SECTION 04210 - BRICK MASONRY

PART 1 GENERAL

1.01 DESCRIPTION

A. Extent of brick masonry work is indicated on drawings.

B. Related Sections:

1. Concrete Unit Masonry: See 04000.
2. Dovetail Slots: See 03300.
3. Steel Lintels: See 05500.
4. Metal framing: See 05400 and 09100.

1.02 SUBMITTALS

A. Product Data:

1. Standard Brick Masonry Unit BMU.
2. Accessories.

B. Samples:

1. Provide color samples for Resident's selections for brick masonry unit.
2. Color masonry mortar.

C. Samples for testing:

1. BMU.
2. Mortar cubes, grout cubes.
3. BMU - Mortar - Grout prisms, prepared in accordance with ASTM E 447.

D. Test Reports: As listed in Quality Assurance.

1. Submit test report and certificate of conformance document for each type and color of brick specified on contract documents for Resident’s approval.
2. Test reports shall include:

a. Compressive strength.
b. Modulus of rupture.
c. 24 hour cold water absorption.
d. 5 hour boil water absorption.
e. Saturation coefficient.
f. Initial rate of absorption.

g. Efflorescence.
h. Weather classification.

3. Certificate of conformance shall state that brick meets or exceeds applicable ASTM specifications indicated herein.

1.03 QUALITY ASSURANCE

A. Brick Tests

1. All tests shall be performed by an independent certified testing laboratory.
2. All tests shall be in accordance with ASTM C-67 latest edition.

B. Before Construction:

1. Test 3 BMU for net cross sectional area compressive strength according to ASTM E 447 and test references therein.
2. Test trial mix mortar cubes and grout cubes according to ASTM 447 and test references therein until strengths attained fall within the specified limits.
3. Test 3 specimen prisms of BMU - mortar - grout prisms at the rate of one test for each 500 square feet of bearing wall area, but not less than 3 tests for any one wall. The first test shall be made while the initial 1,000 square feet of masonry gearing wall is being constructed.
4. The average compressive strength of each set of prisms shall equal or exceed the specified f'm of 1500 psi for all grouted brick masonry walls.

1.04 SAMPLE PANELS

A. Sample panel size shall be 4' x 4' showing the proposed color range, texture, bond, mortar, and workmanship.

B. Final brick selection shall be made only following Resident's review of sample panel.

C. Brick from manufactured material for project shall be shipped to site and sample panel erected.

D. No brick shall be shipped from manufacturer to site until Resident's acceptance of job panel which has been erected from actual material for project. This panel shall replace the sample panel and shall remain on site throughout construction, and become the project standard for bond, mortar, workmanship, and appearance.

PART 2 PRODUCTS

2.01 FACING BRICK

A. Qualities:

1. Standard units size: Emperor 16” architectural face brick 3 1/2” x 3 1/2” x 15 1/2”
2. Reveal units size: Emperor 16” architectural face brick 3 1/2” x 2 1/4” x 15 1/2”.
3. Type: FBX.
4. Grade: SW (ASTM C-216).
5. Textural color: To be selected from manufacturer's standard smooth texture and standard color group.
6. Use: Exterior type.
7. Minimum compressive strength 8,000 psi.
8. Maximum saturation coefficient 0.78.
9. Minimum IRA 6 g/30 sq. in.
10. Maximum IRA 30 g/30 sq. in. Where IRA exceeds 30g/30 sq. in. pre-wetting brick is recommended.
11. Shapes: Where special shapes are shown on architectural drawings, manufacturer shall provide shop drawings for Resident’s approval prior to manufacturing shapes.

B. Acceptable Manufacturers

1. Interstate Brick Co., West Jordan, Utah
2. Equivalent by Stark Ceramic, Canton, OH

2.02 MORTAR

A. Mortar shall be type ‘S’ consisting of the following qualities:

1. Portland cement: 1 part (ASTM C 150 Type I or II low alkali). Provide natural color mortar.
2. Hydrated Lime: 1/2 part (ASTM C 207)
3. Aggregate: 4 1/2 parts sand (ASTM C 144), except for joints less than 1/4” use aggregate graded with 100% passing the No. 6 sieve.
4. Water: Clean and potable.

2.03 GROUT

A. Qualities

1. Portland cement: 1 part (ASTM C-150 type I or II low alkali).
2. Aggregate: 3 parts sand (ASTM C-404), 2 parts pea gravel (ASTM C-404).
3. Water: Clean and potable.

2.04 MASONRY ACCESSORIES

A. Horizontal Joint Reinforcing and Ties for Masonry: 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 A 82, 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 5/8" on joint faces exposed to exterior and not less than 1/2" elsewhere. Provide the following type of joint reinforcing unless otherwise indicated.

1. Truss type with diagonal cross rods spaced not more than 16" o.c.
2. Number of Side Rods: Single pair for single wythe masonry and as indicated for multi-wythe masonry, or if not otherwise indicated, one side rod for each brick wythe.
3. Wire Sizes: Fabricated with standard gauge side and cross rods, unless otherwise indicated.
4. Wire Finish: Provide manufacturer's standard mill galvanized finish except as otherwise indicated. For exterior walls hot-dip galvanize joint reinforcing after fabrication to comply with ASTM A 153, Class B-2 coating (1.5 oz. per square foot).

B. Individual Wire Ties for Masonry: Fabricate from 3/16" cold-drawn steel wire, ASTM A 82, unless otherwise indicated, of the length required for proper embedment in wythes of masonry.

1. For use with hollow masonry units: Laid cells vertical, provide rectangular shaped ties.
2. For use with solid masonry units provide ties with ends bent to 90□F angles to form hooks not less than 2" long.
3. Where spacing and back-up joints do not align provide either offset or adjustable 2-piece ties.
4. For exterior walls fabricate from either AISI Series 300 stainless steel or hard-drawn copper wire, ASTM B 1, except increase metal thickness approximately 20% for hard-drawn copper wire.

C. Anchors and Ties: Provide straps, bars, bolts and rods fabricated from not less than 16 ga. sheet metal or 3/8" diameter rod stock, unless otherwise indicated.

1. Flexible Anchors: Where masonry is indicated to be anchored to structural framework with flexible anchors, provide 2-piece anchors which will permit horizontal and vertical movement of masonry but will provide lateral restraint.
2. Masonry Veneer Anchors: Corrugated metal ties not less than 33 ga. and not less than 7/8" wide and 7" long wide one end crimped for attachment to substrate. Size to extend to within 3/4" of face of masonry veneer.
3. Masonry Veneer Anchors: Flexible 2-piece anchors consisting of trapezoidal-shaped wire tie and 12 gage 3/4" wide x 9" long strap formed with 3/8" offset and screw holes top and bottom for screw attachment to metal stubs. Size tie to extend within 3/4" of face of masonry veneer.

D. Concrete Inserts for Masonry:

1. Unit Type: Furnish cast-iron or malleable iron or malleable iron inserts of the type and size shown, hot-dip galvanized after fabrication with 1.5 oz. zinc coating, ASTM A 153, Class B-2.
2. Dovetail Slots: Furnish dovetail slots with filler strips where shown. Fabricate from 24 ga. galvanized steel unless otherwise indicated. Provide hot-dip galvanized steel dovetail anchors of the size and type to suit construction requirements.
3. For installation of concrete inserts see concrete sections of these specifications. Advise Concrete Installer of specific requirements regarding his placement of inserts which are to be used by the masonry installer for anchoring of masonry work.

E. Flashing for Masonry: Provide concealed flashings, shown to be built into masonry. Provide concealed flashings as follows:

1. Stainless Steel: ASTM A 167, Type 304, 2D finish, full annealed or dead-soft temper, 0.015” thick. Fabricate through-wall metal flashings with deformations in both directions for integral mechanical mortar bond.

F. Miscellaneous Accessories:

1. Metal Expansion Joint Strips: Provide the following formed to the shape shown.
2. Stainless Steel: AISI Type 302/304 2D finish, fully annealed or dead-soft temper, 0.015" thick.
3. Plastic Weep holes: Unless otherwise indicated, provide 1/4” round x 4” long medium density polyethylene plastic tubes to form weep holes.

2.05 MORTAR AND GROUT MIXES

A. Do not use calcium chloride in mortar or grout admixtures or agents.

B. Mortar for Brick Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.

1. Use Type M mortar for masonry below grade and in contact with earth, and where indicated.
2. Use Type S mortar for reinforced masonry and where indicated.
3. Use Type N mortar for exterior, above grade loadbearing and non-loadbearing walls; and for other applications where another type is not indicated.

C. Grout for Unit Masonry: Comply with ASTM C 476 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.

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL:

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

B. 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.

C. Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp, unchipped 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 units.

D. Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 square inch per minute. Use wetting methods which ensure that units are nearly saturated but surface dry when laid.

1. Bond and interlock each course of each wythe corners, unless otherwise shown.
2. Match coursing, bonding, color and texture of new masonry work with existing work where indicated.

E. Lay out 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, jambs and wherever possible at other locations.

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

G. 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.

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

I. 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.

3.02 MORTAR BEDDING AND JOINTING

A. Lay brick and solid concrete masonry 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.

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

C. 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.

3.03 CAVITY WALLS

A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.

B. Tie exterior wythe to back-up with individual metal ties spaced not more than 16" o.c. vertically and 24" o.c. horizontally. Stagger in alternate courses.

C. Provide weep holes in exterior wythe of cavity, composite and veneer walls located immediately above ledges and flashing, spaced 2'-0" o.c., unless otherwise indicated.

3.04 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY

A. Use individual metal ties embedded in horizontal joints to bond wythe together. Provide ties as shown, but not less than one metal tie for 4 square feet of wall area spaced not to exceed 24" o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 1'-0" of all openings and space not more than 3'-0" apart around perimeter of openings. At intersecting and abutting walls, provide ties at not more than 24" o.c. vertically.

B. Use continuous horizontal joint reinforcing embedded in horizontal joints for bond tie between wythes. Install at not more than 16" o.c. vertically as specified. Provide continuity at corners and intersections using prefabricated "L" and "T" units.

3.05 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 5/8" on exterior side of walls and 1/2" at other locations. Lap reinforcement a minimum of 6". Do not bridge control and expansion joints with reinforcing, unless otherwise indicated. 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, column fireproofing, pipe enclosures and other special conditions.

B. Space continuous horizontal reinforcing as follows:

1. For multi-wythe walls (solid or cavity) where continious horizontal reinforcing acts

as structural bond or tie between wythes, space reinforcing as required by code but not less than 16" o.c. vertically.

2. For single-wythe walls, space reinforcing at 16" o.c. vertically, unless otherwise indicated.
3. For parapets, space reinforcing at 8" o.c. vertically, unless otherwise indicated.
4. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcing placed in two 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.

3.06 ANCHORING MASONRY WORK:

A. Provide anchoring devices of the type indicated. If not indicated, provide standard type for facing and back-up involved.

B. Anchor masonry to structural 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 24" o.c. vertically and 36" o.c. horizontally.

C. Anchor single wythe masonry veneer to backing with metal ties as follows:

1. Anchor veneer to structural members with metal anchors embedded in masonry joints and attached to structure. Provide anchors with flexible tie section, unless otherwise indicated.
2. Anchor veneer to metal studs with flexible 2-piece anchors. Fasten strap section through sheathing to metal studs with self-tapping screws complying with requirements of Division 9 section in which metal stud construction is specified. Embed tie section in masonry joints. Provide not less than 1" air space between masonry veneer and face of sheathing applied over studs.

D. Anchor veneer to wood structures with metal ties embedded in masonry joints and nailed to wood studs or sheathing. Provide not less than 1" air space between masonry veneer and wood construction. Nail anchors through sheathing to studs.

C. Space veneer anchors as shown, or if not shown, space not more than 16” o.c. vertically and 24” o.c. horizontally. Provide additional anchors within 1'-0” of openings and space not more than 3'-0” around perimeter.

3.07 LINTELS

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

3.08 CONTROL AND EXPANSION JOINTS

A. Provide horizontal expansion joints in masonry under all steel relieving angles and vertical expansion joints spaced so as not to exceed 30 feet in length of wall, and at one side of all openings (if wider than 6 feet then two sides), at intersections and corners of walls, at changes in wall height, at locations where control joints occur in block walls behind brick or in floors and roofs that bear on the walls, and where shown on Drawings. Build-in related masonry accessory items as the masonry work progresses.

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

B. Build flanges of metal expansion strips into masonry. Lap each joint 4” in direction of flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.

C. Build-in flanges of factory-fabricated expansion joint units, specified in a Division 7 section.

D. Build-in joint fillers where shown, specified in a Division 7 Section "Joint Sealers". Joint width for sealants shall be 3/8” unless otherwise indicated.

3.09 FLASHING OF MASONRY WORK

A. Provide concealed flashings in masonry work at, or above, all 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 bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar.

B. Extend flashings the full length of lintels and shelf angles and minimum of 4” into masonry each end from a line 1/2” in from exterior face of outer wythe of masonry, through the outer wythe of masonry, through the outer wythe, turned up a minimum of 4”, and through the inner wythe to within 1/2” of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2”. At heads and sills turn up ends not less than 2” to form a pan.

C. Provide weep holes in the head joints of the same course of masonry bedded in the flashing mortar.

D. Interlock end joints of deformed metal flashings by overlapping deformations not less than 1-1/2” and seal lap with elastic sealant.

E. Install prefabricated flashings in accordance with manufacturer's instructions.

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

3.10 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 brick masonry surfaces by the bucket and brush hand cleaning method or by high pressure water method. Comply with requirements for BIA Technical Notes No. 20 "Cleaning Brick Masonry".

D. Use commercial cleaning agents in accordance with manufacturer's instructions.

END OF SECTION