

DIVISION 04 – MASONRY

04720 CAST STONE

A. Design Considerations

1. Cast stone shall comply with ASTM C1364, *Standard Specification for Cast Stone*.
2. Care must be taken in the design of individual units of cast stone, working within the limits of easy manufacture, transport, handling, installation and structural integrity. It is generally recommended that units have a volume of 1.5 to 2.0 cubic feet, a length not exceeding 4 to 6 feet or 15 times the least dimension of the unit. Shapes shall permit the easy removal of completed units from their molds. Economic efficiency is achieved through repetitive use of forms.
3. Dimensions of cast stone shall coordinate with coursing of other masonry materials in the assembly.

B. Special Documentation Requirements

1. Samples of cast stone materials, showing the full range of finishes and colors, shall be submitted by the Contractor for approval of the A/E and the Owner. Cast stone shall be incorporated in wall mockup panels, as required in the Unit Masonry Assemblies section of the Design Standards Manual.
2. Drawings shall indicate sizes and profiles of cast stone units (including drips and washes), as well as anchors and dowels (if any), flashings, and locations of colors and textures, if more than one of each. Where cast stone is installed as part of unit masonry assemblies, comply with documentation requirements of that section of the Design Standards.

C. Materials and Methods of Construction

1. Manufacturer and installer shall have a minimum of 10 years experience in the manufacture and installation of cast stone work, respectively.

04810 UNIT MASONRY ASSEMBLIES

A. Design Considerations

1. As unit masonry assemblies often constitute the major component of the exterior envelope of a building, great care must be exercised in the design, detailing and execution of these systems to ensure that they function as intended, to manage heat, air and moisture transfer between the interior and exterior of the building. Each element in the assembly must be selected and incorporated to be compatible with the life expectancy of the assembly as a whole, and of the building itself.

B. Special Documentation Requirements

1. Drawings must show all items to be incorporated into unit masonry assemblies, including backup materials, insulation, air and vapor barriers, vertical and horizontal reinforcing, ties, lintels, flashings, weeps and other items as applicable. Dimensions should be indicated for insulation thickness and cavity width and assembly should be located in relation to column grid or other datum. Indicate locations of all movement joints in unit masonry assemblies, and provide details for each type of joint.
2. The designer must provide drawing details and specifications for the proper installation of all thru-wall flashings, including heights, inside corners, outside corners, vertical offsets, end dams, and methods of flashing around concealed obstructions. Three dimensional drawings are useful, and may be required, to convey the design intent at these conditions. Details must be at a large enough scale to show clearly the relative positions of each and every component at each point in the assembly.
3. Brick: On projects requiring new brick to match existing brick, the research, selection and specification of matching brick are the responsibility of the A/E, with approval of the University Architect. During the design process, the A/E shall utilize consultants and contractors as required to determine the most appropriate brick selection. All related costs are to be included in the A/E design fee. Contract documents must specify the specific manufacturer and brick designation of the matching brick.
4. Sample Panels: Prior to installation of masonry work, the Contractor shall be required to erect up to 3 sample wall panels for University Architect approval of materials selected. After materials' approval, the Contractor shall be required to erect a

complete mockup on the site in location as desired by the A/E. Retain mockups during construction as standard for judging completed masonry work. As a minimum, the sample panel shall be "L" shaped, 8'-0" high by 4'-0" wide with 4'-0" leg. Brick shall be on outside corner of panel. Panels shall show the proposed color range, texture, bond, mortar joints and workmanship of all facing materials and shall include a sample of the proposed fenestration. If contrasting elements such as doors and frames are proposed, a sample of these materials shall be included in each mockup panel. Obtain A/E and University approval prior to start of masonry work represented in the mockup. Approved panels shall become the standard of comparison for all materials included and the panels shall remain undisturbed at the jobsite until the project is accepted by the University. The Contractor shall then demolish mockups and remove from site. Where new brick installations are required to match existing construction, sample panels shall be 2'-0" high by 2'-0" wide and shall be installed in an area of existing wall designated by Rutgers University, including removal of existing materials as required. Any sample panels containing materials not selected for the project shall be removed and replaced by selected materials prior to final completion of the project. The mockup shall be required to include all components necessary for a complete project, including but limited to the following: back-up wythe of construction; all waterproofing and flashing accessories, including end dams, etc.; masonry ties; masonry sill and /or lintel; and door and/or window frames. The mockup shall be used to verify aesthetics and workmanship acceptance criteria. Aesthetics shall include: tolerance of units, even distribution or blending of different colored units, joint tooling, and joint color uniformity. Workmanship and procedural requirements include such items as placement of reinforcement, embedment of connectors, installation of flashing and end dams, and control of mortar droppings.

C. **Materials and Methods of Construction**

1. Facing brick shall be Grade SW, Type FBX, per ASTM C216, unless otherwise approved by the University Architect.
2. For reasons of reduced structural loading and economy of installation and transportation, lightweight concrete masonry units (less than 105 lb/cu. ft.) shall be used in masonry walls, wherever possible. Concrete masonry units shall have a minimum nominal thickness of 6 inches.
3. In cavity wall construction, thru-wall flashing shall be provided at tops and bases of walls, and at all interruptions in the wall cavity.

Wall cavities, exclusive of insulation, shall be at least 2 inches wide. All thru-wall flashings are to be metal type. In roof level applications the flashings shall be deformed 16 oz. copper, 16 oz. lead-coated copper (unless otherwise restricted), or 26 ga. stainless steel. The thru-wall flashing assembly at these locations shall be two-piece type with receiver and removable counterflashing of the same material. Joints in metal flashing shall be joined with 1 inch lock seams and soldered, except at slip joints. In conditions where the flashing is not to be exposed on the exterior of the wall, the flashing material may be 7 oz. fabric-clad copper. Installation shall comply with flashing manufacturer's recommendations. Joints in fabric-clad copper shall be lapped a minimum of 6 inches and sealed with mastic at laps and at junctures with dissimilar materials. Fabric-clad copper shall be extended past the exterior face of the wall, and be cut flush with the face of the wall after the masonry construction is complete.

4. In exterior masonry cavity walls, open head joint type plastic weep vents with insect screens shall be provided immediately above all thru-wall flashings, at the lowest point, to avoid a gutter effect at the wall cavity. Weeps of this type shall be spaced no more than 2'-0" o.c., horizontally. Similar vents may be installed at tops of walls to aid in equalizing cavity pressure and promoting air circulation and rapid drying of the cavity. Aluminum weep-hole vents shall be avoided, due to corrosive reactions of aluminum to masonry materials.
5. To prevent blockage of weeps and mortar bridging of cavities, open cavity spaces are to be filled with continuous inorganic, multi-level mortar-catching material, similar to Mortar Net, from all thru-wall flashings to approximately 10" above the weeps. A/E shall select 3 such products for review and approval of the University. Approved products shall be included in specifications.
6. Coursing for both brick and CMU shall be coordinated with windows and door heads so that fractions of courses are avoided at openings.
7. Mortar: Admixtures, including antifreeze compounds, accelerators, retarders, and water-repellant agents, and any admixtures containing calcium chloride, shall not be added to mortar. Pigments may be added to mortar to obtain colored mortars, provided that they are produced specifically for use in mortar mixes and they can be demonstrated to have been successfully employed for this purpose. All colored mortars must be pre-

approved by the University along with the brick colors and shall be made a part of the required sample panels.

8. Brick, stone or concrete wall caps and copings are prohibited. See Manufactured Roof Specialties section of the Design Standards for requirements for metal copings.

04900 MASONRY RESTORATION AND CLEANING

A. Design Considerations

1. Masonry can suffer from well-intentioned but improper maintenance and repair efforts and overly aggressive cleaning. Before undertaking repair, restoration or cleaning of masonry, the Architect shall investigate the specific materials and techniques used in the original construction. Proposed processes, replacement materials and techniques shall be compatible with existing materials. Historically significant structures, including properties listed on the National Register of Historic Buildings, shall comply with the Secretary of the Interior's Standards for Rehabilitation, as applicable to masonry cleaning and restoration.
2. Identify and correct underlying problems such as structural issues and water intrusion into the wall at roofs and junctures with other systems before proceeding with repairs to masonry.

B. Special Documentation Requirements

1. Documents shall indicate extent of cleaning and restoration work. Where more than one type of restoration or cleaning is involved, indicate extent of each.

C. Materials and Methods of Construction

1. Tests of proposed cleaning methods and materials shall be conducted on limited areas of the materials to be cleaned and observed for both immediate and long term effects before proceeding.
2. Cleaning of masonry shall be by the gentlest method possible, using natural bristle brushes and low pressure water. Diluted detergents may be used, subject to testing. All cleaning materials shall be thoroughly rinsed off of masonry at completion of washing. Water or liquid chemical solutions shall not be used when there is a possibility of freezing temperatures.

3. Sandblasting and high-pressure power-washing (greater than 150-200 psi) of masonry are prohibited.
4. For all structures, mortar joint profiles and mortar colors are critical and must be specifically approved by the University.
5. Modern mortars are stronger than older mortars. The use of modern mortars to re-point walls incorporating older, softer mortar can damage masonry. The properties of the existing mortar must be ascertained by the A/E and new mortar matching the existing for color, texture, strength and composition specified.
6. Firms performing masonry cleaning and restoration work shall have a minimum of 5 years of documented experience in masonry cleaning and restoration.