SPECIFICATION FOR BRICK FLOORS OVER CHEMICAL RESISTANT MEMBRANE

1. SCOPE

1.1 This specification is meant to provide general guidelines for good practice when applying acid proof brick over chemical resistant membranes when used for brick flooring and trench applications.

1.2 Consult applicable mortar and membrane technical data sheets for more information. The selection of the membrane and mortar materials should be based on a review of the anticipated chemical, thermal and mechanical conditions as well as in consultation with Armor and the installation contractor.

1.2 Other applicable documents to review may include a number of detail drawings including: CED-745 plate embed into brick floor, CED-1006 pipe penetrations through floors, CED-1011 trench detail, CED-1015 floor and curb detail, CED-1020 compression joint detail, CED-1023 core holes in brick floor detail, CED-1028 brick trench tie-in to monolithic detail, CED-1031 acid brick curb detail, CED-1038 floor drain detail.

2. JOBSITE CONDITIONS

2.1 All brick masonry involving chemically curing mortars should be performed under cover from the elements, and at a minimum temperature of 50˚F (10˚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 substrate with which the masonry will be in contact as well as the materials themselves. 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. All completed work shall be kept dry or until the mortar has reached the point of cure designated by Armor.

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

3. SUBSTRATE

3.1 Concrete shall be poured to proper grade and wood floated. Cure with plastic sheet, do not use liquid curing compounds. Concrete shall be free of high and low spots, and from pits, cavities or honeycombing. To insure good drainage slope should be 1/4" to the foot (20 mm to the meter). Concrete mix designs and jobsite environmental conditions can be highly variable. In all cases the placed concrete shall have cured sufficiently to pass the ASTM D4263 mat test to ensure absence of moisture.

3.2 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 set so that draining shall continue through weepholes in the drain sides, and shall not act as barriers to create puddles.

3.3 Minimum slope shall be 1/8" to the foot. Slope of 1/4"(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" (6 mm) to the foot (0.3 m) is free draining.

4. MEMBRANES

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

1) Hot Applied Asphalt System Penncoat™ 101 (data sheet CE-142)
2) Cold applied urethane asphalt Tufchem™ II Membrane (data sheet CE-196)
3) Cold applied urethane Pennchem™ 97 (data sheet CE-293)
4) Sheet applied Penncoat 600 Membrane (data sheet CE-144)
5) Furan laminate Furalac™ Membrane (data sheet CE-295)

5. BRICK

5.1 The brick shall generally be Type II or III as described in ASTM C-279 (latest revision), and shall be clean, dry, and at a temperature between 50˚F and 90˚F (10˚C and 32˚C). Brick shall be laid by the brick layers method over the membrane using the selected acid proof mortar. Red shale, fireclay or carbon brick may be used, subject to specific chemical and thermal conditions, owner preference, and economic considerations.

5.2 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.

5.3 A layer of mortar 1/8" (3 mm) thick shall be spread on the membrane, and while still soft, the 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" (3 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 filled with mortar.

5.4 To assure a completely clean surface, the top surface of each brick may be pre-waxed with water-soluble wax before the bricks are set with paraffin-based wax that has a melting point temperature of 140˚F (60˚C). Waxing must be done carefully to prevent wax from getting onto the sides of the brick. After the completion of the floor, the wax is removed with high pressure hot water leaving the exposed surface clean. Heavy industrial and chemical plant applications (as opposed to food/beverage/pharmaceutical floors) may skip the waxing/cleaning step, depending on budget, schedule and aesthetics expectations of the client.

5.5 Floor shall be kept free from traffic and water until initial set has occurred. This waiting time shall be as per mortar specification.

6. MORTAR

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

CE-128 Furalac™ Green Panel and CE-206 Furalac FN Mortars (furan resin)
CE-254 Asplit™ CN Mortar and CE-290 Asplit Special Mortar (phenolic resin)
CE-250 Pennchem™ Mortar and CE-255 PC1000 Mortar (vinyl ester resin)
CE-276 Penntrowel™ Novolac Brick Mortar (high functional novolac epoxy resin)

CE-231 Penntrowel Vinyl Ester Carbon Mortar (vinyl ester resin)

6.2 Selection of the most suitable mortar for the anticipated conditions should be made by consultation with Armor, their representative or its approved contractor.

7. EXPANSION JOINTS PURPOSE AND LOCATION

7.1 Expansion joints are required to allow for the potential irreversible growth of domestic acid brick and to allow for potential anticipated thermal expansion and contraction. There are several guidelines that could be followed to determine where the joints are placed. However, not all rules should be followed as there would be redundancy. It is suggested the specified locations be determined on a case-by-case basis after review by the qualified contractor or Armor. In general, they should be placed:

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

b) Around all fixed objects, one brick away from the fixed objects including pump bases, columns etc.

c) Along the tops of all trenches, 3' (1m) back from the edge of the trench.

d) Inside and crosswise of trenches, down wall, across bottom and up opposite side, 3' to 4' (1-1.2m) from any change in direction of the trench, or step-type change in elevation of the bottom, and not more than 20' (6.1m) apart.

e) 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.

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

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

7.2 Consult Armor drawing CED-1020 for a typical compression and expansion joint design. 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™ U500 Joint Filler.

7.3 The bottom portion of the joint to ½" (12 mm) from the top shall be filled with 100% closed cell foam material. Do not use brick with spalled edges along 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.

8. SLOPE DESIGN NOTE

8.1 Acid proof floors should be designed to drain completely. To do this, a fall of up to 1/4" (6 mm) to the foot may be considered. However, this amount of slope is very evident when walking across the slope. A 1/8" (3 mm) to the foot slope will still drain if all brick and joints are smoothly laid. With a 1/8" (3 mm) bed joint it is possible to make up the differences in brick tolerance and to lay such a floor.

9. TRENCH DESIGN NOTES

9.1 Consult specification CES-301 for further information for trench construction. Trench walls cannot normally be bowed as recommended therein and hence care must be taken to consider the points outlined below.

9.2 Keep all walls of trenches straight, especially ensuring forms are not sprung inward by the weight of concrete poured against them.

9.3 Concrete must be free from cavities, stone pockets, and honeycombing.

9.4 Utilize waterstops to maintain concrete to be liquid tight, particularly in areas of below grade sumps or where there may be a standing head.

9.5 The thickness of a brick lining for trenches is a critical consideration, as the brick is not anchored to the trench walls, but is 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), then 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 alternately 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). For trench runs greater than 40 feet (13m) consult Armor.

9.6 Expansion joints in trenching should be continuous from top of side to bottom, across bottom, and up the other side to top, and placed not farther apart than 20 (6.1 m) feet to provide for brick growth. Joint spacing may be closer together if thermal considerations indicate.

10. SAFETY PRECAUTIONS DISCLAIMER CONTACT INFORMATION

10.1 Consult current Safety Data Sheets before commencement of work.

10.2 Mixes and applications of these products present a number of hazards. Read and follow the hazard information, precautions and first aid directions on the individual product labels and 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. For all Terms and Conditions of Sale see armor-inc.com.

10.3 Please contact Armor for further information at +1-877-98ARMOR (982-7667) or customerservice@armor-inc.com.

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