

**DIVISION 04 - MASONRY**

**SECTION 04300**

**UNIT MASONRY SYSTEM**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Section 01001- Basic Requirements
  - 2. Section 04100– Mortar for New Masonry Work.
  - 3. Section 04300 – Unit Masonry System
  - 4. Section 07190 – Water Repellents.
  - 5. Section 07600 – Flashing and Sheet Metal.
  - 6. Section 07900 – Joint Protection.

**1.02 SECTION INCLUDES**

- A. Concrete Masonry Block and Brick Masonry units, reinforcement, anchorage, and accessories.

**1.03 SUBMITTALS**

- A. Product Data: Provide masonry units and fabricated wire reinforcement.
- B. Samples: Provide samples of each type of Brick to be used.

**1.04 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for UL Assembly wall designs indicated on drawings. If applicable, conform to requirements for fire rated masonry construction.

**1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with ACI 530 and ACI 530.1.

**1.06 DELIVERY, STORAGE AND HANDLING**

- A. Deliver Concrete Masonry Units to project site in original manufacturer's packing, unopened and covered.
- B. Coordinate placement and storage on site as not to interfere with work in progress.
- C. Protect CLMU and brick stored on site from damage from other work, machinery and material on site.

**1.07 ENVIRONMENTAL REQUIREMENTS**

- A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

- B. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

## PART 2 PRODUCTS

### 2.01 CONCRETE MASONRY UNITS

- A. General: Comply with requirements indicated below applicable to each form of concrete masonry unit required.
- B. Hollow Load Bearing Block Units: ASTM C90, Type I – Moisture Controlled; normal weight.
- C. Solid Load-Bearing Block Units: ASTM C 90, Type I – Moisture Controlled; normal weight.
- D. Hollow Non-Load Bearing Block Units: ASTM C129, Type I-Moisture Controlled; normal weight.
- E. Size and Shape: Provide size and shapes where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
  - 1. Manufacturer's standard units with nominal face dimensions of 16 " long x 8 " high (15 5/8" x 7 5/8" actual) x thickness indicated.
  - 2. Provide square edge units for outside corners unless otherwise indicated.
- F. Grade: Grade shall be N.
- G. Type I, Moisture-Controlled Units: Cure units by autoclave treatment at a minimum temperature of 350 degrees F. (176 degrees C) and a minimum pressure of 125 psi.
- H. Exposed Faces: N/A

### 2.02 BRICK UNITS

- A. Manufacturers/Suppliers:
  - 1. ACME Brick, Co.
  - 2. Bradley Brick, Co.
- B. Face Brick: ASTM C216, Type FBS, Grade SW. Brick Supplier is to provide samples to the Architect for selection. Equal to Acme Brick, , Tulsa Special Blend, Modular Velour referred to as "College Blend".
- C. Size and Shape: Nominal size brick 3 3/4" x 2 1/4" x 8 " inches. Provide special units as required.
- D. Color/Style: See Item B. Final Color to be selected by Architect and Owner.

### 2.03 REINFORCEMENT AND ANCHORAGE

- A. Materials: Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics.
- B. Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire for zinc coating applied after prefabrication into units. ASTM A 123. Class B-2 (1.5 oz per sq., ft. of wire surface).
- C. Zinc-Coated (Galvanized) Steel Sheet: Carbon steel with zinc coating complying with ASTM A 525. Coating designation G90.
  - 1. Application: Use for dovetail slots and where indicated.

- D. Hot-Dip Galvanized Steel Sheet: ASTM A 366, Class 2 or ASTM A 635; hot-dip galvanized after fabrication to comply with ASTM A 153, Class B.
1. Application: Use for anchors.
- E. Joint Reinforcement: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10' (feet), with prefabricated corner and tee units, and complying with requirements indicated below:
1. Width: Fabricate joint reinforcement in units with widths of approximately 2" less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.
  2. Wire size for Side Rods: 0.1875" diameter.
  3. Wire Size for Cross Rods: 0.1875" diameter.
  4. For single-wythe masonry provide type as follows with single pair of side rods:
    - a. Truss design with continuous diagonal cross rods spaced not more than 16" o.c.
  5. For multi-wythe masonry provide type as follows:
    - a. Ladder design with perpendicular cross spaced not more than 16" o.c. and number of side rods as follows:
      1. Number of Side Rods for Composite Construction: One side rod for each face shell of concrete masonry back-up and one rod for brick wythe.
  6. For anchorage to steel framework provide manufacturer's standard anchors with crimped 1/4" diameter wire anchor section for welding to steel and triangular-shaped wire tie section sized to extend within 1" masonry face.
  7. Wire Size: 0.1875" diameter.
- F. Unit Type Masonry Inserts in Concrete: Furnish cast iron or malleable iron inserts of type and size indicated.
- G. Dovetail Slots: Furnish Dovetail slots, with filler strips, of slot size indicated, fabricated from 0.0336" (22 gage) sheet metal.
- H. Anchor Bolts: Provide steel bolts with hex nuts and flat washers complying with ASTM A 307, Grade A, hot-dip galvanized to comply with ASTM C 153, Class C, in size and configuration indicated.
- I. Sheet Metal Flashing: Fabricate from the following metal complying with requirements specified in Division-7 section "Flashing and Sheet Metal" and below:
1. Stainless Steel: 0.015" thick.
  2. Fabricate through-wall metal flashing with deformation in both directions for integral mechanical mortar bond.
  3. Fabricate metal expansion joint strips from sheet metal indicated above, formed to shape indicated.
- J. Asphalt-Coated Copper Flashing: Manufacturer's standard project consisting of sheet copper of weight per sq. ft. indicated below coated with flexible fibrated asphalt.
1. Weight 5 oz.
- H. Laminated Flashing: Manufacturer's standard Laminated flashing of type indicated below:
1. Copper-Fabric laminate: Copper sheet of weight per sq. ft. indicated below, bonded with asphalt between 2 layers of glass fiber cloth.
    - a. Weight: 5 oz.
- I. Adhesive for Flashings: Of type recommended by manufacturer of flashing material for use indicated.
- J. Rubberized Asphalt Base Flashing: Base flashing to be used at the base of the exterior brick veneer wall shall be a 40 mil (32 rubberized asphalt and 8 mil cross laminated) perma base adhesive polyethylene film by W.R. GRACE Products or by FIBERWED flashing and vapor barrier systems.

- K. Mortar Netting: Use Mortar netting to be placed at locations around weep holes at the base of the brick veneer walls to prevent unwanted mortar build-up at weeps. Available manufacturers include: Mortar Net USA, Ltd. And Hohmann & Barnard, Inc.
- L. Horizontal expansion and steel angle support shall occur at a maximum of 30 feet height from lowest point of brick shelf.

## 2.05 ACCESSORIES

- A. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No. 3 to 18.
- B. Nonmetallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, Grade RE41E1, capable of compression up to 35 percent, of width and thickness indicated.
- C. Premolded Control Joint Strips: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
  - 1. Styrene-butadiene rubber compound complying with ASTM D 2000, Designation 2AA-805.
- D. Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- E. Building Paper: No. 15 or 30 (as required) asphalt saturated felt.
- F. Nailing Strips: Softwood, preservative treated for moisture resistance, dovetail shape, sized to masonry joints.
- G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials, recommended by masonry unit manufacturer.
- H. Mortar Netting: Use Mortar netting to be placed at locations around weep holes at the base of the brick veneer walls to prevent unwanted mortar build-up at weeps. Available manufacturers include: Mortar Net USA, Ltd. And Hohmann & Barnard, Inc.

## PART 3 EXECUTION

### 3.01 EXAMINATION AND PREPARATION

- A. Verify that field conditions are acceptable and are ready to receive Work.
- B. Coordinate placement of anchors supplied to other Sections.
- C. Wetting Clay Brick: Wet brick made from clay or shale which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods that ensure each clay masonry unit being nearly saturated but surface dry when laid.
- D. Do not wet concrete masonry units if using them in job.
- E. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coating from reinforcing.
- F. Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown.
- G. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8 inches of masonry between chases or recesses and jamb of openings and between adjacent chases and recesses unless otherwise called for on the plans.
- H. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to opening.

- I. Cut masonry units with motor driven 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. Use dry cutting saws to cut concrete masonry units.

### 3.02 COURSING

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- B. Brick Units:
  - 1. Bond: Running Bond.
  - 2. Coursing: Use three units and three mortar joints to equal 8 inches. .
  - 3. Mortar Joints: Concave
- C. Cut mortar joints flush bitumen dampproofing is applied.
- D. Concrete Masonry Units:
  - 1. Bond: Running bond.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches. Adjust as required for special conditions.
  - 3. Mortar Joints: Concave

### 3.03 PLACING AND BONDING

- A. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- B. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

### 3.04 WEEPS

- A. Install weeps in veneer at 24 inches oc horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and ramp walls and use mortar netting continuously at these locations to minimize the build-up of excess mortar around weep holes. Provide Mortar netting around weeps to prevent loose mortar build-up.

### 3.05 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement 16 inches oc. Place joint reinforcement continuous in first and second joint below top of walls.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches oc.

### 3.06 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches oc. Place joint reinforcement continuous in first and second joint below top of walls.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Masonry Back-Up: Embed wall ties for bonding veneer at maximum 16 inches oc vertically and 36 inches oc horizontally. Place at maximum 3 inches oc each way around perimeter of openings, within 12 inches of openings

- E. Stud Framed Back-Up: Secure wall ties, strap, and anchors and embed into masonry veneer at maximum 16 inches oc vertically and 36 inches oc horizontally. Place at maximum 3 inches oc each way around perimeter of openings, within 12 inches of openings.
- F. Provide horizontal angle support for masonry wall at maximum height of 30 feet. See structural sheets for installation.

### 3.07 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

- A. If required: Install horizontal joint reinforcement 16 inches oc. Place joint reinforcement continuous in first and second joint below top of walls.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Embed anchors in concrete: Attach anchors to structural steel members. Embed anchorages in every second block sixth brick joint.
- D. Reinforce joint corners and intersections with strap anchors 16 inches oc.

### 3.08 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

- A. Install horizontal joint reinforcement 16 inches oc. Place joint reinforcement continuous in first and second joint below top of walls.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Embed anchors in concrete: Attach anchors to structural steel members. Embed anchorages in every second block sixth brick joint.
- E. Reinforce joint corners and intersections with strap anchors 16 inches oc.

### 3.9 MASONRY FLASHINGS

- A. Extend flashings horizontally at foundation walls, above ledge or shelf angles and lintels, under parapet caps, at bottom of walls, ramps.
- B. Turn flashing up minimum 8 inches and bed into mortar joint of masonry back-up.
- C. Lap end joints and seal watertight.
- D. Turn flashing, fold, and seal at corners, bends, and interruptions.

### 3.10 LINTELS

- A. Install loose galvanized steel lintels over openings, and where required for support. Reference should be made to Structural Plans for locations and details.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.

- C. Maintain minimum on each side of openings, 2 1/2 to 3 inches for bearing on steel and 6 to 8 inches for bearing on masonry.

### 3.11 GROUTED COMPONENTS

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- B. Place and consolidate grout fill without displacing reinforcing.
- C. If applicable at bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

### 3.12 CONTROL AND EXPANSION JOINTS

- A. Provide control joints at a maximum of 20 feet apart on center at exterior locations as required and as noted on the plans.
- B. Do not continue horizontal joint reinforcement through control and expansion joints.
- C. Install preformed control joint device in continuous lengths. Seal end, butt, and corner joints in accordance with manufacturer's instructions.
- C. Size control joint in accordance with Section 07900 for sealant performance.
- D. Form expansion joints as detailed.

### 3.13 BUILT-IN WORK

- A. As work progresses, install built-in metal door and glazed frames fabricated metal frames, window frames, wood nailing strips anchor bolts, plates and other items to be built in the work furnished by other Sections.
- B. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

### 3.14 TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- B. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft .

### 3.15 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, grounds, and columns. Coordinate with other sections of work to provide correct size, shape, and location.

### 3.16 PARGING (If required.)

- A. Dampen masonry walls prior to parging.
- B. Parge masonry walls in two uniform coats of mortar to a total thickness of 3/4 inch; to a smooth steel trowel finish.

### 3.17 CLEANING OF NEW MASONRY

- A. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

4. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
  5. Use bucket and brush hand-cleaning method described in BIA "Technical Note No. 20 Revised" to clean brick and masonry made from clay or shale, except using the masonry cleaner indicated below.
    - a. Detergent
  6. Clean concrete masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.
- B. Protection: Provide final protection and maintain conditions, in a manner acceptable to installer, which ensure unit masonry work being without damage and deterioration at time of substantial completion.

END OF SECTION – 04300