DIVISION IV - MASONRY

SECTION 04100 - MORTAR

PART I - SCOPE

A. This Section includes all labor, materials, equipment, and related items required for the work of mortar as shown on the Drawings and specified herein. The work includes but is not necessarily limited to the following:

1. Furnishing of all mortars required for the work of unit masonry.

B. This Section does not include the following related items:

1. Concrete or grout required for the filling of hollow masonry units, grouting door frames, etc.

2. Unit masonry work.

PART 2 - PRODUCT HANDLING

A. All materials shall be delivered, stored, and handled in a manner to prevent damage by breakage, water, or moisture, or the inclusion of foreign particles. Packaged materials shall be delivered in unbroken packages with the manufacturer's name, brand, and applicable data plainly marked thereon. No materials shall be dumped or stored on the ground. Bulk materials shall be stored on a clean surface or platform as required and shall be protected from deterioration and foreign matter.

B. All tools and equipment shall be delivered, protected, and handled in a manner to prevent any damage which may make them defective for the purpose for which they are inended.

PART 3 - MATERIALS

A. General. One manufacturer's brand and/or source of supply shall be utilized for each material specified hereinafter in order to maintain uniformity of mortars prepared under work of this section.

B. Portland cement shall conform to ASTM C150, Type I or III.

C. Masonry cement shall conform to ASTM C91.

D. Hydrated lime shall conform to ASTM C207.

E. Aggregate shall be natural river sand conforming to ASTM C144, shall be clean, sharp, well graded, and free from injurious amounts of dust, lumps, shale, alkalies, surface coating, and organic matter.

F. Water shall be clean and free from deleterious quantities of acid, alkali, oils, salts, and organic matter.

G. Admixtures. The use of admixtures in mortar shall not be permitted unless approved in writing by the Architect. If an admixture is approved, it shall be used throughout whatever

segment of the work for which it is proposed.

H. Antifreeze Compounds. Antifreeze liquids, salts, and other substances shall not be used in order to lower the freezing point of mortar.

PART 4 - MIXES

A. Mortar shall be freshly prepared and uniformly mixed in proportions by volume conforming to ASTM C270, Type N, 750 p.s.i. or Type S, l,800 p.s.i. at 28 days as specified.

B. Mortar for use in all applications shall be mixed as follows. Proportions of mortar by volume shall conform to the following table, with the aggregate measured in a damp, loose, condition. Provide a custom color mortar as selected by the Architect.

Mortar Type	Portland Cement	Masonry Cement	Hydrated Lime or Lime Putty	Aggregate
N	None	1 (Type II)	None	(Not less than 2¼ and more than 3 times the sum of the cements and lime used)
N	1	None	Over ½ to 1¼	
S	½	1 (Type II)	None	

C. The weights per cubic foot of materials in mortar are considered to be as follows:

Material	Weight/Cubic Foot
Portland Cement	94 lbs.
Masonry Cement	Weight printed on bag
Hydrated Lime	40 lbs.
Sand, damp and loose	80 lbs.

PART 5 - MIXING

A. Measurement by volume shall be manufacturer's packages or other containers of known capacity or by approved batching device so that specified proportions shall be consistently maintained. Material that has partially set shall not be retempered or used; frozen, caked, or lumpy material shall not be used. Mix mortar with proper amount of water, for a minimum of 5 minutes to desired consistency, and uniform color is obtained in electric batch mixer.

B. Mortar Flow. Mortar of the materials and proportions used in the construction shall have a flow after section for one (l) minute of not less than 70 percent of that immediately before suction. The flow shall be determined by the method of the Water Retention Test of the Standard Specifications for Masonry Cement, ASTM C9l.

C. Mortar Consistency. The mortar shall be of as wet a consistency as can be conveniently handled, and it shall be retempered frequently if necessary. Mortar which has greatly stiffened or in which the cement material has started to set shall not be used.

End of Section

SECTION 04120 - MORTARED MASONRY GROUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Mortar and grout for masonry.

1.02 RELATED SECTIONS

A. Section 01400 - Quality Control.

B. Section 01410 - Testing Laboratory Services: Testing laboratory services.

C. Section 04200 - Unit Masonry System: Installation of mortar [and grout].

1.03 REFERENCES

A. ACI 530 - Building Code Requirements for Masonry Structures.

B. ACI 530.1 - Specifications For Masonry Structures.

C. ASTM C91 - Masonry Cement.

D. ASTM C94- Ready-Mixed Concrete.

E. ASTM C144 - Aggregate for Masonry Mortar.

F. ASTM C150 - Portland Cement.

G. ASTM C270 - Mortar for Unit Masonry.

H. ASTM C404- Aggregates for Masonry.Grout.

I. ASTM C476 - Grout for Masonry.

J. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

K. ASTM C1019 - Method of Sampling and Testing Grout.

L. ASTM C1072 - Method for Measurement of Masonry Flexural Bond Strength.

M. ASTM C1142 - Ready-Mixed Mortar for Unit Masonry.

N. ASTM E447 - Test Methods for Compressive Strength of Masonry Prisms.

O. ASTM E518 - Test Method for Flexural Bond Strength of Masonry.

P. IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 0 1 620.

B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type I gray.

B. Mortar Aggregate: ASTM C 1 44, standard masonry type.

C. Hydrated Lime: ASTM C207, Type S.

D. Grout Aggregate: ASTM C404.

E. Water: Clean and potable.

F. Bonding Agent: Epoxy type.

2.02 MORTAR MIXES

A. Ready Mixed Mortar: ASTM C1 142, Type RN.

B. Mortar For Non-Load Bearing Walls and Partitions: ASTM C270, Type N using the Property specification.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Do not use anti-freeze compounds to lower the freezing point of mortar.

D. If water is lost by evaporation, re-temper only within two hours of mixing.

E. Use mortar within two hours after mixing at temperatures of 90 degrees F. or two-and-one-half hours at temperatures under 40 degrees F.

2.04 GROUT MIXES

A Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches; premixed type in accordance with ASTM C94; mixed in accordance with ASTM C476 Fine grout.

2.5 GROUT MIXING

A. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 Fine grout.

B. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

C. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Request inspection of spaces to be grouted.

3.02 PREPARATION

A. Apply bonding agent to existing concrete surfaces.

B. Plug clean-out holes with block masonry units. Brace masonry for wet grout pressure.

3.03 INSTALLATION

A. Install mortar and grout in accordance with premix mortar manufacturer's instructions.

B. Work grout into masonry cores and cavities to eliminate voids at door frames and opening.

C. Do not install grout in lifts greater than 16 inches two CMU courses without consolidating grout by rodding.

D. Do not displace reinforcement while placing grout.

E. Remove excess mortar from grout spaces.

3.04 FIELD QUALITY CONTROL

A. Field testing will be performed under provisions of Section 01400.

B. Test and evaluate mortar in accordance with ASTM C780.

C. Test and evaluate grout in accordance with ASTM C1019.

END OF SECTION

SECTION 04200 - UNIT MASONRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to Work of this Section.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Staining:
   1. Prevent grout, mortar or soil from staining the face of masonry. Remove immediately, grout or mortar in contact with such masonry. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
   2. Protect sills, ledges and projections from droppings of mortar.

C. Cold Weather Protection:
   1. Do not lay masonry units which are wet or frozen.
   2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
   3. Remove all masonry determined to be damaged by freezing conditions.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.

B. Samples: Submit, for verification purposes, samples of each exposed masonry unit. Include in each set of samples the full range of exposed colors and textures to be expected in completed work.

   1. For initial selection of exposed masonry units submit samples showing full range of colors and textures available.

C. Field Constructed Mock-Ups: Prior to installation of masonry work, erect sample wall representative of completed masonry work required for project with respect to qualities of appearance, materials and construction. Locate mock-ups on site in locations indicated or, if not indicated, as directed by Architect. Retain mock-ups during construction as standard for judging completed masonry work. For the following types of masonry, build mock ups which are approximately 6' long by 4' high by full thickness including back-up wythes, if any. When directed, demolish mock-ups and remove from site.

D. Comply with pertinent provisions of Section 01300.

1.04 DELIVERY, STORAGE AND HANDLING

A. Comply with pertinent provisions of Section 01620.

1.05 JOB CONDITIONS

A. Protection of Work:

1. During erection, cover top of walls with heavy, waterproof, sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

2. Extend cover a minimum of 24 inches, down both sides and hold cover securely in place.

3. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls.

4. Do not apply concentrated loads for 3 days after building masonry walls.

B. Staining:

1. Prevent grout, mortar or soil from staining the face of masonry. Remove immediately, grout or mortar in contact with such masonry. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

2. Protect sills, ledges, and projections from droppings of mortar.

C. Cold Weather Protection:

1. Do not lay masonry units which are wet or frozen.

2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.

3. Remove all masonry determined to be damaged by freezing conditions.

4. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation, except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F (6°C).

a. 40°F (4°C) to 32°F (0°C):

1) Mortar: Heat mixing water to produce mortar temperature between 40°F (4°C) and 120°F (49°C).

2) Grout: Follow normal masonry procedures.

b. 32°F (0°C) to 25°F (-4°C):

1) Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C); maintain temperature of mortar on boards above freezing.

2) Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of workday.

c. 25°F (-4°C) to 20°F (-7°C):

1) Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C); maintain temperature of mortar on boards above freezing.

2) Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of workday.

3) Heat both sides of walls under construction, using salamanders or other heat sources.

4) Use windbreaks or enclosures when wind is in excess of 15 mph.

d. 20°F (-7°C) and below:

1) Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C).

2) Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of workday.

3) Masonry Units: Heat units so that they are above 20°F (-7°C) at time of laying.

4) Provide enclosure and auxiliary heat to maintain an air temperature of at least 40°F (4°C) for 24 hours after laying units.

5) Do not heat water for mortar and grout to above 160°F (71°C).

5. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated, apply to mean daily air temperatures, except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.

a. 40°F (4°C) to 32°F (0°C): Protect masonry from rain or snow for at least 24 hours by covering with weather resistant membrane.

b. 32°F (0°C) to 20°F (-7°C): Completely cover masonry with weather resistant insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry

c. 20°F (-7°C) and below: Except as otherwise indicated, maintain masonry temperature above 32°F (0°C) for 24 hours, using enclosures and supplementary heat. Electric blankets, infrared lamps, or other methods proven to be satisfactory. For grouted masonry, maintain heated enclosure to 40°F (4°C) for 48 hours.

PART 2 - PRODUCTS

2.01 MASONRY UNITS, GENERAL

A. Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

B. Masonry Unit Characteristics: Provide units complying with standards referenced and requirements indicated.

2.02 STANDARD MASONRY UNITS

A. Brick.
1. Face brick shall conform to ASTM C216, Grade SE, type FBS or FBX, ($7^5/_6$" x 2¼" x 3⅝" bed depth), solid or cored. See elevation for type.

a. Provide all special matching face brick units for applications where indicated by the details or required, including sill units. Units shall conform to details and dimensions shown on the Drawings and finished surfaces shall be indistinguishable from those of face brick specified above.

B. Concrete Block: Manufacturer's standard normal weight units (125 lbs. per cu. ft. or more, over dry weight of concrete) and units of the dimensions shown on the Drawings. Where dimensions are not shown on the Drawings, provide units having nominal face dimensions of 16" long by 8" (15⅝" x 7⅝" actual) or as required.

C. Special Shapes: Provide where required for lintels, corners, bond beams, and other special conditions. Provide bullnose block at all exposed interior corners, unless otherwise indicated.

D. Hollow Load-Bearing: ASTM C90, where shown as "CMU" and as follows:
1. Type 1.

E. Solid Loadbearing: ASTM C90, where shown as "Solid CMU."
1. Type 1.

F. Weight Classification:
1. Below Grade: Normal weight units (125 lbs. per cu. ft. or more, oven dry weight of concrete).
2. Above Grade: Lightweight units (not to exceed 105 lbs. per cu. ft., oven dry weight of concrete). Lightweight aggregated: Conform to ASTM C 331 expanded shale produced by rotary kiln process; shall be 100% Solite or approved substitute; and shall be graded to assure a consistent texture.

2.03 MORTAR MATERIALS

A. Portland Cement: ASTM C150, Type I, except Type III may be used for cold weather construction. Provide natural color.

B. Masonry Cement: ASTM C91.

C. Hydrated Lime: ASTM C207, Type S.

D. Aggregate for Mortar: ASTM C144, except for joints less than ¼", use aggregate graded with 100% passing the No.16 sieve.

E. Aggregate for Grout: ASTM C404.

F. Water: Clean and potable.

2.04 MASONRY ACCESSORIES

A. Horizontal Joint Reinforcing

1. Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner ("L") and intersecting ("T') units. Fabricate from cold-drawn steel wire complying with ASTM A82, with deformed, continuous, side rods and plain, cross rods into units with widths of approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar with mortar coverage of not less than ⅝" on joint faces exposed to exterior and not less than ½" elsewhere.

a. Truss type with diagonal, cross rods spaced not more than 16" o.c.

1) Reinforcing Single-Wythe Walls: Like standard Dur-O-Wall D/A 310 truss with two side rods; one rod in each face shell.

b. Ladder type may be used at contractor's option for ease of placing vertical reinforcing rods.

2. Wire Sizes: Fabricate with 9-gauge side and cross rods, unless otherwise indicated.

3. Wire Finish:

a. Provide manufacturer's standard mill galvanized finish for interior walls.

2.05 ANCHORS AND TIES

A. Anchors and ties shall be of corrosion resistant metal equal in strength, size and numbers to conform with requirements of American Standard A41.1 titled American Standard Building Code Requirements for Masonry.

1. Wall Ties/Anchoring Systems. Shall be Hohmann & Barnard, Inc. DW-10HS on sheathing, or equal.

2.06 MISCELLANEOUS MASONRY ACCESSORIES

A. Reinforcing Bars: Deformed steel, ASTM A615, Grade 60.

1. Reinforcing bars for bond beams shall be No. 4 unless otherwise indicated.

2. Provide ½" smooth, steel, rods not less than 32" long with one end greased at bond beam control joints.

B. Bond Breaker Strips at Control Joints: Standard building paper or #15 asphalt felt.

2.07 MORTAR AND GROUT MIXES

A. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents.

1. Do not use calcium chloride in mortar or grout.

B. Mortar of Unit Masonry: Comply with ASTM C270, Proportion Specification, for types of mortar required, unless otherwise indicated.

1. Limit Cementitious materials in mortar to Portland cement lime.
2. Use type S mortar.

C. Grout for Unit Masonry: Comply with ASTM C476 for grout for use in construction of reinforced and non-reinforced unit masonry. Use grout of consistency indicated or if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout. Grout shall be not less than 2500 p.s.i. concrete. Maximum size aggregate shall be ½".

PART 3 - FLASHING

A. Through-Wall Flashing at brick cavity walls.

1. Cavity Wall Membrane Flashing shall be Peel-N-Seal, 40 mil thick, self-adhering cavity wall membrane by Advanced Building Products, Inc., or equal.

2. Where laps occur, lap sheets at least 6" and seal with cold setting cement. Roll to insure full adhesion.

3. At obstructions, carry flashing up 6" and secure with cold setting cement.

4. Where ties or anchors, conduit, etc. penetrate through sheet, punctures shall be made minimum size possible and mastic troweled around place to thoroughly seal the puncture.

5. At lintels and shelf angles, flashings shall extend minimum of 6" beyond ends of lintels.

PART 4 - EXECUTION

4.01 INSTALLATION - LAYING BRICK

A. Lay all face brick in exterior wall construction using Type N mortar furnished under work of Section 04100.

1. All brick shall be thoroughly wet before laying, except in freezing weather. All bed and head joints shall be completely filled with mortar. Fill all head joints with a heavy buttering of mortar on one side of the brick, press the brick down into the bed joint and push the brick into place so that the mortar squeezes out from the top and sides of the head joint. Mortar should correspondingly cover the entire side of a brick before placing with next brick. Attempting to fill joints by slushing or dashing will not be permitted. Partial filling of joints by buttering or spotting the vertical edges of the brick with mortar cut from the extruded bed joint will not be permitted. Where closures are required, the opening should be filled with mortar so that insertion of the closure will extrude mortar, both laterally and vertically. All brick work shall be plumb, true to line, courses level and properly anchored to back-up, abutting masonry and concrete.

2. Face Brick Bond. The bond for brick laid in walls shall be running bond with tooled joints throughout. Coursing shall be accurately spaced and laid in such manner that the bond is kept plumb throughout. Variations in the width of vertical joints shall be inconspicuous and made only as necessary to maintain the bond. Improper layout of bond will be rejected. Intersecting and abutting walls and corners shall be bonded together by interlocking alternate courses of brick. No brick smaller than 3-3/4" long shall be used as a jamb closure, and all cuts required shall be made with a masonry saw.

3. Face Joints. All face joints in brick shall be for horizontal joints as shown on the drawings, and for vertical or head joints may be from 5/16" to 7/16" to adjust bond and minimize cutting at openings. In exposed wall faces, joints shall be cut flush, and as the mortar takes its initial set, shall be tooled with 1/2" diameter round tool 6" longer than the length of the masonry unit. Tooling shall compact the mortar tightly against the masonry units on both sides of the joints. Head joints shall be tooled first. Joints must be tooled smooth, even and uniform. At completion of work, all holes in joints of exposed masonry must be filled. Rake joints 3/8" deep at jambs of brick abutting other materials and at other joints shown to be caulked by others under work of Section 07900; except that caulked control joints shall be treated as specified below.

4. Control Joints. Provide continuous 3/8" wide vertical control joints in exterior face brick where indicated by cutting half-brick closures in alternate courses, omitting mortar continuously in the joint. Control joints shall fall at normal head joint locations and shall be absolutely plumb so as to be inconspicuous in the finish work. Caulking of control joints is specified under Section 07900.

5. Weeps. Provide weep holes in exterior brick wall surfaces in all joints containing through wall membrane flashing at spacing shown on the Drawings.

B. Workmanship. The Contractor is cautioned that the Architect will demand first class workmanship. All brick masonry shall be performed by experienced masons. Any chipped, cracked, or otherwise damaged or defective work will be rejected.

4.02 INSTALLATION - LAYING CONCRETE BLOCK

A. Thickness: Build masonry construction to the full thickness shown except, build single-wythe walls to the actual thickness of the masonry walls, using units of nominal thickness shown or specified.

B. Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp, unshipped, edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry unit.

C. Do not wet concrete masonry units.

D. Pattern Bond: Lay standard concrete block in running bond with vertical joints in each course centered on units in each course above and below. Bond and interlock each course above and below. Bond and interlock each course at corners, unless otherwise shown.

E. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half size units at corners, jams, and wherever possible at other locations.

F. Lay-up walls plumb and with courses level, accurately spaced and coordinated with other work.

G. Stopping and Resuming Work: Rack back ½ masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if specified to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.

H. Built-In Work: As the work progresses, build-in items specified under this and other sections of these Specifications. Fill in solidly with masonry around built-in items.

1. Fill space between hollow metal frames and masonry solidly with mortar.
2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

3. Fill CMU cores with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar conditions unless otherwise indicated.

I. Intersecting Loadbearing Walls: If carried up separately, provide rigid steel anchors at not more than 2'-0" o.c. vertically. Form anchors of galvanized steel not less than 1 - ½" x ¼" x 2' - 0" long with ends turned up not less than 2" or with cross-pins. If used with hollow masonry units, embed ends in mortar filled cores.

J. Non-Loadbearing Interior Partition Walls: Build full height of story to underside of solid structure above, unless otherwise indicated. Provide ½ x ½" 16 gauge wire mesh ties spaced 16" o.c.

K. Build chases and recesses as shown and as required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.

L. Lay solid concrete units with completely filled bed, head, and collar joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.

M. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout. For starting courses on footings where cells are not grouted, spread out full mortar bed including areas under cells.

N. Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with ⅜" joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials. Tool exposed joints slightly concave using a jointer larger than joint thickness. Rake out mortar in preparation for application of caulking or sealants where shown.

O. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

4.03 HORIZONTAL JOINT REINFORCING

A. Provide continuous horizontal joint reinforcing as shown and specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of ⅝" on exterior side of walls and ½" at other locations. Lap reinforcement a minimum of 6." Do not bridge control and expansion joints with reinforcing. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, pipe enclosures and other special conditions.

B. Space continuous horizontal reinforcing as follows:

1. For single-wythe walls, space reinforcing at 16" o.c. vertically, unless otherwise indicated.

C. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above lintels and below sills. Extend reinforcing a minimum of 2'-0" beyond jambs of the opening, bridging control joints where provided.

4.04 ANCHORING MASONRY WORK

A. Provide anchoring devices of the type indicated.

B. Anchor masonry to structural steel members where masonry abuts or faces such members to comply with the following:

1. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.

2. Anchor masonry to structural members with metal ties embedded in masonry joints and attached to structure. Provide anchors with flexible tie sections, unless otherwise indicated.

3. Space anchors as shown, but not more than 16" o.c. vertically and 24" o.c. horizontally.

4.05 LINTELS AND BOND BEAMS

A. Install loose lintels of steel and other materials where shown.

B. Provide masonry lintels where shown and wherever openings of more than 1' - 0" are shown without structural steel or other supporting lintels. Provide precast masonry lintels. Thoroughly cure precast lintels before handling and installation.

1. For bond beams and certain lintels, use specially formed "U" shaped lintel units with reinforcing bars placed as shown and filled with grout of consistency required to completely fill space between reinforcing bars and masonry unit.

2. Reinforcing bars shall be as indicated on the drawings.

3. Provide ½" smooth rods with one end greased through control joints. Vertical joints of bond beam block shall correspond with block joint pattern where exposed.

C. Provide minimum bearing of 8" at each jamb, unless otherwise indicated for lintels.

D. Score precast masonry lintels exposed to view and set in place to match adjacent bond pattern.

4.06 CONTROL AND EXPANSION JOINTS

A. Provide vertical expansion, control, and isolation joints in masonry where shown or required. Provide bond breaker paper one side of control joint and fill with mortar or grout as detailed. Rake joint to a depth of ¾" to receive backer rod and sealant.

B. See Division 7 sections for "Joint Sealers."

C. Joint width for sealants: ⅜" unless otherwise indicated.

4.07 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 intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings, and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.

C. Clean exposed standard CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.

END OF SECTION