

SECTION 04200 - MASONRY AND STONE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Masonry work includes concrete unit masonry, brick masonry, calcium silicate masonry units and cast stone.

1.02 QUALITY ASSURANCE

- A. All work shall conform to the standards of the Brick Institute of America and to codes having jurisdiction.
- B. The project shall be bid to include cold-weather practices if project is to be constructed when temperatures could fall below 40°F (4°C).
- C. All brick shall be from a single manufacturer's production run.
- D. Calcium silicate or cast stone products, depending on which is selected, shall be provided by a single manufacturer.
  - 1. Use only one product throughout the project.
  - 2. The color of all stone products must match.
  - 3. Do not combine calcium silicate and cast stone products on the same project.
- E. Comply with ASTM C 1364 – Architectural Cast Stone and the Cast Stone Institute Technical Manual.
- F. Mortar and Grout Testing:
  - 1. Test grout in each type of wall construction in conformance with ASTM C 1019-02.
  - 2. Inspect cores of fully grouted masonry reinforcing.

1.03 JOB CONDITIONS

- A. Protection of Work:
  - 1. Cover top of wall or partially completed work with waterproof membrane at end of each day.
  - 2. Extend cover 24inches minimum down both sides, hold securely in place.
- B. Cold Weather Protection:
  - 1. Preparation: remove ice or snow from masonry bed by applying heat until top surface is dry to the touch.
  - 2. Remove all frozen or damaged masonry work.
  - 3. Do not use wet or frozen units.
- C. Construction Requirements While Work is Progressing:
  - 1. Air temperatures 40°F (4°C) to 32°F (0°C):
    - a. Heat sand or mixing water to produce mortar temperatures between 40°F (4°C) and 120°F (49°C).
  - 2. Air temperatures 32°F (0°C) to 25°F (-4°C):
    - a. Heat sand and mixing water to produce mortar temperatures between 40°F (4°C) and 120°F (49°C).
    - b. Maintain mortar temperatures above freezing.

3. Air temperatures 25°F (-4°C) to 20°F (-7°C):
  - a. Heat sand and mixing water to produce mortar temperatures between 40°F (4°C) and 120°F (49°C).
  - b. Maintain mortar temperatures above freezing.
  - c. Provide heat sources on both sides of wall during construction.
  - d. Provide windbreaks when wind exceeds 15 mph.
4. Air temperatures 20°F (-7°C) and below:
  - a. Heat sand and mixing water to produce mortar temperatures between 40°F (4°C) and 120°F (49°C).
  - b. Provide enclosures and heat to maintain air temperature above 32°F (0°C).
  - c. Minimum temperature of units when laid; 20°F (-7°C).

D. Protection requirements for completed work:

1. Mean daily air temperature 40°F (4°C) to 32°F (0°C);
  - a. Protect masonry from rain or snow with weather-resistive covering for 24 hours.
2. Mean daily air temperature 32°F (0°C) to 25°F (-4°C):
  - a. Completely cover masonry with weather-resistive covering for 24 hours.
3. Mean daily air temperature 25°F (-4°C) to 20°F (-7°C):
  - a. Completely cover masonry with insulating blankets or equal protection for 24 hours.
4. Mean daily air temperature 20°F (-7°C) and below:
  - a. Maintain masonry temperature above 32°F (0°C) for 24 hours by using enclosures and supplementary heat or with electric heating blankets.

1.04 SUBMITTALS

- A. Shop Drawings: Submit calcium-silicate unit and/or architectural cast stone manufacturers shop drawings, including profiles, cross sections, modular unit lengths, reinforcement if required, exposed faces, anchors and annotation of cast stone types and locations if required by Architect of Record.

1.05 DELIVERY AND STORAGE

- A. Cast Stone and Calcium Silicate units; Store units in accordance with manufacturer's instructions to prevent damage or staining.
1. Protect with waterproof covers and prevent condensation under covers.
  2. Prevent contact with dirt and splashing.

PART II - PRODUCTS

2.01 FACE BRICK (allow 8 weeks minimum lead time)

- A. Provide units complying with the following from each manufacturer:
1. ASTM C 216.
  2. Size: Standard utility 3 5/8" x 3 5/8" x 11 5/8".
  3. Grade: SW
  4. Type: FBS
- B. National Accounts: Walgreens has established National Accounts with Carolina Ceramics Brick Co. and Mutual Materials Co. and Yankee Hill Brick. Each manufacturer has been

assigned a specific geographic region to supply. Obtain brick in each region from the following manufacturers:

<u>Carolina Ceramics Brick Co.:</u>	<u>Denise Whittington</u> <u>1-866-788-1916 x120</u>
<u>Mutual Materials Co.:</u>	<u>Steve Hubbard</u> <u>1-800-477-7137</u>
<u>Yankee Hill Brick:</u>	<u>Jeff Meyer</u> <u>1-402-330-2751</u>

1. Carolina Ceramics Brick Co.
  - a. Product: "Heritage Wirecut".  
(Type 1) Color: "Topaz"  
Finish: Velour  
(Type 2) Color: "Pebble Beach"  
Finish: Velour
  - b. Territory: East and South:  
East: Michigan (L.P.), Indiana, Ohio, Kentucky, West Virginia,  
Virginia, Pennsylvania, New York, Massachusetts, Maryland,  
Connecticut, New Jersey, Vermont, New Hampshire, Maine, Delaware,  
Rhode Island.  
South: North Carolina, South Carolina, Georgia, Tennessee, Alabama,  
Mississippi, Arkansas, Louisiana, West Virginia, Delaware.  
Midwest: South Dakota, Nebraska, Kansas, Oklahoma, Missouri,  
Iowa, Minnesota, Wisconsin, Illinois.
2. Mutual Materials Co.
  - a. Product: "Copper, Mission Texture Wirecut"  
(Type 1) Color: "Copper"  
Finish: Mission Texture Wirecut.  
(Type 2) Color: "Castle Gray"  
Finish: Smooth
  - b. Territory: West: Washington, Oregon, Idaho, Wyoming, Utah,  
Colorado, Montana, Nevada, California, Arizona, New Mexico.

C. Provide special shapes at all non 90-degree corners.

D. Provide soldier units with adjacent side finish at end units.

- 2.02 HOLLOW BRICK MASONRY (Thru-Wall Units): Provide "Heritage" masonry units as  
manufactured by Carolina Ceramics, or "Copper", as manufactured by Mutual Materials or  
Walgreens approved equal. Color and Finish of masonry units shall match products listed above  
(Type 1 and Type 2). Conform as ASTM C652.

Size: As required by the architect/engineer of record, but not less than 8" w x 4" h x 12" l.

Grade: SW

Type: HBS

Class: H60V

Water Repellent: Apply Prosoco Sure Klean® Weather Seal Siloxane WB, Prosoco Sure Klean®  
Weather Seal Siloxane PD or Hydrozo Enviroseal® 7.

- 2.03 CONCRETE MASONRY UNITS: Provide hollow load bearing block complying with ASTM  
C90, normal weight.

Size: Nominal 16" long x 8" high

A. Concrete Masonry Units for Single Wythe Exterior Wall Systems:

1. Size: Nominal 8" width min. x 8" high x 16" long.
2. Units shall have integral Water Repellant Admixture: Grace Masonry Products DRY-BLOCK.

2.04 SPLIT FACE CONCRETE MASONRY UNITS: Provide hollow load bearing block complying with ASTM C90, normal weight.

Size: Nominal 16" long x 8" high. Integral Water Repellant Admixture: Grace Masonry Products DRY-BLOCK™

Style/Color: Northern and Chicago Prototype; Northfield Block Company standard #21 or 205, CEMEX "Biltmore Tan #3546" or Walgreen approved equal.  
Southern Prototype; Demaco "Tse Tan" by Old Castle Coastal, or Walgreen approved equal.

2.05 CALCIUM SILICATE UNITS

A. Provide Renaissance® Masonry Units manufactured by Arriscraft International, Inc. or Walgreens approved equal.

B. Calcium Silicate Units: ASTM C 73, Grade SW; solid units, pressure formed and autoclaved,  $3 \frac{5}{8}$ " x  $11 \frac{5}{8}$ " x  $23 \frac{5}{8}$ ", sandblasted and rockered finish (as indicated) on exposed faces and ends, "Nutmeg" or "Oyster" color.

1. Compressive Strength: 6600 psi, to ASTM C 170.
2. Absorption: 8.8 percent to ASTM C 97.
3. Density: 129 lbs/ft<sup>3</sup> to ASTM C 97.
4. Modulus of Rupture: 770 psi to ASTM C 99.

C. Fabricate calcium silicate masonry units to the following tolerances:

1. Unit Length: plus-or-minus 1/16".
2. Unit Height: plus-or-minus 1/16".
3. Deviation from Square: plus-or-minus 1/16" with measurement taken using longest edge as base.
4. Bed Depth: plus-or-minus 1/8.

2.06 CAST STONE

A. Provide RockCast Architectural Series units manufactured by RockCast, Division of Reading Rock, Inc. or Select Stone series units manufactured by Continental Cast Stone Manufacturing, Inc.

B. Cast Stone Units: ASTM C 90, machine cast,  $3 \frac{5}{8}$ " x  $11 \frac{5}{8}$ " x  $23 \frac{5}{8}$ ", smooth face and split face finish (as indicated) on exposed faces and ends, RockCast "Buffstone" or Continental Stone color #1105".

1. Compressive Strength: ASTM C 140, > 5,000 psi at 28 days.
2. Absorption: ASTM C 140, < 5.0 percent at 28 days.
3. Linear Shrinkage: ASTM C 426, < 0.065 percent.
4. Density: ASTM C 140, > 120 lbs/ft<sup>3</sup>.
5. Freeze-thaw: ASTM C 666, < 4.0 percent.
6. Curing: in exposed chamber at 95 percent RH and 95 to 120 degrees F for 12 to 18 hours or yard cure for 350 degree-days.

C. Cast Stone Materials

1. Portland Cement: ASTM C 150, Type I or III, white or gray as required to match specified color.
2. Coarse Aggregates: ASTM C 33 except for gradation, granite, quartz or limestone.
3. Fine Aggregates: ASTM C 33 except for gradation, manufactured or natural sands.
4. Pigments: ASTM C 979, except do not use carbon black pigments, inorganic iron oxide.
5. Water Reducing, Retarding and Accelerating Admixtures: ASTM C 494.
6. Water: drinkable.
7. Reinforcing Bars: ASTM A 615, deformed steel bars, galvanized when less than 1 1/2" of material.
  - a Galvanized Coating: ASTM A 767.

- D. Fabricate Cast Stone units to the following tolerances:
1. Comply with the Cast Stone Institute Technical Manual.
  2. Cross Section: plus-or-minus 1/8".
  3. Unit Length: do not exceed length/360 or plus-or-minus 1/8" whichever is greater.
  4. Warp, Bow or Twist: do not exceed length/360 or plus-or-minus 1/8" whichever is greater.
- E. Water repellant: Apply Prosoco Sure Klean® Weather Seal Siloxane WB, Prosoco Sure Klean® Weather Seal Siloxane PD or Hydrozo Enviroseal® 7.

#### 2.07 MORTAR AND GROUT:

- A. Provide mortar and grout complying with ASTM C 270 or ASTM C476 (for reinforced masonry) and requirements of architect of record. Type N based on proportion specification, unless type S is required by the engineer of record.
- B. Mortar shall be pre-blended and pre-packaged to produce mortar with the required properties when dispensed from a silo type dispensing system. On site batching of individual mortar materials is prohibited.
- C. MORTAR MATERIALS:
1. Portland cement: ASTM C 150, type I.
  2. Masonry cement: ASTM C 91.
  3. Hydrated lime: ASTM C207, type S.
  4. Sand: ASTM C 144.
  5. Aggregates for grout ASTM C 404.
  6. Mortar color pigment: none.
  7. Admixture: Comply with ASTM C-270. Anti-freeze compounds or those containing chlorides are prohibited.
    - a. Provide Grace Masonry Products DRY-BLOCK™ mortar admixture at all single wythe concrete masonry unit and hollow brick masonry walls.
  8. Water: drinkable.

#### 2.08 ACCESSORIES

- A. Joint Reinforcement: Provide ASTM A 82 cold drawn steel wire with ASTM A 153, Class B2 hot-dipped galvanized coating, anchor type as required by the architect of record. Corrugated wall ties are prohibited.

1. Provide Type 304 stainless steel anchors in coastal areas and highly corrosive environments.
2. Cavity Walls with Insulation: provide units with adjustable double wire/eye or clips to hold insulation tight against block back up.

B. Miscellaneous Materials: Flashing, weep products, control/expansion joint materials as required by architect of record.

1. Acceptable concealed flexible flashing: 3 oz copper sheet bonded between two layers of asphalt waterproofed creped kraft paper, EPDM thru-wall flashing (40 mil min.).
2. Acceptable weep products (brick masonry): Rectangular plastic tubes with insect screen and cotton wick, cotton wick cords, Mortar Net weep vent.
3. Acceptable weep products (hollow brick masonry): cotton wick cords, Masonry Technology, Inc. "Core Vent".
4. Cavity drainage system; provide Mortar Net™ at brick masonry and Mortar Net Block™ at block or hollow brick masonry walls.
5. Single Wythe Concrete Masonry Unit Drainage System: Blok-Flash CMU Drainage System as manufactured by Mortar Net USA LTD. System includes drainage pans with weep spouts, web spacer / bridge units, drainage mattes and bug guards.

C. Cleaner: Prosoco Sure Klean® "600 Detergent" or "VanaTrol".

### PART III - EXECUTION

#### 3.01 INSTALLATION

- A. Cut masonry units using motor-driven wet saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible.
  1. Pre-soak calcium silicate units using clean water, prior to cutting. Allow units to dry prior to placement.
- B. Vertical Reinforcement: Provide inspection ports at all locations where vertical reinforcing is to be fully grouted within the unit core to allow confirmation that cores have been fully grouted. Following inspection, close all inspection ports and make flush with surrounding masonry.
- C. Increase quantity of wall ties around perimeter of openings, at wall terminations and corners. Place wall ties within 8" of openings and edges of masonry.
- D. Pull calcium silicate and cast stone units from multiple cubes to minimize variation in color.

#### 3.02 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: Vertical lines, surfaces or columns, walls do not exceed 1/4" in 10' nor 1/2" up to 40'. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story of 20' maximum. Vertical alignment of head joints not to exceed 1/4" in 10'.
- B. Variation from Level: For bed joints, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum.

- C. Variation of Linear Building Line: Do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.
- D. Variation in Mortar Joint Thickness: Do not exceed joint thickness indicated by more than plus or minus 1/8".

3.03 LAYING MASONRY WALLS:

- A. Pattern Bond: Lay brick masonry in  $\frac{1}{3}$  running bond for utility size brick. Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.
  - 1. Lay exposed Concrete Masonry Units, Split Faced Masonry Units, Calcium Silicate units and Rock Cast units in running bond.
- B. Tool exposed joints slightly concave.
- C. Keep cavity in cavity walls clean of mortar drippings and debris.
- D. Hollow Brick Masonry Units:
  - 1. Shall be laid with full face and head joints to increase resistance to water penetration.
  - 2. Shall be flashed and weeped at wall base, below and above all wall openings and at tops of walls.
- E. Calcium Silicate and Cast Stone Units:
  - 1. Set in full bed of mortar.
  - 2. Fully bond intersections, external corners and vertical joints.
  - 3. Do not adjust units after laying. Where resetting is required, remove, clean units and reset in new mortar.
  - 4. Surface efflorescence and cracking are cause for rejection of individual delivered units.
  - 5. Do not apply sealer to calcium silicate units.
- F. Single Wythe Exterior Concrete Masonry Walls:
  - 1. Shall be laid in running bond.
  - 2. Shall be laid with full face and head joints to increase resistance to water penetration. Tool joints slightly concave.
  - 3. Shall be flashed continuously above grade with Blok-Flash CMU Drainage System. Install Blok-Flash Drainage Mattes in each core above the Blok-Flash flashing course. Install bug guards at each drainage spout.
  - 4. Shall be stained by field application of a water repellent / color treatment. See Section 09910 for color treatment specification.

3.04 CLEANING

- A. After mortar is thoroughly set and cured, clean masonry completely using the "bucket and brush hand cleaning" method. Use only cleaning solutions approved by manufacturer of masonry units being cleaned. Apply cleaning solution in strict accordance with solution manufacturers written instructions. Do not use metallic tools to remove large mortar particles. Do not use muriatic acid. Do not sandblast.
- B. Test cleaning method on small inconspicuous area of each type of masonry to be cleaned, before full cleaning, to confirm masonry will not be damaged or discolored.

- C. Apply water repellent to Hollow Clay Masonry Units and Cast Stone Units after installation, cleaning and acceptance.

END OF SECTION