

Division 04 | **Masonry**

Section includes various general guidelines regarding masonry maintenance, mortaring, unit masonry, anchoring, and stone assemblies.

This design guideline is written to the designer of record (DOR). This guideline is written to document UA standards of work, assist the designers in ensuring UA standards are incorporated into the contract documents and provide a resource to facilitate the design process. It is the designer of record's responsibility to coordinate the criteria set forth in these design guidelines and in conjunction with the manufacturer requirements and use the most stringent standard.

A. General

Industry Standards

The following industry standards should be reviewed & referenced during design and listed as reference materials in the project specifications.

Brick masonry	Brick Institute of America (BIA)
Concrete masonry units (CMU)	Masonry Advisory Council (MAC)
Cast Stone	Cast Stone Institute
Limestone	Indiana Limestone

Specification Sections

Unit Masonry Assemblies
 Dimension Stone Cladding
 Dimension Cast Stone

Brick Selection for Projects

The University administers a formal selection process for brick selection for all projects. This process is administered by the University's Project Manager.

Sample panels of all exposed masonry, whether used on interior or exterior of project, shall be specified for review and approval by UA during design of the project. Exact requirements are a function of the project size and shall be reviewed with the UA Design Staff and Project Manager.

The brick selection process is to be initiated in the Schematic Design phase to allow selection to occur with ample time to select brick prior to construction.

At the earliest point during design, a request form will be sent out by the Project Manager to brick suppliers interested in providing sample panels of their best effort to meet the project requirement. Brick sample panels for the selection of type, color range, mortar color, and joint tooling should be 51-5/8" in length and 48" in height and provided in pressure treated 2x frame and secured to a wood or plastic pallet.

Based on the sample review process, a brick selection will be made prior to project bid. Should a brick selection not be made prior to bid, the project team will identify a material allowance that will be carried in the bid/construction contract.

See attached Brick Selection Process flowchart which outlines the steps, protocol and expectations for the selection process to be administered by UA.



Submittals

The Contractor is to submit product data, test reports, shop drawings, manufacturer's installation instructions, etc. for all products and materials used in masonry wall construction, including but not limited to masonry units, loose laid lintels and support members, mortar materials, wall ties, masonry cleaners, through wall flashing systems, weeps, liquid applied flashings/damproofings, etc.

Submittals are to be reviewed by the Designer of Record and UA Design Staff. Comments, recommendations and any adjustments to products/materials, installation requirements, etc. are to be incorporated into the mockup review.

Pre-installation Conference and Mock-Up Approval

The material quality, performance, workmanship, and aesthetics of masonry construction is extremely important to the university and is thoroughly reviewed as it largely sets the impression for the quality of our buildings.

B. Design

Masonry Units

1. Brick

- a. New Construction
 - i. Wood mold brick is standard for the University in new construction. Brick shall be selected per project requirements. The brick and mortar shall be selected and approved jointly by the Architect and UA prior to the bid date. The intent of the brick and mortar selection is to match as close as possible to existing building for an addition, or match as close as possible to adjacent building(s), for new projects. The specific type of brick will be noted on the sample request form that is sent to suppliers by the Architect or Project Manager.
 - ii. All head and bed joints shall be completely filled with mortar and tooled with concave, V-shaped joints or weather joint (raked joints are not acceptable). When adding to or building adjacent to an existing building, the joint tooling shall match the joint tooling of the existing building. UA standard V-shaped head joints and weather tooled bed joints. Other joint types will be determined by project design requirements.
- b. Renovation
 - i. Reuse of existing bricks and pavers is a goal of the typical renovation project. If new bricks and/or pavers are required then they should match the existing as close as possible.
 - ii. The University of Alabama Project Manager must arrange for approval of mortar joint profiles and mortar colors for any renovation project with the Building Envelope Staff and UA Staff Architect.
- c. Use of Reclaimed Brick
 - i. With use of reclaimed brick on this project, the expectations for defective brick that are to be culled and not installed in wall construction are to be reviewed by all parties during the mock-up approval and pre-installation conference. These guidelines and expectations for defective units are to be photographed during the pre-installation and these photos will serve as the precedent for the project as the basis for surface quality expectations.



2. Concrete Masonry Units (CMU) Requirements

All CMU to meet requirements of:

- a. ASTM C90, Standard Specification for Load-Bearing Concrete Masonry Units.
- b. ASTM C129, Standard Specification for Non-Load-Bearing Concrete Masonry Units.
- c. ASTM C270, Standard Specification for Mortar for Unit Masonry.
- d. ASTM C476, Standard Specification for Grout for Masonry.

3. Cast Stone

- a. All cast stone materials to be wet cast materials. No dry cast, dry packed cast stone is permitted.
- b. Cast Stone is a unit masonry product and is typically installed by masons. Therefore all cast stone is to be detailed by the Architect with specified attachments secured to a suitable structural backup assembly.
- c. Details and specifications by the architect must include anchorage & fastener requirements, which are to be verified and confirmed by the cast stone manufacturer. As a condition of bidding, the Cast Stone manufacturer must affirm that the connections and details on the architect's drawings are able to be constructed and that any spanning/structural requirements of the cast stone are contemplated and included in the bidder's scope.
4. Limestone
 - a. Alabama Limestone- Silver Shadow, manufactured from Russellville Limestone. Flueri Cut or Veine cut

Accessories

1. Mortar

- a. Acceptable manufacturers: LaFarge, Cemex, Holcim, and Citadel.
- b. Mortar Colors: The following colors have been custom mixed for the UA campus by various manufacturers and are to be included in the specifications as a basis of design. In cases where an alternate color is needed to match an adjacent building, deviations from these colors will occur on a case-by-case basis.
 - i. Bama Buff
 - ii. UA Blend
 - iii. Capstone Blend
- c. Exterior Brick or Stone Veneer Mortar mixes:
 - i. Portland Cement-lime mix Type N: Packaged blend of Portland cement and type S hydrated lime only. Veneer of exterior cast stone/ natural stone/ brick veneer only.
 - ii. Mortar Cement: ASTM C 1329; Type "N" for all veneer materials (i.e. brick, natural stone, cast stone, colored CMU, used on exterior walls).
- d. Exterior Masonry (single wythe CMU) and Interior CMU:
 - i. Masonry Cement: Available for CMU walls only (i.e. exterior to be veneered, or coated interior walls and below grade). Type S load bearing and below grade, and Type N non load bearing CMU walls, unless otherwise noted by Structural Design Engineer.
 - ii. Pre-packaging, Sack Mixes, Mortar Supplier, Sand and Mock-up Match



- e. Related Materials – Sealants within or abutting the masonry veneer.
 - i. Reference division 7 for sealant requirements. Architect to specify custom color sealants to allow for matching of sealant color to mortar colors for sealants to be used at control joints, shelf angles, etc. within the masonry veneer.

2. Masonry Anchors

- a. Corrugated metal ties are not to be used on masonry veneers.
- b. Anchors shall be made of hot-dipped galvanized for brick and stainless steel when anchoring natural stone or cast stone veneers.
- c. Brick anchors to be equal to Hohmann & Barnard, Inc. hot-dipped galvanized DW-10 when anchoring to metal stud with sheathing only and X-seal where cavity insulation is required.
- d. Anchors are to be attached with gasketed stainless steel screw at 16" O.C. each way.
- e. For CMU, use galvanized pintle & eye anchors.

3. Weeps

- a. Provide plastic cell vent weeps in the color to match the mortar or clear, subject to review UA Architect. Preliminary color to be selected via submittal, final color to be reviewed and approved during mock-up process (among a full range of cell vent colors).
- b. Weep vents shall be installed at all flashed locations at 2' O.C. maximum distance between weeps. For atypical configurations, the architect to note spacing.
- c. For window and door openings, weeps to be installed over lintel, at the ends of the lintel and intermediate spacing of 2' o.c. Architect to show expectations for weep locations on the drawings and review during the mock-up process. Generally, weep locations and their installation should not detract from the appearance and authenticity of lintels, coursing, etc. Care and consideration should be taken in locating in conjunction with through wall flashing systems.
- d. Keep weep vents and area above flashing free of mortar.
- e. Install cavity mortar drainage net behind vents at all flashed locations. Cavity Mortar net should be staggered type and should extend a minimum of 8" above the flashing at the lowest point.

4. Masonry Cavity Wall Construction Damp Proofing

- a. Air and water resistive barrier shall be a fluid applied vapor permeable system with a minimum 12 perms and produced by one of the listed manufacturers in Division 7 guidelines.



5. Through-Wall Flashing

- a. The typical through-wall flashing system is to consist of a stainless steel bed flashing, flexible through wall flashing that spans from the masonry unit back to the substrate, and a sealed termination bar to mechanically attach the flexible flashing to the backup wall.

The correct installation of a through wall flashing system is essential for the performance of wall systems; however, the aesthetics and appearance of our masonry structures are equally important. Flashings should generally terminate at the face of veneer with a tightly hemmed edge and be designed, manufactured and installed to not be conspicuously visible from exterior view.

At all locations where a person touches the building (base flashing, beneath wall caps, door & window flashings, etc.), there should not be exposed drip edges and sharp edges/terminations, or corners which create a hazard. At all of these locations, hemmed edges flush to the masonry prevent hazards and serve to provide a clean aesthetic.

See standard through wall flashing detail in Section IV: Standard Drawings. All through-wall conditions at roof intersections shall be detailed for UA approval. Should the designer have a question regarding flashing design and the appropriateness of a detail, they are to contact the UA Architect for discussion.

b. Standard Through-Wall Flashing System

- i. Stainless Steel Bed Flashing – Type 304 Stainless Steel, 26 gage. Provide tightly hemmed edges and upturn legs on cavity side to support flexible flashings. Flashings may be pre-manufactured or custom fabricated depending on conditions. In all cases, flashing design/size/configuration must be verified during shop drawings to confirm design requirements are met and then verified during mock-up process. The Architect and University shall reserve the right to adjust flashings during mock-up review as needed to ensure expectations for performance, aesthetic and means & methods are met.
- ii. Self-Adhered Flexible Flashing (SAFF) Standard - Provide .040 non asphalt polyethylene self-adhesive membranes or non-asphalt fabric 502 coated copper where applicable. No rubberized asphalt shall be used for through-wall conditions. It is acceptable within a cavity where not exposed.

Products:

1. Advanced Building Products, Inc.; Copper Fabric Flashing
 2. AFCO Products, Inc.; Copper Fabric
 3. Hohmann & Barnard, Inc.; H & B TeXtroflash or equal
 4. Phoenix Building Products
 5. W.R. Grace Products
 6. Carlisle Self Ad. .040 non asphalt
 7. Sandell Const. Solutions
 8. Heckman
- iii. Termination Bar & Mastic Sealer
- iv. End Dams – Required only when lintel does not extend 8 inches beyond jamb.

Note: For flashing at a shelf angle condition, see Section IV: Standard Drawings, Flashing Detail.



- *Drawing Note: The following note should be prominently noted on wall section/detail sheets:*

6. Loose Lintels and Shelf Angles

- a. All steel loose lintels and shelf angles are to be hot dipped galvanized and dressed smooth prior to arriving at jobsite to be free of burrs. For all lintels exposed to view, they are to be wiped down prior to installation to ensure all mud stains, dirt, etc. are removed. Cleaning of lintels is not a punch list activity, it must be performed during installation and masonry cleaning.
- b. For galvanized items, apply zinc coating by hot dip process according to ASTM A 123/A123M or ASTM A 153/A153M.
- c. Paints, to be used for repairing galvanized surfaces, shall be zinc dust content paint with dry film containing not less than 94% zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20.
- d. Lintels are to be installed 1" behind the face of masonry veneer. This dimension allows a minimum of 2/3 brick bearing of the depth of brick on the lintel. The 1" recess also ensures a minimum 5/8" depth of a tooled mortar is in front of the lintel which is necessary to prevent mortar from cracking and falling out due to freeze/thaw cycle.
- e. Lintels are to extend a minimum of 8" beyond the jamb of the window/opening for proper bearing. With this extension, typical ends dams on the through wall flashings are not required at punched openings.
- f. All loose lintels are to be designed and sized for tolerance within the cavity for installation. Floating lintels are not to be sized to be flush to backup wall and the projecting edge (viewed from exterior), is to project no more than 1/2" proud of the finished edge of the window panning/frame assembly. This results in the location and relationships of the lintel driving the depth of the window set in the jamb. The Architect is to use these dimensions to locate the various components and install blockings and window trim components to properly position the windows and masonry veneer.

7. Control Joints

- a. Design of Control Joints: The Architect is to locate control joints in masonry walls on the Elevations of Design Development drawing submittal. This requirement is to allow time for UA Design Staff to review locations and provide comments. Control joints are to be located in blind/return corners of projects (such as pilasters), hidden behind downspouts, and in other rhythmic and inconspicuous locations. The goal for the University is for masonry veneers to not show have the flashings and control joints diminish from the appearance of a load-bearing construction. Flashings and control joints are required to meet Building Code and the guidelines of the Brick Institute, however, their location, configuration, colors should be very carefully designed to provide a convincing masonry wall assembly.
- b. Sealants for exterior control joints should be silicon products, see Division 7. The Architect is to specify that custom colors be available to match colors for the exterior palette of materials. It is typical for the University to use Manufacturer's standard colors, however, in certain circumstances, custom colors are required, therefore, specifications in



Division 7 need to be specified for ‘Custom Color sealants for all exterior sealants’ to ensure flexibility for color matched sealants is available for the project. Basis of Design colors based on Dow 790/795 are as follows:

Sealants around Windows	DOW Sandstone
Sealants at limestone/Stone	DOW Limestone
Brick Control Joints	Custom Colors

C. Construction

Brick Mock-Up Size and Location

Upon General Contractor selection, a full scale mockup containing all exterior elements (i.e. cast or natural stone, metal parts, window and roofing materials) will be constructed to remain on site until project completion. The location of mock-up must be so that the panel can be viewed preferably in the afternoon sunlight. The time of year and project location will determine the exact angle to place the mockup (Generally, facing the mock-up W/SW is preferred).

CMU Wall Corners

Bullnose concrete block required at all jamb and corner conditions where interior masonry surfaces are exposed to view. Provide square edged block at base course and at ceiling/soffit locations.

Cutting Back

No brick shall be cut or broken with either a hammer or a trowel. All brick pieces shall be saw cut.

Efflorescence Prevention

All masonry units shall be stored off the ground and protected with waterproof covers. Mortar shall be proportioned and mixed as specified. The top course of unfinished masonry walls shall be covered properly at the end of each working day to maintain a dry cavity. The cover shall extend a minimum of 2' down the face of the wall. For more information about efflorescence, visit website: <http://www.milleregrs.com/Masonry.htm#Efflorescence>

Cleaning

1. The use of sand blasting, powered wire brushing or harsh acids is prohibited. Cleaning products permitted on campus are as follows (situation specific):
 - UA Standard Products are as follows:
 - Brick Cleaning
 - CMU Cleaning
 - Cast Stone Cleaning
2. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer.
 - a. Products:
 - i. Prosoco Vanatrol
 - ii. Diedrich 202V
 - iii. EaCoChem NMD80



3. MSDS information must be provided to The University of Alabama Project Manager before any cleaning activities may begin. Cleaning solutions shall be tested on the mock up prior to its use on the main structure.
4. Contractor shall be responsible for preventing the runoff from any cleaning operations from entering nearby storm sewers or tributaries.
5. Cleaning technique and chemical solution to be determined during the mock-up process relative to material type.

- End -