

04220 CONCRETE MASONRY UNITS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 WORK INCLUDED

- A. Concrete masonry units.
- B. Glazed masonry units.
- C. Acoustical concrete masonry units.
- D. Reinforcing, anchors, and accessories.

1.03 WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

- A. Section 05500 - Miscellaneous Metals: Loose steel lintels.
- B. Section 07210 - Insulation.
- C. Section 07670 - Thru-Wall Flashing.

1.04 RELATED WORK:

- A. Section 03200 - Concrete Reinforcing.
- B. Section 04100 - Mortar: Mortar and grout.
- C. Section 04210 - Brick Masonry
- D. Section 06100 - Rough Carpentry: Centering and shoring.
- E. Section 07920 - Caulking and Sealant: Sealant for masonry control and expansion joints.
- F. Section 09260 - Gypsum Wallboard Systems

1.05 REFERENCES:

- A. ACI 530 - Building Code Requirements for Masonry Structures.
- B. ACI 530.1 - Specifications for Masonry Structures.
- C. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcing.
- D. ASTM A123 - Zinc Coatings on Iron and Steel Products.
- E. ASTM A951 - Standard specification for masonry joint reinforcing.
- F. ASTM C55 - Concrete brick.
- G. ASTM C90 - Load-bearing concrete masonry units.
- H. ASTM C126 - Glazed concrete masonry units.
- I. ASTM C129 - Non-load-bearing concrete masonry units.
- J. ASTM C744 - Prefaced concrete units.
- K. ASTM C780 - Method for Construction Evaluation of Mortars.
- L. ASTM E514 - Test Method for Water Permeance of Concrete Masonry.

1.06 SUBMITTALS:

- A. Submit in accordance with Section 01300.
- B. Submit manufacturer's product data for each type of concrete unit masonry, concrete unit masonry accessories, and other manufactured products, including certifications that each type complies with specified requirements.
- C. Submit 1 sample of all accessories and anchors.

1.07 QUALITY ASSURANCE

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

- A. Maintain one copy of documents on site.
 - B. Testing as per Section 01410 – Testing Laboratory Services.
- 1.08 QUALIFICATIONS
- A. Manufacturer: Company specializing in manufacturing the products specified with minimum 3 years experience.
 - B. Installer: Minimum 5 years documented experience.
- 1.09 MOCKUPS:
- A. Concrete Masonry Unit Mockup:
 - 1. Provide mockups as directed by the Architect.
 - 2. As soon as the samples have been approved, deliver enough units to the job site to construct:
 - a. 6'-0" x 2'-8" sample wall panel for double sided glazed units.
 - b. 6'-0" x 4'-0" sample wall panel for CMU.
 - c. 6'-0" x 2'-8" sample wall panel for acoustical units.
 - 3. Construct the panel using the mortar, reinforcing, tooling and cleaning as specified.
 - 4. The approved sample panel shall be the standard of workmanship.
 - 5. Panel shall not be removed until masonry work as required by this section has been accepted or as directed by the Architect.
 - 6. Use sample panel to test cleaning methods.
- 1.10 ENVIRONMENTAL CONDITIONS:
- B. Hot Weather and Cold Weather Installation:
 - 1. Meet the requirements of **ACI 530.1 Sec. 1.8 C and 1.8 D.**
- 1.11 DELIVERY, STORAGE AND HANDLING OF MATERIALS:
- Deliver, store and handle materials to prevent inclusion of foreign materials and damage by water or weather. Store packaged materials in their original packages. Damaged or deteriorated materials shall be removed from the premises.
- 1.12 PRE-INSTALLATION CONFERENCE
- Convene one week before commencing work of this section, under provisions of Section 01200.

PART 2 - PRODUCTS

- 1.01 **2.01 CONCRETE MASONRY UNITS:**
- A. Acceptable concrete masonry unit manufacturers:
 - 1. Concrete Masonry Units and Glazed Concrete Masonry Units:

Product specified is manufactured by Featherlite Building Products Corporation and is listed as a standard of quality.
 - 2. Acoustical Concrete Masonry Units:

Products of Featherlite Building Products Corporation and the Proudfoot Company, Inc. conforming to the specifications are acceptable.
 - 3. Substitutions: Under provisions of Section 01600.
 - B. Concrete Masonry Units:
 - 1. Provide units complying with characteristics indicated below for face size, exposed face and, under each form of block included, for weight classification:
 - a. All concrete masonry units: ASTM C90 hollow units.
 - b. Sizes: Manufacturer's standard units with nominal face dimensions of 16 inches long x 8 inches high x thickness indicated or as required or indicated on drawings.
 - c. Exposed Faces: Manufacturer's standard color and texture.
 - d. Special Shapes: Provide where required for lintels, corners, jambs, sash, control joint headers, bonding, starter blocks, and other special conditions. Bull nose corner units shall be used at all exposed corners and jambs.
 - C. Glazed Concrete Masonry Units:

1. Provide concrete units indicated below with manufacturer's standard smooth resinous tile facing complying with ASTM C744:
 - a. Size: Manufacturer's standard units with nominal face dimensions of 8" x 16", unless otherwise indicated.
Special Shapes: Provide where required by drawings for sills corners, jambs, sash, control joints, headers, bonding, starter blocks, and other special conditions.
 - a. Loadbearing Block: ASTM C90.
 - b. Exposed Faces/Color: The architect will make color and texture selection from manufacturer's standard colors and textures, unless otherwise indicated.

D. Acoustical Masonry Units:

1. Provide units complying with characteristics indicated below for face size, exposed face and, under each form of block included, for weight classification:
 - a. All concrete masonry units: ASTM C90 hollow units.
 - b. Sizes: Manufacturer's standard units with nominal face dimensions of 16 inches long x 8 inches high x thickness indicated or as shown.
 - c. Exposed Faces: Manufacturer's accepted color and texture.
 - d. Provide Special Shapes where shown on drawings for lintels, corners, jambs, sash, control joints, headers, bonding, starter blocks, and other special conditions.

2.02 REINFORCING, ANCHORS AND ACCESSORIES

A. Acceptable Manufacturers:

1. Products specified are manufactured by Dur-O-Wal and are listed as a standard of quality.
2. Products of, Hohmann & Bernard, Inc., MRCA, and Heckman Building Products, conforming to specification requirements, are acceptable.
3. Substitutions: Under provisions of Section 01600.

B. Horizontal Joint Reinforcing:

1. Wire not lighter than 9 gage conforming to ASTM A82; hot-dipped, galvanized finish ASTM A153.
2. Joint Reinforcing: Shall be ladder type masonry reinforcing with 9 gauge side and cross wires. Side wire spacing shall allow placement in face shells with 5/8" cover; Dur-O-Wal Ladur. *[Truss type reinforcing should never be used if there is vertical reinforcing in the wall, since it will interfere with placement of vertical bars.]*
3. Adjustable Anchors in Cavity Walls:
 - a. CMU Backup: ladder-type masonry reinforcing with eyelets or loops for loose ties flush-welded every 16 inches o.c. (Dur-O-Eye by Dur-O-Wal or equal.)
 - b. Steel Stud Backup: DW-10HS with 3/16" diameter wire ties of sizes to accommodate wall thickness. Vertical and horizontal spacing shall be 16" o.c.. Provide Textro seal self-sealing membrane at each veneer anchor.
Screws: Self drilling, self tapping, corrosion resistant as furnished by anchor manufacturer.
 - c. Reinforcing Steel: Type specified in Section 03200; sizes as indicated on drawings.
 - d. Concrete framing or backup walls: Dovetail Anchors – Corrugated bar type, minimum 16-gauge hot-dip galvanized. Dovetail anchor slots furnished and installed in Section 03100.

C. ACCESSORIES:

1. Control Joints: Preformed rubber material; RS Series conforming to ASTM 2000 2AA-805, size as required.
2. Bond Breaker: ASTM D226, #15 felt.
3. Compressible Filler: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, compressible up to 50% of width and thickness indicated.
4. Mortar Net: High density polyethylene (HDPE), 90% open mesh, dovetail shape. Size as required for cavity opening.
5. Weep Holes: 2" high open head joints extend to flashing surface.
6. Flashing: As per Section 07600.
7. Other accessories as may be required for work of this section.

PART 3 - EXECUTION

3.01 LAYING AND SETTING CONCRETE UNIT MASONRY:

- A. Concrete masonry units shall be laid up ahead of **masonry veneer**, then damp-proofed as specified in Section 07160.
- B. Lay concrete unit masonry with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of longitudinal face shells. Solidly bed cross webs with mortar of starting courses, cells filled with grout and cells with reinforcing.
- C. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimension indicated and to provide minimum clearance and grout coverage for vertical reinforcing bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
- D. All work shall be plumb and true and built accurately to the dimensions shown. All units shall be set in running bond except where indicated stacked bond. Units shall be cut accordingly to fit around pipes, ducts, openings, and all voids slushed full with mortar.
- E. Units shall be set tightly against inside of frames where they occur and all voids slushed full with mortar. Frame anchors shall be built-in as the work progresses and the cells of all masonry units adjacent to the bucks or frames shall be filled solidly with mortar. Such filling shall extend to full height of frames and to a point not less than 16 inches on each side of jamb. Slush hollow metal frame jambs in masonry work with well compacted mortar as the work progresses.
- F. Wall horizontal joint reinforcing at intersections, corners, and splices shall be lapped 12 inches. One extra layer or joint reinforcing shall be placed over all door openings in block walls and extended a minimum of 4 feet beyond the jamb on each side of the opening.
- G. Vertical joints in concrete masonry work shall be spaced so as to line up plumb and true, and all joints shall be as uniform as the units will allow.
- H. Bond partitions to other partitions, but in locations where partitions join exterior walls, form cold butt joints and tie with H&B #344 Rigid Partition Anchors spaced 16 inches o.c. vertically. Sealant for cold butt joints shall be in accordance with Section 07920.
- I. Anchor masonry to concrete with dovetail anchors spaced not more than 16 inches o.c. vertically.
- J. Where cutting of any concrete masonry unit is necessary and the joints are exposed, the cuts shall be made with a power driven saw with diamond blade and OSHA compliant dust collection.
- K. Mortar joints shall be 3/8 inch thick varying slightly, as necessary to work bond and shall be cut off flush where block face is not exposed or as shown on drawings. All other joints shall be tooled with sled jointing tool to provide neat concave joint after they have become thumbprint hard.
- L. All walls and partitions shall be laid with extreme care to prevent irregularities, mortar splashes, and to hold clean straight mortar joints.
- M. All concrete masonry units shall have all mortar and other foreign materials completely removed from the pores and faces of the block and left clean. Pointing of units shall be done when joints are tooled.
- N. Reinforcing Bars:
 - 1. Reinforcing bars shall be installed at locations as indicated on the drawings.
 - 2. Clean reinforcing of loose rust, oil, mill scale, earth, and other materials which will reduce bond to mortar or grout. Do not use reinforcing bars with kinks or bends not shown on drawings, or bars with reduced cross-section due to excessive rusting or other causes.
 - 3. Place vertical reinforcing before laying of concrete unit masonry. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bar diameters nor 10 feet.
 - 4. Position reinforcing accurately at the spacing indicated. Support and secure vertical bars against displacement. Provide at least 1/2 inch clear between vertical bars and concrete unit masonry shell.
 - 5. Splice reinforcing bars where shown; do not splice at other points unless approval is obtained. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact, and wire tie.
- O. Grouting:
 - 1. Provide grout in accordance with ASTM C476 for filling masonry cavities where shown on drawings.
 - 2. Provide fine or coarse grout as required in **ACI 530 Sec. 1.15.1 and Table 1.15.1**, as shown below:

Grout Type	Maximum grout pour height (feet)	Minimum width of grout space (inches).	Min grout space dimensions for grouting cells of hollow units (inches x inches)
Fine	1 ft	0.75 in	1.5 x 2 in
Fine	5 ft	2 in	2 x 3 in
Fine	12 ft	2.5 in	2.5 x 3 in
Fine	24 ft	3.0 in	3 x 3 in

Coarse	1 ft	1.5 in	1.5 x 3 in
Coarse	5 ft	2 in	2.5 x 3 in
Coarse	12 ft	2.5 in	3 x 3 in
Coarse	24 ft	3 in	3 x 4 in

3. Grout for cells of concrete unit masonry shall be $f'c = 2,000$ psi grout in accordance with Section 04100.
4. Pour grout using chute or container with spout. Vibrate grout during placing and 5 minutes after placing to reconsolidate. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2 inch below top course of pour. Maximum pour height allowed shall be 5 feet.

P. Control Joints:

1. Vertical: Locate where indicated on the drawings. Lay units to form a vertical joint with a bond breaker on one side.
2. Rake joints 1/4 inch deep.
3. Sealant: Shall be in accordance with Section 07920.

Q. Cavity Walls:

1. Do not let mortar fall into cavity air space.
2. Embed in masonry, joint reinforcing with ties at 16 inches o.c. vertically to secure veneer.

3.02 FLASHINGS:

Build in, as work progresses, all dampproofing and flashings which enter the masonry, using the material and following the instructions of the appropriate section of the specifications.

Seal

3.03 REINFORCED MASONRY BOND BEAMS AND LINTELS:

- A. Provide concrete masonry unit lintels and tie beams in the locations indicated and over openings more than 15 inches wide where no lintels are indicated. This includes openings for ducts and similar items.
- B. All exposed lintels, except precast units, shall have joints to match the pattern of the adjacent masonry.
- C. Form lintels and bond beams of concrete masonry trough units; reinforced as shown and fill with grout. Care shall be exercised in casting lintels and bond beams to insure complete filling of cells and true alignment with uniform mortar joints on exposed faces.

3.04 OPENINGS AND HOLES:

- A. Provide all openings and holes in masonry work. Provide all chases and recesses in masonry work of all types as indicated on the drawings and as required for pipes, ducts, and other work of Mechanical and Electrical Contractors. Such work shall be accurately located by the Contractor requiring the work, but masonry work shall not be constructed without giving other Contractors due notice and opportunity to lay out or install such items as may be required for their work.
- B. Where required for installation of work of other Contractors, leave openings as indicated on the drawing or as required to receive a later installation.
- C. After work of other Contractors is in place, openings shall be neatly filled with masonry of the same type as in the adjoining surfaces.

3.05 SETTING AND BUILDING-IN:

- A. Build-in materials occurring in any type of masonry construction which are furnished by other Contractors. All build-in work shall be accurately placed, secured, held in position, and located by the Contractor requiring the work.
- B. Set and build-in items of miscellaneous iron such as loose lintels and anchors required to complete all parts not connected to steel.
- C. Set all anchor bolts required for the attachment of work to masonry.
- D. Build-in recesses, flashings, slots, anchors, reinforcing, sleeves and other work required by the drawings.

3.06 PROTECTION:

At the end of each days work, cover the tops of walls with canvas or other suitable material weighted down to exclude weather.

3.07 REPAIR, POINTING AND CLEANING:

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as compared to sample panel or wall panel designated as basis of acceptance. Provide new units to match adjoining units and set in fresh mortar, pointed to match adjacent joints.

- B. Pointing: During the tooling of joints, enlarge any voids or holes and completely fill with mortar. Point-up joints at openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of sealant, where it occurs.
- C. Clean concrete unit masonry to in accordance with masonry manufacturer's recommendations and applicable NCMA "Tek" bulletins.

END OF SECTION