SPECIFICATION FOR INSTALLATION

TUFCHEM® II MEMBRANE ON CONCRETE

1. SCOPE

1.1 This specification governs the installation of TUFCHEM II Membrane as manufactured by Corrosion Engineering for the protection of concrete structures and surfaces. For steel substrates, consult specification CES 326.

1.2 This specification covers the application and inspection work, and shall be used in conjunction with information presented on product data sheets CE-196 and CE-139.

2. MATERIALS

2.1 Primer: PENNTROWEL® Epoxy Primer, data sheet CE-139, which shall be applied on concrete before application of the TUFCHEM II Membrane.

2.2 Membrane: Elastomeric urethane asphalt membrane TUFCHEM II Membrane, as outlined on data sheet CE-196.

3. SURFACE PREPARATION

3.1 When forms are used in placing the concrete, formwork should be designed so as to yield a smooth, continuous concrete surface to which the lining is applied. Concrete irregularities caused by formwork offsets shall be ground smooth before proceeding with lining work as outlined in 3.6 and 3.7 below.

3.2 A single pass troweled finish shall be given to new concrete floors with special care being taken to avoid bringing laitence to the surface.

3.3 Concrete shall achieve a minimum compressive strength of 2,500 psi (17 MPa) before the lining is applied. All concrete surfaces shall exhibit a minimum tensile bond strength of 250 psi (1.7 MPa) as tested with a Dillon Dynamometer or an Elcometer adhesion tester. Random tensile bond tests should be performed on each wall or floor section with a frequency of one test per 400 square feet (37 sm) of surface area to be lined.

3.4 New concrete shall be cured in accordance with good practice as outlined in ACI-308 "Recommended Practice for Curing Concrete". Do not use liquid curing compounds as they may impede the bond of the lining system.

3.5 The concrete surface shall be prepared in accordance with ASTM D-4259 "Standard Practice for Abrading Concrete" to achieve a surface texture similar in appearance and feel to a 100 to 150 grit of sandpaper. The intent is to remove sufficient material in order to achieve a sound concrete surface free of laitence, glaze, efflorescence, and form release agents.

3.6 All form marks and protrusions such as prominent aggregate exposure, tie wires, reinforcing wires, etc., must be cut off below the surface and shall be filled by packing with a suitable fast curing sand/cement repair mix. All cavities, stone pockets, honeycombing, and bug holes shall also be filled.

3.7 ASTM D4263 "Standard Test Methods for Indicating Moisture in Concrete by the Plastic Sheet Method" shall be followed to indicate the presence of moisture in the concrete. This test shall be performed before priming at a frequency of of one test for every 400 square feet (40 sm) of area to be lined,

3.8 The moisture dew point shall be 5˚F (2˚C) above the moisture dew point temperature. Work shall not proceed with respect to Membrane application when the moisture dew point temperature is less than as specified above.

3.9 Note material and mixing temperature requirements in sections 4.3, 5.1, 5.2 and 5.3 below before proceeding.

4. PRIMING CONCRETE

4.1 After concrete surface has been prepared and accepted in accordance with Section 3.0 "Surface Preparation" and Section 7.0 “Inspection and Test", the concrete shall be primed with PENNTROWEL Epoxy Primer. Mix Primer in accordance with its written instructions.

4.2 Concrete should appear visually dry on the surface before proceeding. However the concrete may still have a high moisture content. Test concrete for presence of moisture in accordance with ASTM D 4263. If ASTM Test D4263 indicates the presence of moisture, the Primer shall be installed by using a stiff brush with a hard scrubbing action. This will emulsify the moisture and entrap it within the moisture tolerant Primer allowing lining work to proceed after Primer has dried to touch.

4.3 Primer shall be dry to touch before application of subsequent lining work. Primer will dry hard in approximately 16 hours at 60˚F (15˚C), 8 hours at

70˝F (21˝C), and 6-1/2 hours at 90˝F (32˝C). It is generally efficient practice and preferable to stage work flow to allow Primer to dry overnight.

5. MEMBRANE MIXING

5.1 All materials should be stored at a minimum of 50˝F (10˝C) and not higher than 90˝F (32˝C). Temperatures outside of this range will affect the work life set time and handling properties of the material. It is preferred for best mixing and application results that materials be stored as close to 70˝F (21°C) as possible.

5.2 The mixing area, whether outdoors or indoors, should be as close to 70˝F (21°C) as possible, shaded from the sun and the wind. Minimum and maximum ambient air temperatures for lining application shall be as outlined in section 5.1 above. At the time of mixing and application the temperature of the components are preferred to be approximately 70°F (21°C) for ideal handling properties.

5.3 Remove the lid from the unit pail. The component B is contained inside the component A pail in a false lid inside the pail. Inspect for damage incurred during transit, insure that there are no leaks in the component B container and that there is no water present on or in component A.

5.4 TUFCHEM II Membrane requires a specific mixing blade. For mixing, Corrosion Engineering recommends the use of a Jiffler mix blade - Model DC312 with 2 x 6.5" (165 mm) propeller blades to mix the Adhesive/Membrane. Blades shall be set with dimensions of 5" (125 mm) from the base of the bottom of the blade (sitting on a flat surface) to the top of the ferrule on the top blade. Jiffler mix blades with preset and welded propeller blades are available from Corrosion Engineering +1-610-833-4000. Use of other mixing equipment may adversely affect mix results and product performance. Use of any other equipment shall only be authorized following consultation and written approval of Corrosion Engineering.

5.5 Use a heavy duty variable speed drill, having a 3/4" (16-18 mm) chuck with sufficient torque to deliver a minimum speed of 230 rpm under load. Mix TUFCHEM II base component A for 1 minute to loosen material that may

have settled in transit.

5.6 Open component B hardener, and continue to mix component A at the recommended speed. Begin pouring the component B into the component A. Be careful component B does not splash out of the pail as it is added. Total elapsed time for the addition of the component B should be 15 to 20 seconds while mixing. Tap the component B container to insure all contents are drained into the component A and the container is fully emptied.

5.7 When the material temperature is 70°F (21°C) or higher, mix for at least three (3) minutes using a good mixing technique to yield a uniform mix. When the temperature of the components is 50°F (10°C), mix for at least five (5) minutes using a good mixing technique to yield a uniform mix. A good mixing technique involves moving the mixing paddle around in the pail in a circular motion, while moving the paddle up and down throughout the mix. In this way uncatalyzed Part A material along the side of the pail and on the bottom is fully mixed in with the hardener/catalyst.

5.9 Never allow moisture or other contaminants to come in contact with either membrane component or the wet mix.

6. APPLICATION OF TUFCHEM II MEMBRANE

6.1 Apply Tufchem II Membrane with a flat trowel to a uniform thickness as per the project specification. Typical application thickness is 0.125" (125 mils) (3.0 mm) but can vary depending on project objectives. For vertical surfaces it is often not possible to apply Membrane to a thickness greater than 0.060" (1.5 mm) per pass before slumping may occur. Projects calling for a nominal 0.125" (3.0 mm) or greater lining thickness will have to be applied in two or more coats on vertical surfaces. This build thickness is not a problem on horizontal surfaces such as floors.

6.2 Tufchem II does not have good intercoat adhesion when it has dried to touch. If a two or more coat application is required to achieve the desired build thickness, approach the work area so that a subsequent coat can be applied over the base coat while the base coat is still tacky. Tacky can be determined by a simple test whereby a finger touching the membrane will feel a stickiness when pulled away, and will show black remnants of membrane after removing the finger. Depending on concrete and air temperature, TUFCHEM II Membrane will set in 2-4 hours.

6.3 If Membrane has set beyond the tacky state, and a subsequent coat is required, the dried surface must be lightly abraded to break the film and remove the gloss. Generally it is better to allow the Membrane to dry for a

longer period if time, as it is difficult to sand freshly dried membrane. Stage work flow accordingly.

7. CURING

7.1 Cure of Membrane is affected by air and concrete surface temperature, relative humidity, amount of sunlight and rain. In general the membrane lining may be put into service if dry to touch.

7.2 Membrane dry to touch cure schedule for foot traffic conditions is 48 hours at 60˚F (16˚C), 24 hours at 70˚F (22˚C), and 12 hours at 90˚F (30˚C) . Relative humidity is assumed to be 50%. For foot traffic, Membrane must be tack-free.

7.3 If job scheduling requires getting on the lining sooner (for example, to apply a subsequent polymer concrete or acid brick layer), it is permitted to dust the surface lightly with silica flour to prevent workers boots sticking to the tacky lining as they walk on it. Use common sense and good judgement to ascertain if the lining has not achieved sufficient cure to proceed without damaging the lining. This technique is not meant to proceed onto a still-wet lining.

8. CLEAN UP

8.1 Clean tools with mineral spirits and rags. Dispose of rags in accordance with good practice that complies with local regulations.

9. INSPECTION TESTING AND RECORD KEEPING

9.1 It is good practice to record certain variables when performing industrial lining work.

9.2 The ambient air and material temperature in the mixing and work area shall be measured and recorded every four hours. Mixing time (both A and B component as outlined in section 5.5, 5.6 and 5.7) and application and curing temperatures shall be noted. The moisture dew point shall be measured and recorded every four hours of the working period during application.

9.3 An initial 100 sq. ft. (10 sm) representative area shall be prepared and then deemed as an acceptable work standard by all parties. This area shall be the standard for the remaining work.

10. REMEDIAL WORK AND REPAIRS

10.1 Despite best efforts it is occasionally necessary to perform remedial work to the lining. The lining can be damaged by other trades or application or mixing mistakes may be discovered that do not yield a satisfactory result. Due to the nature of the nonconformance, repair procedures can take different specific forms. In general, the following procedure applies:

10.2 Cut out the nonconforming membrane and scrape down to the primed concrete surface. There will remain some traces of black on the cured primer. As long as the Primer has been surface abraded, it is OK to proceed and reline.

10.3 Abrade the adjacent membrane with a wire brush or power brush to roughen the surface to marry the new membrane to old. Overlap a repair a minimum of 2" (50 mm).

10.4 Solvent clean the existing primed concrete surface and wire brush for preparing existing membrane. Isopropyl alcohol is recommended for solvent cleaning.

10.5 Re-apply the membrane in accordance with specifications above..

11 SAFETY PRECAUTIONS / DISCLAIMER

11.1 Mixes and applications of this product present a number of hazards. 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.

11.2 Please contact Corrosion Engineering for further information at +1-610-833-4000 or by email at Contactus.corrosion@ergon.com. For all Terms and Conditions of Sale see ergonarmor.com.