheets.
- 6.2 The use of acetone for vinyl ester based materials such as PENNCOAT 331/340 linings is not recommended.

7. STORAGE AND SHELF LIFE

- 7.1 PENNCOAT 331/340 Lining and components should be stored in a cool, dry, area and out of direct sunlight. PENNCOAT 331/340 Linings and Primer should ideally be used immediately. Storage is not recommended. The hardener is a peroxide and should not be stored near amines. Contact of the hardener with an amine will result in a violent reaction.
- 7.2 Typical Shelf Life
 - 7.2.1 PENNCOAT 331/340 Lining and PENNTROWEL Vinyl Ester Primer can be stored safely up to 8 months at 50°F, 6 months at 70°F, and 1 month at 90°F. Shelf life may be shortened in humid climates.

8. SAFETY PRECAUTIONS AND DISCLAIMER

- 8.1 PENNCOAT 331/340 Lining components and mixes of them present a number of hazards. Read before using and follow the hazard information, precautions, and first aid directions on the individual product labels and Material Safety Data Sheets.
- 8.2 The statements, technical information and recommendations contained herein are believed to be accurate as of the date hereof. Since the conditions and methods of use of the product and of the information referred to herein are beyond our control, Corrosion Engineering expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information; NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. The

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information provided herein relates only to the specific product designated and may not be applicable when such product is used in combination with other materials or in any process. The user should thoroughly test any application before installation. Nothing contained herein should be taken as an inducement to infringe any patent and the user is advised to take appropriate steps to be assured that any proposed use of the product will not result in patent infringement.

- 8.3 Please contact Corrosion Engineering for specific recommendations at +1-610-833-4000 or fax +1-610-833-3040.

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