

## SECTION 04 2200

### CONCRETE UNIT MASONRY

#### PART 1 - GENERAL

- 1.1 SUMMARY: Provide Concrete Unit Masonry, as shown and specified per Contract Documents.
- 1.2 REFERENCES:
- A. American Concrete Institute (ACI):
    - 1. ACI 530: Building Code Requirements and Specification for Masonry Structures.
    - 2. ACI SP-66: Detailing Manual.
  - B. American Society for Testing and Materials (ASTM):
    - 1. General: Materials and testing standards as identified throughout this Section or within referenced manufacturers' standard specifications.
    - 2. ASTM C140: Standard Test Methods for Sampling and Testing of Concrete Masonry Units.
  - C. National Concrete Masonry Association (NCMA): TEK Bulletin No. 28.
  - D. Underwriters Laboratories, Inc. (UL): Fire Resistance Directory and Building Material Directory.
- 1.3 SUBMITTALS:
- A. General: Submit product data, test reports, and mill certificates.
  - B. Shop Drawings: Submit manufacture and installation details for reinforcing per ACI, including fastenings, for review prior to fabrication of work. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties, and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.
  - C. Samples:
    - 1. General: Submit the following listed samples for review prior to fabrication of work.
    - 2. Masonry Units: One of each type, texture and color.
    - 3. Color Mortar: Full range of samples.
    - 4. Laboratory Samples: Masonry units, cement, mortar and aggregates for tests as called for in this Section.
  - D. Closeout: Submit maintenance data.

#### 1.4 QUALITY ASSURANCE:

##### A. Testing:

1. General: Refer to Section 01 45 23 - TESTING AND INSPECTION SERVICES.
2. Retesting: Agency selected and paid for by the Owner; retesting paid for by Contractor.
3. Masonry Testing: Test concrete masonry units, mortar and grout; comply with CBC Chapter 21A.

##### B. Fire Performance Characteristics: Provide materials and construction identical to those of assemblies whose fire resistance has been determined per ASTM E119.

##### C. Single-source Responsibility:

1. General: Obtain masonry materials from one manufacturer for each different product required.
2. Masonry Units: Uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, for each continuous surface or visually related surfaces.
3. Mortar Materials: Ingredients of uniform quality, including color for exposed masonry, for each cementitious component and from one source and producer for each aggregate.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS:

##### A. Concrete Masonry Units:

1. Split Face Hollow Concrete Masonry Units: Hollow load-bearing block units (CMU); ASTM C90, Grade N, Type I –Moisture Controlled, normal weight. Split Face texture all exposed faces and ends. Color to be selected by Architect from manufacturer's full range of available colors.
2. Size: Manufacturer's standard units with nominal face dimensions of 16 inches long x 8 inches (15-5/8 inches x 7-5/8 inches actual), unless otherwise indicated; thickness as shown.

4. Special Shapes: Provide special units for 90 degree corners, lintels and bond beams. Where required, provide special shapes for jambs, sash, control joints, headers and other special conditions.
- D. Mortar and Grout: Refer to Section 04 05 00 - COMMON WORK RESULTS FOR MASONRY.
- E. Masonry Reinforcing and Accessories: Refer to Section 03 30 10 - CONCRETE.
- F. Lintels: As shown; refer to Section 05 12 00 - STRUCTURAL STEEL FRAMING.
- G. Miscellaneous Masonry Accessories:
  1. Nonmetallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D1056, Grade RE41E1: width and thickness as shown.
  2. Premolded Control Joint Strips: Styrene-butadiene rubber compound complying with ASTM D2000, Designation 2AA-805, designed to fit standard sash block and to maintain lateral stability in masonry wall.
  3. Bond Breaker Strips: 15 lb. asphalt roofing felt per ASTM D226, Type I.
- H. Cleaning Solution: Non-acidic; not harmful to masonry work or adjacent materials.

## 2.2 MIXES:

- A. Mortar and Grout: Refer to Section 04 05 00 - COMMON WORK RESULTS FOR MASONRY.
- B. Partial Sack Batches: Not permitted.

## PART 3 - EXECUTION

### 3.1 PREPARATION:

- A. Environmental Requirements:
  1. Cold Weather: Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and for 48 hours after completion of masonry work.
  2. Hot Weather: Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and for 48 hours after completion of masonry work.
- B. Examination:
  1. General: Examine conditions of work in place before beginning work; report defects.
  2. Inserts: Verify that anchors, inserts, etc., placed under other Sections have been properly installed.

- C. Measurements: Take field measurements; report variance between plan and field dimensions.
- D. Storage:
  - 1. General: Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. Pile masonry units on plant platforms in dry location. Protect masonry units during freezing weather with tarpaulins or other suitable material.
  - 2. Moisture Absorption of Concrete Masonry Units: Limit during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity available through the National Weather Service, Monterey Forecast Office.
- E. Protection:
  - 1. General: Protect masonry surfaces not being worked on during construction. When rain is imminent and work is discontinued, cover tops of masonry walls exposed to weather with a well-secured waterproof membrane.
  - 2. Stains: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove grout, mortar, or soil immediately on contact with masonry. Protect base of walls from rain-splashed mud and mortar splatter with coverings on ground and over wall surface.
  - 3. Loading:
    - a. General: Do not apply uniform floor or roof loading for at least 48 hours after construction of masonry walls or columns.
    - b. Concentrated Loads: Do not apply concentrated loads for at least four (4) days after construction of masonry walls or columns.
- F. Surface Preparation: Clean surfaces to be in contact with mortar or grout free of deleterious materials.

### 3.2 INSTALLATION:

- A. General: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified. Establish lines, levels, and coursing indicated. Protect from displacement. Maintain masonry courses to uniform dimension.
- B. Placing and Bonding:
  - 1. General: Lay hollow masonry units with face shell bedding on head and bed joints. Buttering corners of joints or furrowing of mortar joints is not permitted. Remove excess mortar as Work progresses. Interlock intersections and external corners. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

2. Cutting Masonry Units: Use dry cutting motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Wherever possible use full-size units without cutting.
3. Wetting: DO NOT WET CONCRETE MASONRY UNITS.
4. Bond: Running.
5. Mortar Joints: Concave; form vertical and horizontal joints of uniform thickness. Install mortar per ASTM C270. Place mortar in masonry unit bed joints back 1/4 inch from edge of unit grout spaces, bevel back and upward. Permit mortar to cure seven (7) days before placing grout. Remove excess mortar from grout spaces.

C. Reinforcement and Anchorage:

1. General: Clean reinforcement of all rust, mill scale, earth, ice or other materials that will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not specifically shown or required for installation.
2. Placement: Position reinforcement accurately, as shown, before grouting; support and secure vertical bars against displacement. Lap reinforcement ends minimum 6 inches. Maintain position within 1/2 inch of dimensioned position. Provide a clear distance between masonry unit surfaces and reinforcing of not less than one bar diameter.
3. Vertical Reinforcement: Place before laying masonry units. Tie vertical reinforcement to matching dowels at base of masonry and thread masonry units over or around reinforcement. Support vertical reinforcement at 10'-0" intervals, maximum. Where vertical bars are shown in close proximity, provide a clear distance between bars of not less than the nominal bar diameter or 1 inch (whichever is greater). For columns, piers and pilasters, provide a clear distance between vertical bars as shown, but not less than 1-1/2 times the nominal bar diameter or 1-1/2 inches, whichever is greater. Provide lateral ties as shown.
4. Horizontal Reinforcement: Place as the masonry units are laid in bond beam units. Depth of bond beam channel below the top of the unit shall be a minimum of 1-1/2 inches, with a minimum width of 3 inches.

D. Lintels: As shown; do not splice reinforcing bars. Allow masonry lintels to attain specified strength before removing temporary supports.

E. Built-in Work:

1. General: As work progresses, install built-in and other items to be installed in the work and furnished by other Sections. Install items plumb and level.
2. Fabricated Metal Frames: Bed anchors in adjacent mortar joints; fill frame voids solid with grout. Fill adjacent masonry cores with grout.

F. Grouting:

1. General: Install grout per CBC Section 2104A.6. Work grout into masonry cores and cavities to eliminate voids. Do not displace reinforcement while placing grout.
2. Low Lift Grouting: Place first lift of grout to a height of 16 inches and rod for grout consolidation. Place subsequent lifts in 8 inch increments and rod for grout consolidation.
3. Embedded Items: Place in masonry as necessary for work of other trades. Grout solidly in place with not less than 1 inch of grout surrounding inserts.
4. Curing: Maintain masonry continuously moist for at least 3 days after laying.

G. Construction Tolerances:

1. General: Per Section 01 43 00 - QUALITY ASSURANCE. Install to allow application of subsequent finish materials within specified tolerances.
2. Variation From Alignment of Columns: 1/4 inch, maximum.
3. Variation From Unit to Adjacent Unit: 1/32 inch, maximum.
4. Variation from Plane of Wall: Maximum of 1/4 inch in 10'-0" and 1/2 inch in 20'-0" or more.
5. Variation from Plumb: Maximum of 1/4 inch per story non-cumulative; 1/2 inch in two (2) stories or more.
6. Variation from Level Coursing: Maximum of 1/8 inch in 3'-0" and 1/4 inch in 10'-0"; 1/2 inch in 30'-0".
7. Variation of Joint Thickness: 1/16 inch in 3'-0", maximum.

H. Repairing and Pointing:

1. General: Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.
2. Pointing: During the tooling of joints, enlarge voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance.

3.3 FIELD QUALITY CONTROL:

- A. Inspection: Continuous inspection of grouted masonry will be for inspection of that work.
- B. Field Testing:

1. Mortar and Grout:
    - a. General: Tested for compression per CBC 2105A.3.3.
    - b. Samples: At beginning of masonry work, at least one (1) test sample of mortar and grout shall be taken on three (3) successive working days, and at one (1) week intervals thereafter. Mortar samples shall be made in 2 inch x 4 inch cylinders. Additional samples will be taken for each day's work.
    - c. Grout Prisms: Provide 4 inch x 4 inch x 8 inch, made with masonry molds; break molds away after grout has set, but before it has hardened. Test specimens in vertical position, at age of seven (7) days and at age of twenty-eight (28) days.
  2. Test Cores: Take a minimum of two (2) cores, and an additional two (2) cores for each additional 5,000 square feet of grouted masonry walls, at points selected by Architect in compliance with CBC 2105A.3.1. Owner will pay for coring and testing of walls, but Contractor will repair walls cored at no extra cost. In event more than two (2) cores are required to be taken to establish acceptability of work as result of low or questionable tests or suspected faulty workmanship, costs of coring in excess of two (2) cores will be paid by Owner and backcharged to Contractor.
- C. Retesting: Make necessary corrections to non-conforming Work; retest at Contractor's expense.

#### 3.4 CLEANING AND SEALING:

##### A. Cleaning:

1. General: Remove mortar droppings while still fresh. Dry brush exposed masonry at the end of each day's work and after final pointing to remove mortar spots; use cleaning solution as required to provide a uniformly clean surface per NCMA TEK Bulletin No. 28.
2. Walls: At completion of work, thoroughly saturate walls with water and clean with high pressure water.

##### B. Anti-Graffiti Sealing:

1. Sherwin-Williams 2K waterbased anti-graffiti clear coating system.  
Surface Preparation: Install per manufacturers requirements. Surface must be clean, dry and free of efflorescence, dust and mortar. Remove all oil, dust, grease, dirt and other foreign material to ensure adequate adhesion. Cure for twenty eight (28) days minimum, prior to application. Apply under dry weather conditions; mask adjacent areas to protect from overspray.
- 2.

END OF SECTION