

## SECTION 04200 - UNIT MASONRY

### PART 1 - GENERAL

#### RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### SUMMARY

This Section includes the following:

Concrete unit masonry. (6", 8" standard units).

Clay unit masonry in the form of brick-

Brick unit masonry for veneered and infill masonry applications.

Typical Face Brick – **Match Existing Brick**

Clay unit masonry in the form of special shapes.

NOTE: Special shapes (including solids) are part of base bid price and unit costs are not covered by the brick allowance.

Products installed but not furnished under this Section include the following:

Steel lintels in unit masonry are specified in Division 5 Section "Metal Fabrications."

Wood nailers and blocking built into unit masonry are specified in Division 6 Section "Rough Carpentry."

Reglets in masonry joints for metal flashing are specified in Division 7 Section "Flashing and Sheet Metal."

Rigid Insulation for building perimeter and exterior continuous insulation sheathing are specified in Division 7 Section "Insulation."

Hollow metal frames in unit masonry openings are specified in Division 8 Section "Steel Doors and Frames."

#### SYSTEM PERFORMANCE REQUIREMENTS

Provide unit masonry that develops the following installed compressive strengths (f'm):

For clay unit masonry: As follows:

f'm = 2500 psi.

As indicated.

For concrete unit masonry: As follows:

f'm = 1500 psi.

As indicated.

#### SUBMITTALS

General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

Product data for each different masonry unit, accessory, and other manufactured product indicated.

Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcing" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.

Samples for initial selection purposes of the following:

Unit masonry samples in small-scale form showing full extent of colors and textures available.

Cold-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

Hot-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

Results from tests and inspections performed by Owner's representatives will be reported promptly and in writing to Architect and Contractor.

#### QUALITY ASSURANCE

Unit Masonry Standard: Comply with ACI 530.1/ASCE 6 "Specifications for Masonry Structures," except as otherwise indicated.

Fire Performance Characteristics: Where indicated, provide materials and construction identical to those of assemblies whose fire resistance has been determined per ASTM E 119 by a testing and inspecting organization, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

Field-Constructed Mock-Ups: Prior to installation of unit masonry, erect sample wall panels to further verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mock-ups to comply with the following requirements, using materials indicated for final unit of Work:

Locate mock-ups on site in locations indicated or, if not indicated, as directed by Architect.

Build mock-ups for the following types of masonry in sizes of approximately 4 feet long by 4 feet high by full thickness, including face and backup wythes as well as accessories.

Each type of exposed unit masonry construction.  
Typical interior unit masonry wall.

Where masonry is to match existing, erect panels parallel to existing surface.

Retain and maintain mock-ups during construction in undisturbed condition as standard for judging completed unit masonry construction.

When directed, demolish and remove mock-ups from Project site.

#### DELIVERY, STORAGE, AND HANDLING

Deliver masonry materials to project in undamaged condition.

Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.

Store cementitious materials off the ground, under cover, and in dry location.

Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.

## PROJECT CONDITIONS

**Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.**

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

**Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.**

Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come 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.

Protect sills, ledges, and projections from mortar droppings.

Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.

## COLD WEATHER PROTECTION

Do not lay masonry units which are wet or frozen.

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

Remove masonry damaged by freezing conditions.

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

40 degrees F to 34 degrees F:

Mortar: Heat mixing water to produce mortar temperature between 40 degrees F and 120 degrees F.

Grout: Follow normal masonry procedures.

**34 degrees F or below:**

**DISCONTINUE MASONRY WORK.**

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.

40 degrees F to 34 degrees F:

Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

32 degrees F to 25 degrees F:

Completely cover masonry with weather-resistive membrane for at least 24 hours.

25 degrees F to 20 degrees F:

Completely cover masonry with weather-resistive insulative blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

Except as otherwise indicated, maintain masonry temperature above 32 degrees F (0 degrees C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proved to be satisfactory. For grouted masonry maintain heated enclosure to 40 degrees F (4 degrees C) for at least 48 hours.

Hot-Weather Construction: Comply with referenced unit masonry standard.

## PART 2 - PRODUCTS

### MATERIALS, GENERAL

Comply with referenced unit masonry standard and other requirements specified in this Section applicable to each material indicated.

### CLAY MASONRY UNITS

General: Comply with the following requirements applicable to each form of brick required:

Provide special molded shapes where indicated and as follows:

For applications requiring brick of form, color, texture, and size on exposed surfaces that cannot be produced by sawing standard brick sizes.

Provide units without cores or frogs and with all exposed surfaces finished for ends of sills, caps, and similar applications that expose brick surfaces that otherwise would be concealed from view.

Face Brick Standard: ASTM C 216 and as follows:

Grade and Unit Compressive Strength: Provide units of grade and minimum average net area compressive strength indicated below:

Grade SW.  
3000 psi.

Type FBS (for general use in exposed masonry requiring wider variations in size and color ranges than Type FBX).

Size: Provide bricks manufactured to the following actual dimensions within the tolerances specified in ASTM C 216:

Standard Modular: 3-5/8 inches thick by 2-1/4 inches high by 7-5/8 inches long.

Application: Use where brick is exposed, unless otherwise indicated.

Color: **Match Existing Brick**

Building (Common) Brick: ASTM C 62, and as follows:

Grade and Unit Compressive Strength: Provide units of grade and minimum average net area compressive strength indicated below:

Grade SW.  
3000 psi.

Size: Provide bricks manufactured to the following actual dimensions within the tolerances specified in ASTM C 216:

Standard Modular: 3-5/8 inches thick by 2-1/4 inches high by 7-5/8 inches long.

Application: Use where brick is indicated for concealed locations.

### CONCRETE MASONRY UNITS

General: Comply with requirements indicated below applicable to each form of concrete masonry unit required.

Provide special shapes where indicated and as follows:

For lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.

Size: Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in the applicable referenced ASTM specification for concrete masonry units.

Concrete Masonry Units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated on drawings.

Concrete Building Brick: Specified dimensions as follows:

Standard Modular: 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.

Provide Type I, moisture-controlled units.

Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

Standard aggregate, ground finish.

Hollow Load-Bearing Concrete Masonry Units: ASTM C 90, Grade N and as follows:

Unit Compressive Strength: Provide units with minimum average net area compressive strength indicated below:

2000 psi.

Not less than the unit compressive strengths required to produce concrete unit masonry construction of compressive strength indicated.

Weight Classification: Lightweight.

Solid Load-Bearing Concrete Masonry Units: ASTM C 145, Grade N and as follows:

Unit Compressive Strength: Provide units with minimum average net area compressive strength indicated below:

75% solid units

2000 psi.

Weight Classification: Lightweight.

Concrete Building Brick: ASTM C 55 and as follows:

Unit Compressive Strength: Provide units with minimum average net area compressive strength indicated below:

3500 psi.

Weight Classification: Lightweight.

## MORTAR AND GROUT MATERIALS

Comply with ASTM C 476 for grout for use in construction of reinforced and nonreinforced unit masonry.

Grout shall conform to ASTM 476 and compressive strength of grout determined in accordance with ASTM C1019; 2000 psi minimum.

Reference and comply with ACI-530-08 for grout requirements.

Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.

**Provide natural color cement.**

**Mortar for this project shall be Standard, Type-S mortar.**

Color Mortar is not required – See Requirement below for Sand.

Sand shall meet the requirements of Standard Specifications for Aggregate for Masonry Mortar (ASTM C-144-81), with the gradation to satisfy paragraph 4, Grading, and with the omission of sub-paragraph 4.4. **Sand color shall be - WHITE SAND.**

Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this article, combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.

Hydrated Lime: ASTM C 207, Type S.

Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.

Aggregate for Grout: ASTM C 404.

Water: Clean and potable.

### PREPACKAGED MORTAR CEMENTS

Prepackaged mortar cements may be used with the prior approval. The mortar cement shall be in accordance with ASTM C91-83, and meet the following minimum requirements.

Type S Mortar Cement: The masonry mortar made from the mortar cement shall have a compressive strength of 1800 psi minimum at 28 days when tested in accordance with ASTM C-270, with maximum air volume of 16%.

The mortar cement shall contain Portland cement, hydrated lime, plasticized admixtures and/or hydraulic hydrated lime. Mortar cements which contain other materials, including ground limestone, ground slag or other cementitious and non-cementitious materials, are not acceptable.

Instructions for mixing the mortar shall be published and accompany all shipments. The instructions shall be volumetric measurements, and shall be developed to show proper proportions of sand to one (1) bag of the prepackaged mortar cement with volume of water to produce a flow of the proper consistency.

Freeze-thaw resistance: The mortar cement shall comply with the following requirements when subjected to 50 cycles of the freeze-thaw test:

Loss of compressive strength	35.0% maximum
Loss of dry weight	1.0% maximum

The test specimen shall be made in accordance with ASTM C-91, Paragraphs 18, 19, and 20, and be tested in accordance with ASTM C-91, Paragraphs 22.1 and 22.2.1, and ASTM C-67, Paragraphs 8.1, 8.3, and 8.4.

### ON-THE-JOB MORTAR CEMENT

Type S Mortar shall have a compressive strength of 1800 psi minimum at 28 days. The mortar shall be proportioned within the following volumetric limits:

1 part Portland Cement  
1/2 part Hydrated Lime

Masonry sand measured in a damp loose condition is to be not less than 2-1/4 nor more than 3 times the sum of the volumes of cement plus lime used.

Plasticizer per instructions of the manufacturer, the quantity of which is not to exceed 2% by volume of the cement and lime combination.

### MEASUREMENTS AND MIXING

The method of measuring materials shall be by volume, and shall be such that the specified proportions of the mortar materials can be controlled and accurately maintained. A measuring device to make consistent volume measurements shall be used throughout the project. Measurement of sand by shovel shall not be permitted.

Mortar Mixer shall be paddle-type mechanical mixer. It shall be of such design and size to accommodate the mixing of the ingredients.

The mortar mixer shall be charged in this order: add approximately one-half the water required, one-half the sand, the cement and lime (or prepackaged mortar cement), the remaining amount of sand, and then sufficient water to bring the mix to desired consistency. Mortar shall be mixed for a minimum of five minutes after all materials have been charged into the mixer with all batches being mixed to the same consistency.

Mortars that have stiffened because of evaporation of water from the mortar may be retempered by adding water as frequently as needed to restore the required consistency. Mortars shall be used and placed in their final position within 2 hours after mixing. When the temperature is over 80 degrees F., the mortar shall be used within 1-1/2 hours after mixing. Mortar not used within the stated time periods shall be discarded.

#### JOINT REINFORCEMENT, TIES AND ANCHORING DEVICES:

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:

Zinc-Coated (galvanized) Steel Wire: ASTM A 82 for uncoated wire and with ASTM C 641 for zinc coating of class indicated below:

Class 1 (0.40 oz. per sq. ft. of wire surface).

Application: Use for masonry not exposed to exterior or earth.

Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 153, Class B-3 for zinc coating applied after prefabrication into units.

Application: Use for masonry exposed to exterior and in contact with earth.

Zinc-Coated (Galvanized) Steel Sheet: Carbon steel with zinc coating complying with ASTM A 525, Coating Designation G90.

Application: For dovetail and anchors slots used in masonry and concrete not exposed to exterior or earth.

Hot-Dip Galvanized Carbon Steel Sheet: ASTM A 366, Class 2 or ASTM A 635; hot dip galvanized after fabrication to comply with ASTM A 153; Class B.

Application: For dovetail slots and anchors used in masonry and concrete exposed to exterior or in contact with earth.

Joint Reinforcement: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units, and complying with requirements indicated below:

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.

Wire Size for Side Rods: 0.1483" diameter.

Wire Size for Cross Rods: 0.1483" diameter.

#### **For single-wythe masonry provide type as follows with single pair of side rods:**

Ladder type with perpendicular cross rods spaced not more than 16 inches o.c. and 1 side rod for each face shell of hollow masonry units more than 4 inches in width, plus 1 side rod for each wythe of masonry 4 or less in width.

Uses: Typical interior walls.

**For multi-wythe masonry provide type as follows:**

Adjustable (2-piece) type with single pair of side rods and cross ties spaced not more than 16 inches o.c. and with separate adjustable veneer ties engaging the cross ties. Cross ties are either U-shaped with eyes or rectangular. Space side rods for embedment within each face shell of backup wythe and size adjustable ties to extend at least halfway through outer wythe but with at least 5/8-inch cover on outside face.

Uses: Typical exterior brick veneer walls.

**For masonry veneer on stud framing provide type as follows:**

Masonry Veneer Anchors: One-piece unit, rib-stiffened steel sheet metal plate, pre-punched for nail or screw attachment through sheathing into metal framing, resist tension and compression forces perpendicular to plane of wall; 12 gage x 1" minimum width x length required to anchor into brick wythe 2-1/2" minimum.

Anchor spacing: Arrange anchors not more than 16" o.c. both vertically and horizontally to allow spacing of ties.

Available Products: Subject to compliance with requirements, masonry veneer anchors which may be incorporated in the work includes, but is not limited to, the following:

Heckman Building Products Inc. or approved equal.

No. 315-C Screw-On Anchor Strap with No. 316 Triangle Tie.

**Uses: Typical exterior brick veneer on stud framing.**

Hardware cloth: See drawings for indicated locations and applications. Hot dip mill-galvanized wire, 16 gauge 2 x 2 (1/2") mesh. Tie is 1" less than nominal width of unit or wall.

D/A WMT Wire Mesh Ties; Dur-O-Wall, Inc.  
269 Wire Mesh Ties; Heckman Building Products.

Structural Steel and Masonry Wall Anchors: Tie masonry walls to column flanges parallel to the wall. Anchors are 3/8" diameter mill-galvanized wire. Provide anchor width required for masonry bend to extend 2" into horizontal joint.

Hot dip mill-galvanized wire, 16 gage 2 x 2 (1/2") mesh. Tie is 1" less than nominal width of unit or wall.

No.216 Wire Type Anchor; Heckmann Building Products  
D/A-F/P and D/A-F/RA; Dur-O-Wall, Inc.

Channel Slots and Anchors: Two piece Assemblies which permit vertical or horizontal differential movement between wall and steel framework parallel to, but resist tension and compression forces perpendicular to wall. Consists of wire tie section and extended type metal anchor section.

D/A 902 anchor with ties 912 and 918-921; Dur-O-WALL, Inc.  
131 anchor with ties 134 and 129; Heckman building products.

Weld-on Adjustable Anchor Rods and Straps: Two piece assemblies for tying masonry walls to steel columns and beams.

D/A 709-711 anchor and D/A 701/708 tie; Dur-O-Wall, Inc.  
No. 315 anchor and No.316 tie; Heckman Building Products.

Unit type Masonry Inserts in Concrete:

Dovetail Slots: Furnish dovetail slots, with filler strips, of slot size indicated and entire height of wall, fabricated from 22 gage sheet metal. Cast into concrete walls backing brick veneer at 24" o.c. horizontally to allow veneer anchors to be spaced not more than 24" o.c. horizontally and 16' o.c. vertically.

Dovetail Anchors:

Wire Size: 0.1483" diameter.

Wire tie Shape: Triangular.

Wire Tie Coating: Hot dipped galvanized.

Wire tie Length: As required to extend within 1" of masonry veneer face.

Products: Subject to compliance with requirements, provide the following or equal products:

"D/A 100 slot and D/A 720-723 anchor"; Dur-O-Wal, Inc.

"100 slot and 103 anchor " Heckman Building Products.

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 sizes and configurations indicated.

CONCEALED FLASHING MATERIAL

Vinyl Sheet Flashing: Flexible sheet flashing especially formulated from virgin polyvinyl chloride with plasticizers and other modifiers to remain flexible and waterproof in concealed masonry applications, black in color and thickness indicated below.

Thickness: 30 mils.

Application: Use where flashing is fully concealed in masonry.

Adhesives for Flashings: Of type recommended by manufacturer of flashing material for use indicated.

MISCELLANEOUS MASONRY ACCESSORIES:

Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No. 3 to No. 18.

Non-Metallic Expansion Joint Strips: Premolded, flexible filler strips complying with ASTM D 1056, Type 2 (Closed cell), Class A (cellular rubber and rubber-like materials with specific resistance to petroleum base oils), Grade 1 (Compression-deflection range of 2-5 psi), compressible up to 35%, of width and thickness indicated, formulated from the following material:

Neoprene.

Preformed Control Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

Styrene-Butadiene Rubber Compound: ASTM D 2000, Designation 2AA-805.

Polyvinyl Chloride: ASTM D 2287, General Purpose Grade, Type PVC-65406.

Face brick Expansion Joint Bridge: D/A by Dur-O-Wal, Inc.

Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

**Weepholes: Provide weepholes in masonry construction just above thru-wall flashing and at points indicated on drawing. At the ground level provide "open head joints" in brick at 2'-0" o.c. along the length of the wall. For all weep holes required above the ground level install weep ropes at 2'-0" o.c. above windows doors or other miscellaneous thru-wall flashing points**

Wicking Material: Material as indicated below in lengths required to produce a 2" exposure on exterior and 18' in cavity between wythes.

Fibrous glass rope.

### GROUT FOR UNIT MASONRY

Comply with ASTM C 476 for grout for use in construction of reinforced and nonreinforced 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.

Use fine grout in grout spaces less than 2" in horizontal direction, unless otherwise indicated.

Use coarse grout in grout spaces 2" or more in least horizontal dimension, unless otherwise indicated.

**Do not use calcium chloride in grout.**

### MASONRY CLEANERS:

Job-Mixed Detergent Solution: Solution of trisodium phosphate (1/2 cup dry measure) and laundry detergent (1/2 cup dry measure) dissolved in one gallon of water.

### PART 3 - EXECUTION

#### INSTALLATION, GENERAL:

Wetting Clay Brick: Wet brick made from clay or shale that 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.

Do not wet concrete masonry units.

Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.

Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated holding dimension to face or unit same as indicated on drawings.

Build chases and recesses as shown or 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.

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 the opening.

Cut masonry units using 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.

#### CONSTRUCTION TOLERANCES:

Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4" in 10', or 3/8" in a story height. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story. For vertical alignment of head joints do not exceed plus or minus 1/4" in 10', 1/2" maximum.

Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, not 1/2" in 40' or more. For top

surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.

Variation of Linear Building Line: For position shown in plain and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maximum, or 3/4" in 40' or more.

Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".

Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2". Do not exceed head joint thickness indicated by more than plus or minus 1/8".

#### LAYING MASONRY WALLS:

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

Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.

Pattern Bond: Lay exposed masonry in the bond pattern shown or, if not shown, lay in running bond with vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2". Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.

Stopping and Resuming Work: Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

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.

Fill space between hollow metal frames and masonry solidly with mortar.

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.

Fill cores in hollow masonry units with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.

#### MORTAR BEDDING AND JOINTING:

Lay solid brick-size masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.

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 in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.

Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.

Tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated.

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

Collar Joints: After each course is laid, fill in vertical longitudinal joint between wythes solidly and with mortar for the following masonry work:

Interior walls and partitions.  
Exterior walls, except cavity walls.

Nonloadbearing interior walls or partitions where metal ties or horizontal reinforcing are indicated for structural bonding and nominal thickness of wall or partition is required to meet code requirements for height-to-thickness ratio.

#### STRUCTURAL BONDING OF MULTI-WYTHE MASONRY:

Use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes. Install at not more than 16" o.c. vertically.

For horizontally reinforced masonry, provide continuity at corners with prefabricated "L" units, in addition to masonry bonding.

Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:

Provide continuity with horizontal joint reinforcement using prefabricated "T" units.

Non-bearing Interior Partitions: Build full height of story to underside of solid floor or roof structure above, unless otherwise shown. (See Wall Rating Legend on plan drawings to determine which walls are intended to run full height.)

Run non-bearing partitions (indicated to be full height) within 1" of structure above and secure against lateral movement with channel section width of wall x 1'-0" length spaced at 4'-0" o.c. unless detailed otherwise on drawings.

#### HORIZONTAL JOINT REINFORCEMENT:

General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6".

Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.

Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

Space continuous horizontal reinforcement as follows:

For multi-wythe walls (solid or cavity), space reinforcement 16" o.c. vertically.

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

Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.

In addition to wall reinforcement, provide additional reinforcement at openings as required to comply with the above.

#### ANCHORING MASONRY WORK:

General: Provide anchor devices of type indicated.

Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations:

Headed Bolts.

Postinstalled Anchors: Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

Type: Expansion Anchors.

Corrosion Protection: Stainless-steel components with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Alloy Group 1 or 4) for bolts and nuts; ASTM A 167 or ASTM A 276, Type 304 or 316, for anchors.

For Postinstalled Anchors in Grouted Concrete Masonry Units: Capability to sustain, without failure, a load equal to 6 times the loads imposed by masonry.

Installation of Anchor Bolts: Position fixture, drill hole. Insert anchor bolt, tap flush with fixture, and tighten.

Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

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

Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.

Space anchors as indicated, but not more than 24" o.c. vertically and 36" o.c. horizontally.

#### CONTROL AND EXPANSION JOINTS:

General: Provide vertical and horizontal expansion, control and isolation joints in masonry where shown. Build-in related items as the masonry work progresses.

Build-in non-metallic joint filler where indicated.

Build in vertical pressure relieving joints where indicated; construct joints by inserting non-metallic compressible joint filler of width required to permit installation of sealant and backer rod.

#### LINTELS:

Provide masonry lintels where shown or wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Cure precast lintels before handling and installation.

For hollow concrete masonry unit walls, use specially formed U-shaped lintel units with reinforcement bars placed as shown filled with coarse grout.

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

#### FLASHING OF MASONRY WORK:

General: Provide concealed flashing in masonry work at, or above, shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar. Extend flashings through exterior face of masonry.

Extend flashing the full length of lintels and shelf angles and minimum of 4" into masonry each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4", and through the inner wythe half the width of the inner wythe unit.

Install flashing to comply with manufacturer's installation.

Provide weep holes in the head joints of the first course of masonry immediately above concealed flashings. Space 2'-0" o.c., unless otherwise indicated. Trim wicking material used in weep holes flush with outside face of wall after mortar is set.

Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

#### REPAIR, POINTING, AND CLEANING:

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.

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

Final Cleaning: After mortar is thoroughly set and cured, clean masonry as follows:

Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.

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.

Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.

Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.

Use bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised" to clean brick masonry made from clay or shale, except use masonry cleaner indicated below.

Detergent.

Protection: Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at time of substantial completion.

End of SECTION 04200