

CORROSION ENGINEERING SPECIFICATION FOR INSTALLATION

PENNTROWEL[®] 250 AND N-13 SURFACER

1.0 SCOPE

- 1.1 The following specification sets forth the proper environmental, mixing, application, and curing criteria for PENNTROWEL 250 Surfacers and PENNTROWEL N-13 Surfacers. These surfacers are trowel applied over primed concrete to a normal thickness of 1/4" (6mm) or 3/8" (9mm). After compacting and troweling, a smoother surface may be imparted by using a dry short nap roller.
- 1.2 PENNTROWEL Surfacers are high performance resinous epoxy monolithics formulated for protecting concrete floors in corrosive conditions where temperature cycling and thermal shock are present. PENNTROWEL Surfacers are available in gray, with other colors available upon request.

2.0 MATERIALS

2.1 Primer

- 2.1.1 PENNTROWEL Epoxy Primer shall be used to prime concrete surfaces before surfacer is applied. Read product data sheet CE-139 for more details. The primer is a 2-component chemically curing epoxy compound formulated to improve adhesion of epoxy monolithics to either dry or damp concrete.

2.2 Surfacers

- 2.2.1 PENNTROWEL 250 Surfacers is a 3-component thermal shock resistant epoxy monolithic consisting of a resin, hardener, and filler formulated for acid, alkali, solvent, detergent, and grease protection for concrete floors. The Surfacers is chemically resistant over a

PENNTROWEL[®] SURFACERS INSTALLATION SPECIFICATION
CES-310
10/12 SUPERSEDES 04/00 PAGE 2 OF 8

broad temperature range from 0°F (-18°C) to 250°F (121°C) intermittent. Read product data sheet CE-247 for more details. Consult document CER-151 for specific chemical resistance.

2.2.2 PENNTROWEL N13 Surfacer is a heavy-duty trowel applied monolithic topping compound. Formulated from premium quality novolac epoxy resins, it resists severe chemical exposure including 98% sulfuric acid, 50% caustic, 37% hydrochloric acid, 20% nitric acid, tetrachloroethylene and other strong chemicals and solvents. When trowel applied to a 3" thickness over a suitably prepared concrete substrate, PENNTROWEL N13 Surfacer will provide a hard, dense, abrasion resistant, chemical-resistant and thermal shock resistant surfacer for concrete substrates. For heavy traffic, severe impact, and severe thermal shock areas, PENNTROWEL N13 Surfacer may be specified at 3/8" thickness. PENNTROWEL N13 Surfacer is applied over PENNTROWEL Epoxy Primer.

3.0 CONCRETE PREPARATION

3.1 New Concrete

3.1.1 See "Standard Practice for Curing Concrete" ACI-308

3.1.2 Primer must be applied to a clean uncontaminated concrete surface.

3.1.3 The concrete should have a minimum compressive strength of 3,000 psi (21 MPa) and a minimum surface tensile strength of 300 psi (2.1 MPa).

3.1.4 Concrete additives, curing compounds and air entrainment agents should not be used as they may interfere with the adhesion of the primer.

3.1.5 The concrete slab should be finished with a wood float. Steel trowel finishing is not recommended. To ensure removal of laitance and loosely adhered particles, the slab should be either mechanically abraded (see ASTM D4259 "Abrading Concrete") or chemically etched with a single application of 10% muriatic acid, thoroughly rinsed with water, and dried. (see ASTM 4260 "Acid Etching Concrete"). Due to environmental, safety and quality issues, acid etching is recommended only as a last resort. Read all

PENNTROWEL[®] SURFACERS INSTALLATION SPECIFICATION
CES-310
10/12 SUPERSEDES 04/00 PAGE 3 OF 8

safety warnings and manufacturers recommendations when handling muriatic acid.

- 3.1.6 Concrete floor should be continuously sloped to drains and/or trenches a minimum of 1/4" per foot (21mm/m). The slab should have sufficient flatness to avoid birdbaths or puddling.
- 3.1.7 Concrete should be free of all moisture that will inhibit adhesion or cure of topping compound (see ASTM D 4263 "Indicating moisture in concrete by the plastic sheet method").

3.2 Existing Concrete

- 3.2.1 The integrity and performance of the surfacer is directly related to the quality of the existing concrete slab. The slab should have a strong, sound surface with a minimum compressive strength of 3,000 psi (21 MPa) with a minimum surface tensile strength of 300 psi (2.1 MPa).
- 3.2.2 If concrete has leached badly or is chemically attacked it should be tested for integrity.
- 3.2.3 Existing concrete which is chemically attacked, weathered, or mechanically worn should be replaced with a synthetic rubber latex modified Portland cement and sand mix overlay. Read PENNTROWEL Latex Underlayment data sheet for specific details CE-235. If extensive deterioration is observed, new concrete should be installed in accordance with section 3.1.
- 3.2.4 Existing concrete surfaces must be clean and dry. The surface may be cleaned by scarifying or mechanically abrading (see ASTM D4259 "Abrading Concrete"). Chemically etch by using 10% muriatic acid (see ASTM D4260 "Acid etching concrete") followed by thorough rinsing with water and drying. (See ASTM 4258 "Surface Cleaning Concrete for Coating"). See notes in section 3.1.5.
- 3.2.5 Grease, fats, and oils should be removed by washing with an alkaline detergent. Difficult to remove greases may require chipping or sand blasting. Detergents must be thoroughly rinsed with water. Do not use solvents to remove greases, fats, or oils. Consult ASTM D-4258 and D-4261.

PENNTROWEL[®] SURFACERS INSTALLATION SPECIFICATION
CES-310
10/12 SUPERSEDES 04/00 PAGE 4 OF 8

3.2.6 Existing concrete surface should be reasonably sloped to continuously drain.

4.0 ENVIRONMENTAL CONDITIONS

4.1 Outdoor Installation

4.1.1 The air temperature and concrete slab temperature should be between 50°F (10°C) to 85°F (30°C). The concrete slab temperature must be 5°F (3°C) above the moisture dew point.

4.1.2 For optimum application results primer and surfacer should be applied out of direct sunlight or shaded if possible, and not under windy conditions.

4.1.3 For optimum application results primer and surfacer should be applied onto concrete when the temperature of the slab is decreasing, or cooling, rather than when the slab temperature is rising.

4.1.4 Primer must be applied over concrete surfaces whether new or existing, damp or dry. Primer will not adhere to wet concrete.

4.2 Indoor Installation

4.2.1 If installation is indoors follow sections 4.1.1 and 4.1.4.

5.0 PRIMER APPLICATION

5.1 PENNTROWEL Epoxy Primer components should be stored in a cool, dry, location and brought to as close to 70°F (21°C) as possible prior to use.

5.2 Mixing Instructions

5.2.1 Remove lids from primer resin and hardener cans.

5.2.2 Slowly pour primer hardener into primer resin container.

5.2.3 Stir with a mechanical mixer for a minimum of five minutes, insuring components are of a uniform color and texture.

5.3 Application Instructions

5.3.1 After mixing, apply primer by stiff brush onto prepared concrete using a strong scrubbing action.

PENNTROWEL[®] SURFACERS INSTALLATION SPECIFICATION
CES-310
10/12 SUPERSEDES 04/00 PAGE 5 OF 8

- 5.3.2 Excess primer should be removed with a squeegee to maintain coverage and avoid puddling.
- 5.3.3 Surfacer may be applied while primer is wet, but must be applied before primer is dry to touch.
- 5.3.4 One primer is dry to touch, new primer must be applied. The existing primer need not be removed.

6.0 SURFACER APPLICATION

- 6.1. Store components in a cool, dry location and bring to as close as 70°F (21°C) as possible prior to use.
- 6.2 Remove lid of surfacer resin container and pour resin into a container suitable for mechanical mixing.
- 6.3 The mixer should be a KOL-Type rotary mixer or equivalent. It should consist of a slowly rotating container around a fixed blade which folds the components into a homogeneous mix. Do not use an electric drill mixer as it whips air into the viscous mix. A paddle type mortar mixer is recommended when mixing large mixes.
- 6.4 Add surfacer hardener to resin in mixing container as per ratios specified in product data sheet.
- 6.5 Mix resin and hardener slowly and thoroughly for at least one minute or until mix is homogeneous.
- 6..6 Slowly add all surfacer filler over a period of one (1) minute or until mix is homogeneous.
- 6..7 Surfacer mix which has begun to set cannot be recovered by adding more resin.
- 6..8 Never add water, Portland cement, additives or adulterants to surfacer mix.
- 6.9 Thicknesses
 - 6.9.1 The thickness of the trowelable epoxy topping must not be less than the following:
 - A) 3/16" (4.8mm) for floors in areas subject to light traffic.
 - B) 1/4" (6.4mm) in areas subject to average traffic and wet/dry exposure.

PENNTROWEL[®] SURFACERS INSTALLATION SPECIFICATION
CES-310
10/12 SUPERSEDES 04/00 PAGE 6 OF 8

- C) 3/8" (9.5mm) in areas subject to extremely heavy traffic or to regular spillage of a corrosive liquid.

7. INSTALLATION TECHNIQUES

7.1 Surfacers must be tightly compacted by one of the following methods.

7.1.1 Steel Trowel

A steel trowel is the preferred tool and method for finishing PENNTROWEL Surfacers. This is best accomplished by applying moderate pressure with the trowel to impart a uniform finish. A uniform surface can be obtained with 2 or 3 trowel passes.

Avoid excessive troweling as a dark discoloration (burnishing) may occur.

The use of magnesium trowels is recommended as they will minimize any discolorations.

7.1.2 Wood Float

An alternative finishing method for PENNTROWEL Surfacers is by means of wood float, which may be passed over the surface with moderate pressure.

Finishing with a dry short napped mohair roller is required to insure a non-porous surface. (See following alternative finishes).

7.1.3 Power Trowel

PENNTROWEL Surfacers may be power troweled. Contractors experienced with the specialty equipment and techniques required for this installation technique shall install PENNTROWEL Surfacers Linings in this manner.

7.2 Alternative Finishes

7.2.1 Can be obtained with a dry short-napped mohair paint roller.

7.2.2 Lightly rolling the troweled surface will yield a medium skid resistant surface.

PENNTROWEL® SURFACERS INSTALLATION SPECIFICATION

CES-310

10/12 SUPERSEDES 04/00 PAGE 7 OF 8

7.2.3 Extensive rolling or medium pressure exerted on the roller will yield a resinous somewhat slick smooth surfacer. Periodic cleaning of the roller with solvent (xylol or xylene or toluene) may be required to remove build up. Shake off excess solvent thoroughly before re-rolling. Minimize solvent contact with installed surfacer. Read and follow manufacturers recommendations when handling xylol, xylene, or toluene.

8. EXPANSION JOINTS

- 8.1 Expansion contraction or stress relief joints shall be installed over all points of movement in the substrate. Follow expansion and control joint drawings CED-1002, CED-1018, and CED-1021.
- 8.2 Expansion joints shall pass completely through the topping to the substrate and must be cut or formed to provide a vertical face or side at 90E to the bottom of the substrate. Cuts shall be 1/4" (6mm) to 3/8" (10mm) in width.
- 8.3 Before placing the sealant in the joint, a bond-breaker, such as thin PVC pressure-sensitive tape, shall be placed in the bottom of the joint, adhered to the substrate to prevent the adhesion of the sealant to the substrate. The sealant should then adhere only to the sides of the joint.
- 8.4 When placing an expansion joint over an expansion joint in the substrate, first remove 1/4" (6mm) to 2" (12mm) of the joint filler from the joint in the substrate and replace it with a 10% closed cell polyethylene foam showing a compression deflection of 25% at an applied stress of 4 psi in accordance with ASTM D-1621. Then proceed as in paragraph 7.2.
- 8.5 Expansion joint sealant shall be flexibilized 100% solids epoxy sealant, amine catalyzed, with an elongation of 50% to 75% and with a Durometer hardness (A scale) of at least 60. Read FLEXJOINT® Pouring Grade data sheet CE-133 for specific product information.

9. MISCELLANEOUS DETAILS

- 9.1 In all areas where the installed floor does not butt against a vertical surface, the PENNTROWEL Surfacers shall be keyed in. The key shall be saw cut into the concrete, and have a depth of 1/4" (6mm) and width of a minimum 1/4" (6mm).

10. CURING

- 10.1 Do not allow water or any other fluids on surface for a minimum of 24 hours @70°F (21°C). If floor must be put into service before this time, contact Corrosion Engineering for further details.
- 10.2 Allow installed PENNTROWEL Surfacer to cure a minimum of 24 hours at 70°F (21°C) before allowing heavy traffic. At lower temperatures PENNTROWEL Surfacer will take longer to cure. See data sheet CE-247 and CE-272 for cure rates.
- 10.3 Light foot traffic is allowed after a 4-5 hour cure @70°F (21°C).

11. CLEAN-UP

- 11.1 Clean mixing equipment, tools, and trowels with MEK, xylene, or toluene. Consult cleaning solvent suppliers Material Safety Data Sheet (MSDS) for proper precautions.

12. SAFETY PRECAUTIONS / DISCLAIMER

- 12.1 Read and follow the hazard information, precautions and first aid directions on the individual product labels and material safety data sheets before using. While all statements, technical information, and recommendations contained herein are based on information our company believes to be reliable, nothing contained herein shall constitute any warranty, express or implied, with respect to the products and/or services described herein and any such warranties are expressly disclaimed. We recommend that the prospective purchaser or user independently determine the suitability of our product(s) for their intended use. No statement, information or recommendation with respect to our products, whether contained herein or otherwise communicated, shall be legally binding upon us unless expressly set forth in a written agreement between us and the purchaser/user.
- 12.2 Please contact Corrosion Engineering for specific recommendations at +1-610-833-4000 or fax +1-610-833-4000.