CORROSION ENGINEERING SPECIFICATION FOR INSTALLATION

TUFCHEM® TILING SYSTEMS

1. SCOPE

1.1 Corrosion-resistant tile flooring is broadly used in the food and beverage and pharmaceutical processing industries as a durable and aesthetically pleasing floor to provide protection to concrete from organic and inorganic acids, salts, detergents, alkali cleaning agents, oils, solvents and a variety of organic foodstuffs as typically found in industrial food processing facilities. The tile lining functions as a mechanical and thermal barrier to protect the underlying concrete and provide a sanitary and hygienic working surface.

1.2 The following specification governs materials, preparation and installation of TUFCHEM® Tiling Systems tile floor system, employing the sonic embedment method of application. This method was designed to achieve maximum performance and aesthetics from the finished floor.

1.3 The corrosion-resistant tile floor system shall be installed onto a substrate prepared using either of the following methods, depending on the construction method used to create the slope in the floor:

1.3.1. Directly bonded to a pre-sloped structural concrete slab, using a 100% epoxy setting bed at 1/8" (3 mm) thick.

1.3.2. Bonded to a sand/cement sloping bed consisting of a latex-modified Portland cement mixture specifically prepared with minimal moisture content. Minimum thickness of sloping bed shall be 3/4" (19 mm) , maximum thickness 3" (75 mm). Tiling contractor shall be familiar with requirements of mix design suitable to accept subsequent tile lining.

1.4 Architect Selections:

Architect/specifier has selected the following project-specific materials as

noted below:

Membrane:
Tile Shape
Tile Surface Texture:
Tile Color:
Setting Bed Material:
Side Jointing:
Expansion Jointing:

2. MATERIALS OF CONSTRUCTION

2.1 Ceramic Tile

2.1.1 Tile Properties

Tile shall be fully vitrified industrial ceramic units, exhibiting the following physical properties:

Thickness: 3/4" (18 mm)
Shape: 4" x 8" (100 x 200 mm) rectangular for edging and 4" (100 mm) hexagonal for open floor areas, with integral spacer lugs
Compressive strength:> 40000 PSI (275 MPa).
Hardness: >7 on Moh Scale.
Absorption: 0.1% - 0.3%.
Acid Resistance: No trace of deterioration when tested to DIN EN99.
Color: Brewery Red, Sedona Red, Carolina Clay, Muskoka Sand, Chesapeake Blue, Rocky Mountain Pine, Adirondack Cedar, or as specified by Architect after consultation with a Corrosion Engineering representative.
Surface Texture: R10 smooth, R11 slip resistant, or R12 non-slip.

2.2 Setting Bed

2.2.1 Epoxy Setting Bed - Normal Service Applications

The setting bed material shall be THINSET® Adhesive, a 100% reactive epoxy adhesive composed of an epoxy resin, chemically curing hardener and THINSET® Filler as outlined on Corrosion Engineering Department data sheet CE158, most current revision. The epoxy setting bed shall have a minimum tensile strength of 250 psi (1.72 MPa) when tested in accordance with ASTM C-307. Water absorption of the setting bed material shall not be greater than 0.3%

(ASTM C-413), and shall be suitable for the sonic embedment method of installation.

2.2.2 Epoxy Setting Bed - Severe Service Applications

For areas of severe thermal shock or chemical exposure, epoxy setting bed shall be THINSET® Novolac Adhesive, a 100% reactive epoxy adhesive composed of 6710 Resin, 6711 Hardener and THINSET® Filler as outlined on Corrosion Engineering Department data sheet CE158A, most current revision. The epoxy setting bed be suitable for the sonic embedment method of installation.

2.2.3 Epoxy Setting Bed - Electrically Conductive Flooring Application

For areas where an electrically conductive flooring system is required, epoxy setting bed shall be THINSET® Novolac Adhesive Carbon Grade, a 100% reactive epoxy adhesive composed of 6710 Resin, 6711 Hardener and PENNTROWEL® L/F Filler - Carbon Grade as outlined on Corrosion Engineering Department data sheet CE158B, most current revision. The epoxy setting bed shall be suitable for the sonic embedment method of installation.

2.2.4 Epoxy Setting Bed - Primer

For projects where additional protection of PENNTROWEL® Epoxy Primer is desired under the setting bed, or for projects where a fully cured concrete or concrete leveling bed cannot be assured, PENNTROWEL® Epoxy Primer (data sheet CE-139) shall be applied onto the concrete and allowed to dry to touch before installation of THINSET® Adhesive.

2.3 Side Jointing Grout

2.3.1 Water-Cleanable Epoxy Grout

Chemically resistant grout shall be PENNTROWEL® Water Cleanable Epoxy Grout, designed specifically to be compatible with the sonic embedment method of installation as outlined on Corrosion Engineering data sheet CE-234 most current revision. Grout shall be a 100% solids epoxy composition, consisting of three components. Grout must be able to completely fill .080" (2 mm) joint without voids or pinholes.

2.3.2 Water Cleanable Novolac Grout

For more severe chemical exposure, chemically resistant grout shall be a PENNTROWEL® Water Cleanable Novolac Epoxy Grout, designed specifically to be compatible with the sonic embedment method of installation as outlined on Corrosion Engineering data sheet CE-234A most current revision. Grout shall be a 100% solids, epoxy composition, consisting of three components. Grout must be able to completely fill .080" (2 mm) joint without voids or pinholes.

2.3.3 Furan Grout

For applications requiring the chemical resistance of furan-based grouts, chemically-resistant furan grout shall be FURALAC® Red Panel as outlined on Corrosion Engineering data sheet CE- 130, most current revision. The grout shall be resistant to organic and non-oxidizing inorganic acids, most cleaning agents and detergents, oils, solvents and mineral salts. The grout shall be compatible with fully vitrified ceramic tile, and low absorption 0.5% or less. Required installation method adjustments shall be made when using this type of grout.

2.3.4 Vinyl Ester Grout

Where resistance to strong bleaching agents, chlorine and strong oxidizing inorganic acids, vinyl ester grout shall be used as a side joint material. The vinyl ester grout shall be PENNCHEM® Tile Grout as outlined on Corrosion Engineering Department data sheet CE271, most current revision. Required installation method adjustments shall be made when using this type of grout.

2.4 Expansion Joints

2.4.1 Expansion Joints are required to accommodate mechanical or thermal stresses in the flooring. Expansion joints shall be placed as required to allow for thermal differential stresses between tile lining and substrate.

2.4.2 Expansion Joint - Type

Expansion joints shall be one of either of the following types of expansion joint design:

2.4.2.1 Liquid Applied Jointing - Shall be FLEXJOINT® Joint Filler as outlined on Corrosion Engineering Department data sheet CE133, most current revision, and shall exhibit a Shore A hardness of 70-80. TUIFCHEM II Joint Sealant (data sheet CE-235) shall be used in areas requiring maximum movement capability with less load bearing capability and shall have a Shore A hardness of 20-30. A 100% closed cell foam rod should be installed, such that the foam rod shall be placed into the joint bottom and correct depth to width profiles shall be maintained. Joint width shall be a nominal 3/8" (9 mm).

2.4.2.2 Prefabricated Jointing - Shall be a Corrosion Engineering prefabricated Joint Sealing System using pre-vulcanized extruded rubber and stainless steel channel.

2.4.3 Expansion Joint Locations

Expansion joints shall be installed in accordance with industry-accepted practice with-in the following general guidelines:

1 - Around all fixed objects except drains.
2 - Around the periphery of all rooms.
3 - All points of movement in concrete slab.
4 - Expansion Joints shall be located near the crown of a sloped floor.
5 - Drains should be located as nearly as possible to the midpoint between expansion joints.

2.5 Membranes

2.5.1 For projects where a chemical-resistant waterproofing membrane layer is desired between the structural concrete slab and sand:cememt sloping bed, one of the following membranes shall be selected after consultation with a representative of Corrosion Engineering to determine most suitable membrane selection:
2.5.1.1 PENNCOAT® 101 (1/4" (6mm) hot melt membrane)
2.5.1.2 TUFCHEM® II (1/8" (3 mm) cold applied liquid membrane)
2.5.1.3 PENNCOAT® 600 (60 mil (1.5 mm) sheet membrane)

3. CONCRETE PREPARATION

3.1 New concrete shall be structurally sound, homogeneously poured, clean, free of dirt or contamination, and dry. It shall have been moist-cured to achieve

3000 psi (20 MPa) minimum compressive and 200 psi (1.4 MPa) tensile strength. The base slab shall be wood float finished, with no low spots where puddles can form when slab is flooded with water. Concrete should have smooth surface and be sloped to drain at 1/8" per foot (10 mm per m) or as mutually agreed by owner, architect and contractor.

Prior to commencement of any work, the flooring contractor shall thoroughly examine all floor surfaces, and report any conditions which will adversely affect proper floor installation including low spots and bird-baths, and a suitable method to repair shall be agreed.

3.2 Existing concrete which is clean, dry, structurally sound, and can safely support the superimposed load shall be considered satisfactory. Contaminated concrete which otherwise meets these requirements shall be thoroughly cleaned and left clean and dry. Eroded, broken, chipped and cracked concrete shall be repaired and cured prior to installation of tile or brick. If not provided in the existing slab, a slope of 1/8" per foot (10 mm per m) to the drains shall be established unless agreed in writing to be less.

3.3 Sand-cement Sloping Bed

3/4" to 3" (20 mm to 75 mm) of latex impregnated sand/cement sloping bed of adequate strength and of correct mix design shall be used to create slope to drain when required. Sloping bed shall be installed by tile installation contractor and shall be of a mix design and surface finish suitable for TUFCHEM® Tiling Systems.

4. INSTALLATION

4.1 Installation of all components of tile lining including membrane, sloping bed, tile and setting bed, grout, and expansion joints shall be by a Corrosion Engineering approved and trained contractor familiar with the installation techniques associated with TUFCHEM® Tiling Systems.

4.2 A test panel of a nominal 100 square feet (10 sm) shall be installed for inspection before commencement of work, and shall be used to establish expected standards to which subsequent work shall be performed. Written sign-offs as to acceptance of test panel shall be provided by general contractor, owner, or architect as required for the specific project.

4.3 Commencement of work by tiling contractor shall be deemed as acceptance of structural concrete substrate. Deficiencies such as cracks, incorrect elevations, bird-baths, incorrect slopes, or other shall be noted in writing by

tiling contractor and resolved before commencement of tile lining work.

5. INSTALLATION TEMPERATURES

5.1 TUFCHEM® Tiling Systems utilize a variety of resinous chemically setting materials whose performance and handling characteristics are affected by adverse temperature conditions. All installation work shall be performed at temperatures between 50°F and 80°F (10°C - 26°C). In the event required temperatures cannot be met, agreement shall be made in advance of commencement of work as to who is to accept responsibility for providing required climactic conditions.

6. SAFETY PRECAUTIONS / DISCLAIMER

6.1 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.

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

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