Corrosion Engineering™

AN ERGONARMOR COMPANY

TECHNICAL INFORMATION

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CORROSION ENGINEERING SPECIFICATIONS FOR INSTALLATION

STANDARDS FOR ACID PROOF BRICK FLOORS WITH CHEMICAL RESISTANT MEMBRANE

1. SUBSTRATE

1.1 The substrate shall be concrete of adequate strength and reinforcing to carry all expected loads and to bear the additional weight of the brick floor. It shall be screeded and wood floated to the proper grade and be free from high and low spots, and from pits, cavities or honeycombing. Tops of drains shall be 1/8" (3 mm) below the finished height of the brick floor adjacent to the drain. All drains shall be so set that draining shall continue through "weep-holes" in the drain sides, and shall not act as barriers to create puddles. Minimum slope shall be 1/8" to the foot. Slope of1/4"(6 mm) to the foot is preferred for faster drainage. In general, a slope of 1/8" to the foot will allow water to run off very slowly, and a slope of 1'4" to the foot is free draining.

2. MEMBRANE

2.1 Selection of the most suitable membrane for the anticipated chemical conditions should be made by consulting with the representative of the Corrosion Engineering Department or its agents and distributors. Suitable membrane shall be selected from one of the following:

2..1.1 Hot Applied Asphalt System - The membrane shall be PENNCOAT® 101 (product data sheet CE-142), a multi-layer asphalt and glass-cloth membrane, manufactured by Corrosion Engineering, Lester, Pennsylvania.

2.1.2 Cold Applied Urethane / Urethane Asphalt System - The membrane shall be PENNCHEM® 97 (CE-293), a two component urethane membrane, or TUFCHEM® II (CE-196), a two-component urethane asphalt-based system, manufactured by Corrosion Engineering, Lester, Pennsylvania.

2.1.3 Furan Laminate Membrane - The membrane shall be FURALAC® Membrane (CE-295) manufactured by Corrosion Engineering, Lester, Pennsylvania.

2.1.4 Sheet Membrane - The membrane shall be PENNCOAT® 600 Sheet Membrane System (CE-144) manufactured by Corrosion Engineering, Lester, Pennsylvania.

3. BRICK AND MORTAR

3.1 The brick shall be Type II or III as described in ASTM C-279, and ASTM C-410 (latest revisions) , and shall be clean, dry, and at temperature between 50°F and 80°F (10°C and 27°C). If serious thermal shock is anticipated, Type I brick shall be used. Brick shall be laid by the brick layers method over the membrane using the acid proof mortar indicated in Section 4.

3.2 The following procedure shall be employed:

3.2.1 Mix the mortar selected in the exact proportions and manner indicated by the product data sheets and mixing instructions. No water, aggregate, Portland cement, or other foreign matter shall be added to the mix for any reason without the written authorization of the manufacturer. When mix has passed its working life and is too stiff to use, it must be discarded, and under no circumstances shall any attempt be made to reclaim or retemper it.

3.2.2 A layer of mortar 1/8" (3 mm) thick shall be spread on the membrane, and while still soft, the brick mason shall butter two vertical edges of the brick and set the brick into the soft bed. He shall tap and press the brick tightly against adjoining bricks, adjusting level to provide a smooth surface and to hold a nominal 1/8" (13 mm) joint between adjacent brick. All joints, including the bed, shall be completely full. The excess squeezed out of the top of the joint shall be neatly cut with the trowel and the floor surface left smooth and clean. If a grooved bottom brick is used, the grooves shall be completely filled with mortar.

3.2.3 To assure a completely clean surface, the top surface of each brick shall be pre-waxed before the bricks are set with water soluble wax. Such waxing shall be done carefully to prevent wax from getting onto the side joints. After the completion of the floor, the wax shall be removed with hot water leaving the exposed surface clean.

3.2.4 Floor shall be kept free from traffic and water until initial set has occurred. This waiting time shall be as per mortar manufacturer's specifications.

4. EXPANSION JOINTS

4.1 Expansion joints shall be provided to allow for the irreversible growth of domestic acid brick, (up to 0.16 % of any dimension) and for the anticipated thermal expansion and contraction. They shall be placed:

4.1.2 Around the periphery of all floors either one brick in from the walls, or if curbed sections, one brick in from the curb.

4.1.3 Around all fixed objects and penetrations through the floor except drains, one brick away from the fixed objects (including pump bases, columns, and so forth, etc.).

4.1.4 Along the tops of all trenches, 4' back from the edge of the trench.

4.1.5 Inside and crosswise of trenches, down wall, across bottom and up opposite side, 3' to 4' (0.9-1.2 m) from any change in direction of the trench, or step-type change in elevation of the bottom, and not more than 20' (6.1 m) apart.

4.1.6 Midway between drains, or equally spaced from drains, or pipe or outlet penetrations through trench walls or bottom, so that the drains or penetrations are located at points of no movement.

4.1.7 Over all points of measurable movement in the substrate, such as working cracks or expansion joints.

4.1.8 At maximum distance apart of 20' (6.1 m) in any direction.

4.1.9 Preferably near to high points of the floor, but not placed directly on the crown.

4.2 An expansion joint detail for floors is shown on corrosion Engineering drawing CED-1020, which is part of this standard. Expansion joints in floors shall have straight vertical sides, shall be a minimum of 3/8" (9 mm) in width plus or minus 1/8" (3 mm) and shall be filled flush to the top with FLEXJOINT® Joint Filler, a flexibilized 100% solids amine catalyzed epoxy or other sealant as specified.

4.3 The bottom portion of the joint to ½" (12 mm) from the top shall be filled with 100% closed cell foam materials such as Ethafoam. Brick with spalled edges shall, under no circumstances, be used at expansion joints. If the exposed edge is not uniformly clean, sharp, right angle, such brick shall be removed and replaced with new and true brick.

4.4 Floor joints shall be poured with FLEXJOINT® Pouring Grade Joint Sealant, 100% epoxy expansion joint compound. FLEXJOINT Caulking Grade Joint Sealant shall be used on vertical surfaces. FLEXJOINT Polysulfide Joint Sealant shall be used for exterior applications.

4.5 Sides of the joint shall be primed with PENNTROWEL® Epoxy Primer.

4.6 Where service temperatures are expected to exceed 140°F (60°C) continuous or 160°F (71°C) intermittent, consult Corrosion Engineering to review expansion joint selection. Where service conditions are beyond the limits of the expansion joint materials, the Corrosion Engineering Technical Dept., shall be consulted for an alternative recommendation.

5. SELECTION OF MORTAR & EXPANSION JOINT SEALANT

5.1 The following mortars are suitable for acid and/or alkali service depending on conditions to be expected:

5.1.1 FURALAC ® Mortar (furan resin).
5.1.2 ASPLIT® CN (modified phenolic mortar).
5.1.3 PENNCHEM® Mortar (vinyl ester mortar)
5.1.4 PENNTROWEL® Novolac Brick Mortar (epoxy mortar).
5.1.5 PENNTROWEL Vinyl Ester Carbon Mortar
5.1.6 Phenolic Mortar (Carbon or Special Grade)
5.1.7 Sulfur Mortar (silica or carbon filled).
5.1.8 HES® Single-component cement (modified silicate mortar).
5.1.9 HB® Mortar (special potassium silicate mortar).

5.2 Selection of the most suitable mortar for the anticipated conditions should be made by consultation with the representative of the Corrosion Engineering Department, or its agents and distributors.

5.3 Unless otherwise specified, the expansion joint sealant shall be FLEXJOINT® Joint Sealant or FLEXJOINT Polysulfide Joint Sealant.

6. DESIGN NOTE

6.1 Acid proof floors should be designed to drain completely. To do this a fall of

1/4" (6 mm) to the foot is indicated. At 1/8" (3 mm) to the foot they will still drain if all brick and joints are smoothly laid. With a 1/8" (13 mm) bed joint it is possible to make up the differences in brick tolerance and to lay such a floor. However the use of less than 1/8" (3 mm) bed may result in a floor that will not drain completely.

7. TRENCHES

7.1 Concrete requirements for trench construction should conform to the principles laid down in Corrosion Engineering Specification CES 301, except that for obvious reasons trench walls cannot normally be bowed as recommended therein. However, great care must be taken:

7.1.1 To keep all walls of trenches dead straight (especially insure that forms are not sprung inward by the weight of concrete poured against them).

7.1.2 that the concrete is free from cavities, stone pockets, and honeycombing.

7.1.3 that all cold seams are protected with continuous water stops. and that concrete is liquid tight, particularly in areas of sumps or where there may be a standing head,.

7.1.4 that reinforcing from the trench walls and bottoms continues without interruption into the floor areas and is an integral part of the reinforcing in the floor. There should be no construction joint or point of movement within the dimensions of two brick of the edge of trench lining.

7.1.5 The thickness of the brick linings of trenches is a critical consideration, since contrary to popular assumption, the brick are not anchored to the trench walls, but are free standing. Providing no other considerations require thicker linings, if the trench at its deepest point is not deeper than 2 feet (0.6 m) or longer than 15 feet (4.6 m), a 2 1/4 inch (57 mm), thick brick lining is permissible. If the depth is greater than 2 feet (0.6 m) but less than 6 feet (1.8 m) and the trench length no longer than 15 feet (4.6 m), a nominal 4 inch (101 mm) brick lining is acceptable. This may be obtained by using red shale brick with a 3 3/4" (95 mm) thickness, plus a back joint, or a fireclay brick with a 4 ½" (114 mm) thickness, plus a back joint. If the 15 foot (4.6 m) length dimension is exceeded but the 2 foot (4.6 m) depth is not exceeded, a nominal 4 inch (100 mm) brick lining may be employed. If both are exceeded, or if the 6 foot (1.8 m) depth is exceeded, the

nominal minimum thickness is 8 inches (203 mm).

7.1.6 Expansion joints should be continuous from top of side to bottom, across bottom, and up the other side to top, placed not farther apart than 20 (6.1 m) feet to provide for brick growth. Joint spacing may be closer together if thermal considerations so indicate. Joints should be located over all expansion, control, or construction joints or other points of movement in the concrete, not closer than two brick away from the trench lining, and not closer than 3 feet (0.9 m) from a change of direction, intercept, or end of a trench. All pipe entries and other fixed penetrations through the trench walls or floors should be designed as points of no movement, preferably halfway between expansion joints. If such points are grouped together, their location with respect to expansion joints will require special study.

8. JOB CONDITIONS

8.1 All brick masonry involving chemically curing mortars (resin or silicate) should be performed under cover from the elements, and at a minimum temperature of 60°F (16°C) and a maximum of 90°F (32°C) unless specific arrangements for exceptions are made. The temperature limitations apply not only to the air, but to all structures or slabs with which the masonry will be in contact. In addition, the air temperature must be maintained from start of job until cure is initiated at 5°F (3°C) or more above the moisture dew point. All materials to be used must be kept dry and within this thermal range for not less than 48 hours prior to use. Alt work shall be kept dry until the mortar has reached the point of cure designated by the manufacturer.

8.2 The user should be conscious of thermal changes and erratic cures that can result from high winds (chilling or heating, and rapid drying) and by direct sunlight during summer months, particularly in hot climates, and provide appropriate job protection.

9. DETAIL SKETCHES

9.1 See the following Corrosion Engineering drawings for details:

9.1.1	CED -1006	Pipe penetrations through floors.
9.1.2	CED -1011	Cross section of trench.
9.1.3	CED -1015	Floor and curb.
9.1.4	CED -1017-1021	Expansion joint details.
9.1.5	CED -1028 & 1028A	Typical trench details.

10. DISCLAIMER

10.1 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 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.

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

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