Design Guideline 042000
Unit Masonry

Scope

Guidelines for designing and specifying clay and concrete masonry and accessories.

Face Brick Selection

Brick Selection Process: The Design Manager will coordinate brick selection with the A/E, University Planner and University Architect. Brick selection prior to bidding is required. If cash allowances must be included, be sure to provide for special shapes. Cash allowance prices must be approved by the Director of Construction Management before bidding. Typically the selection process is as follows:

- Step 1 - Early in the design phase, determine if a brick selection is required. Discuss with A/E, University Architect and University Planner to determine the criteria / objectives of the selection.
- Step 2 - The A/E shall contact several brick suppliers and formally request a submittal that will meet the criteria/objectives determined in step 1. The brick supplier's submittal shall include a thin 1' x 2' sample and a statement of unit cost along with any necessary specification data.
- Step 3 - The A/E will compile the submittal information and eliminate any submittals that clearly do not meet requirements or criteria. The remaining choices shall be reviewed at the site with the Design Manager, University Architect and University Planner.
- Step 4 - The suppliers of the acceptable samples shall be requested to build a mock-up panel 4' x 4', at the site, for final selection.
- Step 5 - Chosen samples (should seek a minimum of three) shall be included in the specification and bid as a part of the General Contractor's responsibility.
- Step 6 - The specifications shall call for the supplier of choice to build a 4' x 6' mock-up panel, at the site, that will be used for confirmation of match with the mock-up panel referred to in Step 4, mortar selection, and installation workmanship. This final panel will be the panel used to measure appearance and workmanship for the project. The specifications must direct the General Contractor to construct the 4' x 6' mock-up panel to match the 4' x 4' panel and to meet certain workmanship criteria. This 4' x 6' mock-up panel must be reviewed and approved by the A/E and the owner. The General Contractor is entitled to include any of the specified brick material in his bid price. In addition, specify that the General Contractor must remove all existing mock-up panels from the site by the completion of the project.

Face Brick Specification

General**:** Brick complying with the ASTM C 216 face brick standard is not necessarily durable in this climate, nor suitable for installation in every season; nor does C 216 address the important issue of initial rate of absorption. Consequently, the University requests A/E's to modify ASTM C

216 as indicated below.

Modifications of ASTM C 216**:** Modify face brick standard as follows:

- Strength - As determined by the A/E.
- Type and Grade - Both type and grade must be clearly specified, since the ASTM C 216 default values are not acceptable:
    - Type - Suitable for architectural effect intended, but if other than FBX, coordinate with Design Manager.
    - Grade - SW, in all applications.

ASTM C 216 Table 2 "Physical Requirements" - Add the following Initial Rate of Absorption requirement:

- Initial Rate of Absorption - Not more than 22 gram/min./30 sq. in.; where cold weather installation is anticipated, not less than 6 gram/min./30 sq. in.
- If, during the selection process, face brick with an IRA higher than 22 gram/min./30 sq. in is selected in order to match existing face brick, limit the average saturation coefficient to less than 0.74, or alternatively, limit absorption to 8.4 percent. Brick outside these limits has a higher potential for durability problems.

Coring - Modify Article 10 to delete frogged brick. Frogged brick is not permitted since incompletely filled cavities permit moisture to collect, possibly freezing, lifting brick and destroying mortar bonds. A 3-core pattern is preferred over other patterns, whenever possible, for improved mechanical keying.

Waivered Brick: Where face brick that has been waivered under ASTM C 216 is selected in order to match existing face brick, require manufacturers to submit written certification of acceptable past performance in the local climate.

Finishes Over Face Brick: Do not include painting or waterproof coatings such as silicone over clay masonry units. Specify that brick units with factory applied silicone coatings are not acceptable.

Installation: Some bricks exhibit a wide range of color between those bricks near the outside of the stack during firing, and those near the inside. Unless masons take care to mix these bricks at the site, the resultant effect may be an unpleasant grouping of dark and light colors. Consequently, for brick susceptible to this phenomenon, require that brick be broken out of pallets and intermixed on the site before installation, to ensure pattern randomness.

Cleaning: Avoid specifying acidic cleaners for masonry in areas adjacent to stone surfaces, and where existing landscaping materials may be damaged by run-off.

Concrete Masonry Units (Block)

Standards**:** No special standards beyond ASTM C 90 requirements.

Mortar for Unit Masonry

Mortar: The University accepts the use of either Portland cement/lime mortar or masonry cement mortar. Calcium chloride is not permitted as an additive.

Mortar Spreading Technique**:** Specify that mortar be spread using the "beveling" technique described in BIA 21C-78. Beveling helps keep cavities free of mortar droppings, and assists in filling 3-hole brick cores.

Joints**:** Specify tooled joints in masonry exposed to weather. Avoid the use of raked, struck, or other similar joints in masonry unless units will not be exposed to weather. Require full head joints on brick masonry.

Flashing

Lead and asphalt coated lead materials are not acceptable due to the reputed incompatibility of lead and mortar, and potential toxicity issues. PVC and similar plastic flashings are not acceptable due to brittleness problems caused by stress or loss of plasticizer.

Installation**:** The following requirements are based on BIA and NCMA recommendations: Mechanically attach flashings to substrate for support. Adhesive attachment is not acceptable. Extend flashing over openings at least 4-inches beyond opening sides and form ends into dams. Carry flashing out of the wall to ensure proper function. Because manufacturers of asphalt coated or rubberized asphalt flashings require their products to be cut off 1/2-inch behind the wall face, combination flashings consisting of rubberized asphalt sheet terminating in metal through-wall flashing pans is recommended.

Thin Brick

Installation and use of thin brick products are an option for interior applications only. Care shall be taken in pattern layout and jointing to preserve the look of full depth masonry.

Thin brick installation is not accepted in exterior applications.

Miscellaneous

Weep Holes: Construct weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashings and as follows:

- Form weeps by keeping head joints free and clear of mortar. Cotton wicks and plastic tubes are not acceptable.
- Space weep holes 24 inches o.c.
- The use of brick vents for weep holes is not encouraged.

Cavity Drainage Materials: - Provide free-draining mesh, made from polymer strands that will not degrade within the wall cavity.