

SECTION 042000

UNIT MASONRY

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the unit masonry work as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Face brick veneer and concrete block cavity walls.
2. Face brick veneer and metal stud backup walls.
3. Non-load-bearing concrete block partitions.
4. Face brick and concrete block infill as required to close up existing openings in masonry walls.
5. Stone base.
6. Metal joint reinforcing, anchors, ties, weeps, closures and related accessories for masonry.
7. Control and expansion joints in masonry, filled with joint fillers.
8. "THROUGH-WALL FLASHING."
9. Cavity drainage material.
10. Chases, recesses, pockets and openings in masonry as required for installation of work by others.
11. Building in of items furnished by others into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.
12. Grouting in of metal items built into masonry work.
13. Protection, pointing and cleaning of masonry.

1.3 RELATED SECTIONS

- A. Cast-in-Place Concrete - Section 033000.
- B. Masonry Restoration and Cleaning - Section 049000.

- C. Cold-Formed Metal Framing - Section 054000.
- D. Miscellaneous Metals - Section 055000, for steel lintels.
- E. Thermal Insulation - Section 072100.
- F. Sheet Metal Flashing - Section 076200.
- G. Firestops and Smoke seals - Section 078413.
- H. Joint Sealers - Section 079200.
- I. Glazed Aluminum Curtain Walls - Section 084413.

1.4 SUBMITTALS

- A. Submit Shop Drawings for the following:
 - 1. Anchoring details.
 - 2. Control and expansion joint locations and details.
 - 3. Special brick shapes.
 - 4. Flashing at typical lintels indicating relationship of flashing to lintel hangers.
- B. Submit Samples for the following:
 - 1. Each type of face brick in sufficient number and color to show full range of color and shade. Submit certification that brick meets ASTM standards specified herein.
 - a. Submit samples of all special shapes required showing color range and sizes.
 - 2. Joint reinforcing, each type, width and proposed location (labeled).
 - 3. Anchors, wedges and ties, each type, width and proposed location (labeled).
 - 4. Joint filler, each type.
 - 5. Flashing, including splice sample, 12" long.
 - 6. Mortar color, 12" long cured sample.
- C. Submit technical and installation information for the following:
 - 1. Mortar materials, each material and mortar type.
 - 2. Certification of mortar mix.
 - 3. Flashing material, descriptive literature.
 - 4. Concrete block, joint reinforcing, anchors, ties and joint filler; submit manufacturer's technical and descriptive literature.
 - 5. Block manufacturer shall submit certifications of compliance with ASTM C 90, C 331 and UL 618 prior to any job site delivery. Field sampling of concrete block

may be tested by an Independent Testing Laboratory retained by the Owner according to the requirements of ASTM C 140.

- D. Cleaning Procedures: Submit proposed procedures and materials for cleaning masonry work; including certification that cleaner will not adversely affect stone, gaskets, sealants, etc.

1.5 QUALITY ASSURANCE

- A. Conform to the following non-cumulative tolerances (any masonry work not meeting these standards shall be re-built as directed by the Architect).

1. Variation from the plumb:

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|-----|---|------|
| a. | In lines and surfaces of columns, walls and arrises: | |
| 1). | In 10 feet | 1/8" |
| 2). | In any story of 25 feet maximum | 1/4" |
| 3). | In 40 feet or more | 1/4" |
| b. | For external corners, expansion joints and other conspicuous lines: | |
| 1). | In any story of 25 feet maximum | 1/4" |
| 2). | In 40 feet or more | 3/8" |

2. Variation from the level or the grades indicated on the drawings; for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

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|----|-------------------------------|------|
| a. | In any bay or 20 feet maximum | 1/4" |
| b. | In 40 feet or more | 1/4" |

3. Variation of the linear building lines from established position in plan related portion of columns and partitions:

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|----|-------------------------------|------|
| a. | In any bay or 20 feet maximum | 1/4" |
| b. | In 40 feet or more | 1/2" |

4. Variation in cross-sectional dimensions of columns and in thickness of walls:

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|----|-------|------|
| a. | Minus | 1/8" |
| b. | Plus | 1/8" |

5. Variation in dimensions of masonry openings:

- | | | |
|----|----------------------|-------------|
| a. | Horizontal dimension | -0" + 1/16" |
| b. | Vertical dimension | +0" - 1/16" |

B. Job Mock-Up

1. Prior to installation of masonry work, erect sample wall panel mock-up using materials, bonding patterns and joint tooling required for final work and including cavity wall, masonry sill, stone base, window unit and sill, projecting courses, anchors and reinforcement as detailed. Provide special features as directed by the Architect for caulking and contiguous work. Build mock-up at the site, of size indicated on the drawings, indicating the proposed range of colors, textures and workmanship to be expected in the completed work. Reconstruct mock-up if

directed by the Architect until it meets with Architect's approval. Obtain Architect's acceptance of visual qualities of the mock-up before start of masonry work. Retain mock-up during construction as a standard for judging completed masonry work. Do not alter, move or destroy mock-up until work is completed and accepted by the Architect. Use sample panels to test proposed cleaning procedures after sample panel meets with Architect's approval.

2. Approved sample panel shall remain on view at the site until completion of face brick work and shall establish the technical and aesthetic standards for the Project.
3. Architect shall direct distribution of brick color and texture variation within mock-up.

C. Factory Control

1. The Architect reserves the right to visit the brick manufacturer's facility and review pre-sorting so that all brick falls within a color range acceptable to the Architect.
2. If requested by the Architect, 4' x 4' mock-ups shall be constructed at the factory using the face brick specified. This mock-up, after approval of the Architect, shall become the quality control panel for the selected brick.
3. Prior to any shipment of the face brick from the factory, the Architect reserves the right to inspect the brick for the thoroughness of the pre-sorting and to reject any brick which in his opinion do not fall within acceptable color range.

D. Work of this Section shall conform to the requirements of the following:

1. 2008 ACI 530/ASCE 5/TMS 402 Building Code Requirements for Masonry Structures.
2. 2008 ACI 530-1/ASCE 6/TMS 602 Specifications for Masonry Structures.
3. Brick Industry Association (BIA) "Technical Notes on Brick Construction."

E. Pre-Construction Conference: Prior to installation of masonry and associated work, Contractor shall arrange a meeting with Masonry Subcontractor, installers of related work, and other entities concerned with masonry wall performance, including the Architect and Owner. Contractor shall record discussions and agreements and furnish copy to each participant. Provide at least seventy-two (72) hours' advance notice to participants prior to convening conference. Review methods and procedures related to masonry work, including, but not limited to, the following:

1. Review masonry requirements (drawings, specifications and other Contract Documents).
2. Review required submittals, both completed and yet to be completed.
3. Review and finalize construction schedule related to masonry work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
4. Review required inspection, testing, certifying and material usage accounting procedures.

5. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
6. Coordinate work with air/vapor barrier membrane and related flashing, review details to avoid conflicts.

1.6 PRODUCT HANDLING

- A. General: Deliver, store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Store all masonry units and mortar materials on raised platforms and under ventilated and waterproof cover. Store packaged materials in manufacturer's unopened containers, marked with manufacturer's name and product brand name. Immediately reseal containers after partial use. Remove and replace damaged materials.
- B. Masonry Units: Pack, deliver and store to prevent breakage, cracking, chipping, spalling or other damage. Store, protect and ventilate units at project site.
- C. Aggregate: Store with provisions for good drainage.
- D. Reinforcement and Anchors: Store and protect so that when placed, joint reinforcement and anchors will be free of soil, dirt, ice, loose rust, scale, or other coatings which would destroy or reduce bond with mortar, and will not be disfigured or bent out of shape.

1.7 TESTING FOR EFFLORESCENCE

- A. Test selected face brick for efflorescence in accordance with ASTM C 67.
- B. If, at the end of the test period, the samples of brick or mortar show efflorescence, the materials represented shall be rejected and new materials shall be re-tested. This process shall be repeated until no efflorescence appears. Testing shall be done by an independent testing laboratory at the expense of the Contractor; submit test results in writing to the Architect.

1.8 JOB CONDITIONS

- A. In cold weather, when the outside temperature is below forty (40) degrees F., conform to the requirements of "Cold Weather Masonry Construction and Protection Recommendations" publication by Brick Industry Association (BIA). No anti-freeze admixtures are permitted.
- B. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg. F. and above.
- C. 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.
 1. Extend cover a minimum of 24" down both sides and hold cover securely in place.

2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24" down face next to unconstructed wythe and hold cover in place.
- D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

1.9 ATTIC STOCK

- A. Provide additional 10% of dry mortar mix labeled, packaged and delivered to location determined by Owner for attic stock.
- B. Provide additional 5% of brick labeled, packaged and delivered to location determined by Owner for attic stock.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Standard Concrete Block
 1. Portland cement, ASTM C 150, Type 1, low alkali (less than 65), one source.
 2. Aggregates, ASTM C 331, lightweight expanded shale, clay or slate aggregates, manufactured by the rotary kiln process equal to "Solite," "Norlite," or "Haydite."
 - a. All block shall be from one aggregate type and from one manufacturer.
 3. Concrete Masonry Units: Load bearing lightweight aggregate concrete masonry units conforming to the requirements of ASTM C 90.
 - a. Block for rated walls shall be 75% solid units.
 - b. All other block may be hollow units.
 4. The producer of the concrete masonry units shall furnish certification from an independent testing laboratory confirming that all 8" or larger masonry units meet all of the UL 618 requirements for two (2) hours or better (as required), referencing full scale fire test reports (ASTM E 119). All 4" and 6" units shall conform to "National Bureau of Standards" and "National Research Council" full scale fire tests.

5. Sizes and Shapes: Nominal face size 8" x 16" by thickness as indicated on drawings, with stretcher units, jamb units, header units, square corner units (at ends and corners of exposed or painted work), sash units (at control joints within masonry wall), lintel units and other special shapes and sizes required to complete the work.
6. Finish: For exposed or painted block surfaces, in addition to ASTM requirements, block shall have uniformly dense, flat, fine grain texture, with no cracks, chips, spalls, or other defects which would impair appearance. For concealed CMU, surfaces shall be free from deleterious materials that would stain plaster or corrode metal.
7. Curing: All concrete block shall be steam cured, and air dried for not less than thirty (30) days before delivery.
8. Density of concrete block shall not exceed one hundred and five (105) lbs. per cubic foot.
9. Shrinkage: Shrinkage of concrete blocks shall not exceed 0.065% when tested in accordance with ASTM C 426-99.
10. Water Content
 - a. At the time of delivery to the job site, concrete masonry units shall have a value, in weight of contained water, of not more than thirty (30) percent of the fully saturated content for the unit tested.
 - b. Ship all units from the factory, and store at the job site, with all necessary protection to prevent increase of water content from rain and other sources.

B. Brick

1. Size: Unless otherwise indicated, provide 3-5/8" h. x 1-5/8" th. x 11-5/8" w.
2. Facing Brick: ASTM C 216, Grade SW, Type FBX:
 - a. Basis of Design: Endicott Clay Products, "Grey Sands." Cull out dark bricks per Architect's control sample.
 - b. Texture: Square Edge.
 - c. Water Absorption: not to exceed 8%
 - d. Compressive Strength: minimum requirements of 16,000 psi.
 - e. Saturation Coefficient shall not exceed 0.78.
 - f. Exposed brick shall be cored (75% solid).
3. Where brick is fully concealed provide common brick conforming to ASTM C 62, Grade SW.
4. Provide all special molded shapes as shown on Drawings or as needed to complete work without interruptions to pattern bond. Lip bricks standard. No field cut lip brick will be accepted.
 - a. Brick shall be made in one production run, with stretchers and special shapes intermixed in the kiln.

- b. All exposed-in-place surfaces shall match finish, color, and texture of unit face.
- 5. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncured units with all exposed surfaces finished.
- 6. Bond Pattern: 1/3 running bond, pattern rising to the right.
- 7. Acceptable Alternate Product: Petersen Tegl, D76 "Antique White."
- C. Stone Base
 - 1. Stone for base, where indicated on the drawings, shall be Jet Mist Granite conforming to ASTM C 615, of size and thickness shown on drawings.
 - 2. Finish: Stone shall have thermal finish on all exposed surfaces; concealed surfaces may be sawn. Edges to receive grout or sealant shall be sawn.
- D. Joint Reinforcing for Masonry Walls
 - 1. For anchoring face brick to CMU back-up, provide No. 280 "S.I.S. Dub'l Loop-Lock Ladder Seismiclip Interlock System" made by Hohmann & Barnard or equal by manufacturer noted below in Para. C.5. All wire used in assembly shall be 3/16" dia. Assembly shall contain ladder reinforcing, welded loops, box tie, seismiclip and continuous wire in face brick mortar joint. Provide special formed prefabricated pieces at corners and intersections of walls or partitions. Reinforcing wire in face brick mortar joint to extend at least 2" into face of brick. Show anchor locations on approved shop drawings.
 - a. Reinforcing assembly shall be stainless steel finish conforming to ASTM A 580, AISI Type 304.
 - 2. For block walls forming part of exterior wall construction behind exterior stone veneer, provide super heavy duty reinforcing fabricated of 3/16" dia. side and cross rods, truss or ladder design, ties, spaced every block course. Provide prefabricated pieces at corners and intersections of walls or partitions.
 - a. Reinforcing assembly shall be stainless steel finish conforming to ASTM A 580, AISI Type 304.
 - 3. For interior block walls and partitions, provide standard reinforcing fabricated of 9 ga. side and cross rods, truss or ladder design, no ties, spaced every other block course. Provide prefabricated pieces at corners and intersections of walls or partitions. Reinforcing shall be mill galvanized conforming to ASTM A 641, Class B-1, applied after fabrication.
 - 4. Wire used in assemblies noted above shall be cold drawn steel wire conforming to ASTM A 82.
 - 5. Approved Joint Reinforcing Manufacturers
 - a. Hohmann & Barnard

- b. Wire-Bond
- c. Heckmann Building Products
- d. National Wire Products Industries, Inc.

E. Anchors and Ties

1. For anchoring interior face brick to cold-formed metal framing, provide hot-dip galvanized steel anchors equal to "DW-10" with "Vee Byna-Tie" as manufactured by Hohmann & Barnard or approved equal by one of the other manufacturers noted above in Para. D.5.
2. Dovetail Anchor Slots: Hot-dip galvanized steel, 16 gauge, equal to No. 100 Dovetail Anchor Slot made by Heckmann Building Products, No. 305 anchor slot made by Hohmann & Barnard, or approved equal by one of the other manufacturers noted above in Para. D.5.
3. Flexible Metal Ties for Dovetail Slots: Hot-dip galvanized, 16 gauge by 1" wide by Heckmann Building Products Inc., or approved equal manufacturer noted above in Para. D.5.
 - a. No. 106 Dovetail Corrugated Anchor.
 - b. No. 129 Dovetail Triangle Tie.
4. Wire Mesh: Hot-dip galvanized sixteen (16) gauge steel wire, square mesh, width 3" by length to suit condition; No. 268 by Heckmann Building Products, or approved equal by manufacturer noted above in Para. D.5.
5. For anchoring face brick to concrete back-up where there are no dovetail slots provided, provide "CMU/Concrete Screw Wing-Nut Pos-I-Tie®" with five (5) gauge hot-dip galvanized (ASTM A 153, Class B-2) wire pintle tie made by Heckmann Building Products, or approved equal by manufacturer noted above in Para. D.5.
6. For anchoring CMU wall, at the exterior masonry cavity wall, to the underside of the concrete beam, provide dovetail slot as noted above and the following:
 - a. No. 121 galvanized steel dowel anchor and No. 421 tube as manufactured by Heckmann Building Products or approved by manufacturer noted above in Para. D.5. Galvanized to conform to ASTM A 153, Class B-2.
 - b. No. PTA-310 galvanized steel dowel anchor and No. NS-TA joint filler as manufactured by Hohmann & Barnard or approved equal by manufacturer noted above in Para. D.5. Galvanizing to conform to ASTM A 153, Class B-2.
7. For anchoring masonry to structural steel, provide hot-dip galvanized steel, as listed, or approved equal by manufacturer noted above in Para. D.5:
 - a. Made by Heckmann Building Products. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.
 - 1). No. 195 Column Anchors
 - 2). No. 197 Column Anchors
 - 3). No. 315 Weld-On Anchor Rods with No. 316 Triangle Ties

- 4). No. 315-B Weld-On Anchor Straps with No. 316 Triangle Ties
- b. Made by Hohmann & Barnard or approved equal. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.
 - 1). No. 355 Column Anchors
 - 2). No. 356 Column Anchors
 - 3). No. 357 Beam Anchors
 - 4). No. 359 F anchor straps with VWT tie.
8. For anchoring CMU interior partitions to underside of steel beams, provide stainless steel tube anchors equal to No. 419 and No. 421 made by Heckmann Building Products, No. PTA-420 made by Hohmann & Barnard, or approved equal by manufacturer noted above in Para. D.5.
9. For anchoring CMU interior partitions to underside of structural deck, provide 4" x 4" x 1/4" galvanized steel angles (ASTM A 36), 3'-0" long spaced 3'-0" o.c. alternately on each side of partition. Anchor partition securely to structural deck.
- F. Reinforcing Bars and Rods: ASTM A 615, Grade 60. See Drawings for size.
- G. Stone Support and Accessories
 1. Stone Support: Stone support systems, anchors and accessories shall be manufactured by a company specializing in the design and fabrication of stone approved by the Architect. Provide all fastening devices, wire anchors, support angles, relieving angles, anchors, coping anchors, dowels, cramps, bolts, nuts, shims, expansion shields, flashing, etc., necessary to properly secure stone walls to the structure.
 - a. Stainless Steel to be used for stone supports shall conform to the following:
 - 1). Sheet, Bar and Plate: AISI Type 302/304 non-magnetic, conforming to ASTM A167.
 - 2). Fasteners, Anchor Bolts, Nuts and Washers: AISI Type 302/304 non-magnetic, ASTM A167.
 - 3). Shims: AISI type 302/304, non-magnetic.
 2. Setting Pads: Lead or plastic.
 3. Weeps: No. 341 plastic weep tubes, 1/4" O.D. made by Hohmann & Barnard or approved equal.
 4. Flashing: 26 ga. ASTM A666, Type 304 stainless steel.
- H. Control and Expansion Joint Fillers
 1. Vertical Installation Within Concrete Masonry Wall: Extruded high grade neoprene rubber, cross shape, for use with concrete masonry sash units, which shall provide a force fit in the grooves of the sash block, and shall have 1/2" diameter tubular ends (compressed 25% when installed in 3/8" wide joint).
 - a. Provide the following sizes:
 - 1). 2-5/8" wide control joint fillers for 4" block walls.
 - 2). 4-5/8" wide for 6" block walls.
 - 3). 6-5/8" wide for 8", 10" and 12" block walls.

- b. Provide backer rod and sealant joint over joint filler as per drawings and Section 079200 of these specifications.
- 2. Isolation Joint Filler at Abutting Construction and at Intersecting CMU Walls: Compressible and resilient closed cell neoprene gasket with pressure sensitive adhesive backing, thickness 30% greater than thickness of joint. Acceptable joint filler shall be "Everlastic, Type NN-1" by Williams Products, Inc., or approved equal. Recess joint filler and install backer rod and sealant as per drawings and Section 079200 of these specifications.
- 3. Within Face Brick: Provide filler rod and sealant installed by Section 079200. Filler depth shall be 2 times joint width.
 - a. Compressible filler between top of brick and bottom of shelf angle shall be "Soft Joint Sealant" made by Polytite, or approved equal.
 - b. Sealant Color: Refer to Section 079200.
- I. Neoprene Joint Filler: Provide closed cell neoprene, Type NN-1, conforming to ASTM D 1056, Grade 1, high performance, as manufactured by Williams Products Inc., or equal made by D. S. Brown, Norton, or approved equal.

2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type 1, standard color, one source.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Sand: Clean, washed, buff colored sand, graded per ASTM C 144.
- D. Water: Clean, fresh and suitable for drinking.

2.3 MORTAR MIX

- A. Exterior Face Brick Construction: Mortar mixes shall meet ASTM C 270, Type N, cement/lime mortar. Colors of mortars shall use coloring agent made by Davis Colors, Lehigh Cement or approved equal. Color of mortar to meet with Architect's approval. The Contractor may use preblended mortars by Spec Mix, Glen-Gery, or approved equal.
 - 1. Basis of Design for New Brick Work: Preblended mortar by Spec Mix, ASTM C 270, proportion mix mortar Type N:
 - a. 1 part Portland cement.
 - b. 1 part lime.
 - c. 6 parts masonry sand.
 - d. Color: "Burlywood."
 - 2. Color of mortar must meet with Architect's approved sample and mock-up panel. Color to match basis of design or approved equal.
- B. Exterior Block Back-Up Construction: Provide Portland cement/lime mortar as noted above conforming to ASTM C 270, Type N.

- C. Interior Masonry Construction: Provide Portland cement/lime mortar conforming to ASTM C 270, Type N, for load bearing conditions, mortar shall conform to ASTM C 270, Type M.
- D. Reinforced Concrete Block: Provide Portland cement/lime mortar conforming to ASTM C 270, Type S.
- E. Mortar for Cement Cants: One (1) part Portland cement and four (4) parts sand, by volume.
- F. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of unit masonry. Use grout of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.

G. Mixing

- 1. General: Add cement just before mixing and mix dry. Use sufficient amount of water as necessary to produce workable mix. Mix in small batches to make plastic mass.
- 2. Mixing: Machine mix all mortars in approved type mixer with device to accurately and uniformly control water. Add hydrated lime dry. Mix dry materials not less than two (2) minutes. Add water, then mix not less than three (3) minutes. Mix only amount of mortar that can be used before initial set. Do not use mortar which has reached its initial set or two (2) hours after initial mixing, whichever comes earlier. Mortar may not be re-tempered. Clean mixer for each batch, whenever mortar type is changed, and at end of each day's work.
- 3. Acceleration or other admixtures not permitted.
- 4. Mortar shall have a flow after suction of not less than seventy-five (75) percent of that immediately after mixing as determined by ASTM C 91.

H. Admixtures

- 1. No air-entraining admixtures or cementitious materials containing air-entraining admixtures shall be used in the mortar.
- 2. No antifreeze compounds or other substances shall be used in the mortar to lower the freezing point.
- 3. Calcium chloride or admixtures containing calcium chloride shall not be used in mortar.

2.4 MASONRY ACCESSORIES

- A. Honeycomb Vents for Cavity Weeps: Polypropylene, complying with ASTM D 2240, size 3/8" by height and width of brick, color as selected by the Architect; provide "#QV - Quadro Vent" as manufactured by Hohmann & Barnard, Inc., or approved equal.
- B. "THROUGH-WALL FLASHING": Provide "MFL – Surface-Mount Metal Flashing" made by Hohmann & Barnard, or approved equal, fabricated of Type 304 stainless steel, 26 gauge. See drawings for required profiles.

1. Provide custom-fabricated, preformed inside and outside corners.
 2. Provide "Type 2-FTSTermination Bar" in Type 304 stainless steel where indicated on the drawings.
- C. Cavity Drainage Material: Provide 10" high HDPE "Mortar Net" open mesh mortar net of width to fit masonry cavity shown on drawings, manufactured by Hohmann & Barnard, or equal "Mortar Break II," made by Advanced Building Products.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that masonry may be completed in accordance with all pertinent codes and regulations, the referenced standards, and the original design.
3. Do not start any work until mock-ups are approved by the Architect.

B. Discrepancies

1. In the event of discrepancy, immediately notify the Architect in writing.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Starting of work by the Contractor means acceptance by the Contractor of the substrate.

3.2 COORDINATION

- A. Carefully coordinate with all other trades to ensure proper and adequate interface of the work of other trades with the work of this Section.

3.3 PREPARATION

A. Brick

1. Wet brick having ASTM C 67 absorption rates greater than 30 grams per 30 square inches.
2. Except for absorbent units specified to be wetted, lay masonry units dry.

- B. Concrete Block: Do not wet concrete block units.

3.4 INSTALLATION

A. General

1. Build walls to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown.
2. Build chases and recesses as shown or required for the work of other trades.
3. 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.
4. 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 off-sets. Avoid the use of less than half size units at corners, jambs and wherever possible.
5. Lay up walls plumb and true with courses level, accurately spaced and coordinated with other work.
6. Provide templates made of steel studs for plumbing of two-story masonry openings.
7. Pattern Bond: Lay exposed masonry in running bond. Lay concealed concrete block with all units in a wythe bonded by lapping not less than two (2) inches. Bond and interlock each course of each wythe at corners. Do not use units of less than four (4) inches horizontal face dimensions at corners or jambs.
8. Where possible, masonry walls and partitions shall be built after all overhead ducts, pipes and conduits are in place and tested. Masonry shall be neatly built around the items above. Walls and partitions shall be plumb, true to line and free from defects such as open cells, voids, dry joints and other similar defects. In rooms and spaces scheduled to have concrete block finish, all such surfaces including upper wall surfaces up to termination of structural ceiling in spaces without suspended ceilings, shall be made suitable for paint application. Cutting of openings in walls and partitions in place shall be done only with the approval of the Architect.

B. Mortar Bedding and Jointing

1. All joints between bricks shall be completely filled with mortar. Bed joints shall be beveled per BMI recommendations, with the brick then shoved in place. At cavity wall construction, care shall be taken that no excess mortar goes into masonry cavity. Cross joints shall be formed by applying a full coat of mortar to the entire end or the entire side, as the case requires, and then shoving the mortar covered end and/or side of the brick tightly against the bricks previously laid; the practice of buttering the corners of brick and then throwing mortar scrapings into the empty joints will not be permitted. All brick shall be laid without disturbing the brick previously laid. Dry or butt joints will not be permitted. Grouting shall be done only as necessary. Do not slush head joints.

2. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on exterior walls and in all courses of piers, columns and pilasters, where solid CMU is used and where adjacent to cells or cavities to be reinforced or filled with concrete or grout.
 - a. To ensure alignment of brick and block coursing, adjust block back-up by cutting block to insure alignment of coursing or use adjustable anchorage.
 3. Lay masonry walls with 3/8" joints unless otherwise shown on drawings.
 4. Tool exposed joints slightly concave. Concealed joints shall be struck flush.
 5. Remove masonry units disturbed after laying; clean and reset 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.
- C. Stopping and Resuming Work: Rake back 1/2 brick 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.
- D. Built-In Work
1. 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.
 2. Mortar in door frames, access doors, louvers and other metal items embedded or built into masonry work solidly with mortar as the masonry units are laid up.
 3. Grout under lintels, bearing plates, and steel bearing on masonry with solid bed grout.
 4. Sleeves, pipes, ducts and all other items which pass through masonry walls shall be caulked with interior grade sealant meeting requirements of Section 079200, so as to be air tight and prevent air leakage. Refer to Section 078413 for packing of voids in rated masonry walls.
 5. Fill vertical cells of masonry units solid with grout which have anchoring, reinforcing rods, supporting or hanging devices embedded in the cell including stone anchors and window or curtain wall anchors.
 6. Fill vertical cells of masonry units solid with mortar on each side of door frames to sixteen (16) inches beyond.
 7. Unless otherwise noted, fill vertical cells of masonry units solid with grout which are below steel bearing plates, steel beams, and ends of lintels, to eight (8) inches beyond bearing and from floor to bearing.
 8. Place wire mesh in horizontal joint below masonry unit cells to be filled with mortar, to prevent mortar from dropping into unfilled cells below.
 9. Masonry indicated as being reinforced shall have all voids filled solid with grout. Grout shall be consolidated in place by vibration or other methods which insure complete filling of cells. When the least clear dimension of the grouted cell is less than two (2) inches, the maximum height of grout pour shall not exceed twelve

(12) inches. When the least clear dimension is two (2) inches or more, maximum height of grout pour shall not exceed forty-eight (48) inches. When grouting is stopped for one (1) hour or longer, the grout pour shall be stopped 1-1/2" below the top of a masonry unit. Vertical bar reinforcing shall be accurately placed and held in position while being grouted, and shall be in place before grouting starts. All such reinforcing shall have a minimum clear cover of 5/8". Lap all bars a minimum of forty (40) bar diameters and provide steel spacer ties (not to exceed 192 bar diameter) to secure and position all vertical steel and prevent displacement during grouting. Provide continuous horizontal reinforcement embedded in mortar joints every second course.

E. Cutting and Patching

1. All exposed masonry which requires cutting or fitting shall be cut accurately to size with motorized carborundum or diamond saw, producing cut edges.
2. Do not saw cut any masonry openings in face brick construction without Architect's approval and after a procedure has been reviewed and approved.
3. Holes made in exposed masonry units for attachment of handrail brackets and similar items shall be neatly drilled to proper size.
4. All masonry which requires patching in exposed work, if approved by Architect, shall be patched neatly with mortar to match appearance of masonry as closely as possible and to the Architect's satisfaction. Rake back joints and use pointing mortar to match as required.

F. Solid Wall Construction

1. Fill the vertical longitudinal joint between wythes solidly with mortar by parging the in-place wythe and shoving units into the parging.
2. Tie wythes with continuous horizontal reinforcement embedded in mortar joints sixteen (16) inches o.c. vertically.

G. Cavity Walls

1. Two wythes of masonry cavity walls shall be securely tied together by horizontal joint reinforcement and ties anchored to reinforcement, as herein specified, spaced every other block course.
 - a. Where cavity back-up is concrete use ties specified herein spaced sixteen (16) inches o.c. both directions.
2. Cavity between facing and backing wythe shall be kept clean and clear of all mortar droppings, and no mortar ledges shall project into the cavity. Temporary wood strips, cut to width of cavity and fitted with lift-up wires, shall be laid on the joint reinforcement and carefully lifted out before placement of the next layer of reinforcement. Any projecting mortar shall be spread over the back of the outer wythe immediately following the setting of the masonry unit.
 - a. Specified cavity drainage material shall be installed at the bottom of each cavity over the flashing to protect weep holes.

3. At cavity and solid walls adjacent to window openings fill block solid with mortar where window anchors are to be located. Coordinate with window subcontractor.
4. Concrete block back-up at cavity wall construction shall be anchored to slab at top with dovetail anchors spaced sixteen (16) inches o.c.
5. Anchor CMU back-up with anchors as specified herein.
6. Where stone veneer is used in cavity wall configuration, back-up block shall be reinforced every block course.
7. Refer to Section 072100, "Thermal Insulation," for material and installation of cavity wall insulation.

H. Interior Block Partitions

1. Build to full height unless otherwise shown on drawings. At non-rated partitions fill void between CMU and structural deck with continuous neoprene filler. At fire rated partitions, fill void with fire stop material meeting the requirements of Section 078413. Fasten to structure at top of partition using steel angles as specified herein.
2. Provide continuous horizontal joint reinforcing every other block course, except as otherwise noted. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8". Lap reinforcement a minimum of six (6) inches at ends of units.
3. 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.
4. Corners
 - a. Provide interlocking masonry unit bond in each course at corners.
 - b. Provide continuity at corners with prefabricated "L" reinforcement units, in addition to masonry bonding.
5. Intersecting and Abutting Walls
 - a. Unless vertical control joints are shown as part of structural frame, provide interlocking masonry bond. Provide starters and special shapes as shown on the drawings to bond these walls.
 - b. In addition to masonry bonding, provide horizontal reinforcement using prefabricated "T" units at interior partitions.

I. Ties and Anchors for Masonry Construction

1. Provide ties and anchors as shown or specified, but not less than one metal tie, spaced not to exceed sixteen (16) inches o.c. horizontally and/or vertically. Provide additional ties within 1'-0" of all openings and spaced not more than 24" apart around perimeter of openings.

2. Anchoring Masonry to Structure: Provide an open space not less than 1/2" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.
3. Attach brick veneer to cold formed metal framing by anchoring brick to studs using specified anchors penetrating through sheathing and through flange of stud. Prior to application of anchors cover sheathing and vapor barrier with tape specified herein. Space anchors 8" o.c. at each stud; provide stainless steel screw anchors for attaching anchor to studs.

J. Control and Expansion Joints

1. Provide vertical expansion, control and isolation joints in masonry as shown. Build in related items as the masonry work progresses.
2. CMU Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 40'-0" o.c. In addition, locate joints at points of natural weakness in the masonry work, including the following:
 - a. At structural column or joint between bay.
 - b. Above control joints in the supporting structure.
 - c. Above major openings at end of lintels upward and below at ends of sills downward. Place at one side of jamb for openings not less than 7'-0" wide and at both sides for openings over 6'-0" wide.
 - d. At reduction of wall thickness.
 - e. Where masonry abuts supporting structure.
 - f. If additional joints are required, indicate same on approved shop drawings.
3. Brick Veneer Expansion Joint Spacing: Vertical expansion joints in brick veneer construction shall be located maximum 25'-0" o.c. unless otherwise noted in addition to expansion joints located within 2'-0" of each corner of the building.

K. Lintels

1. Install loose steel lintels furnished by Section 055000, allowing eight (8) inch bearing at ends.
2. For concrete block walls, use specially formed U-shaped concrete block lintel units with reinforcing bars in accordance with the drawings.

3.5 FLASHING/WEEP HOLES

- A. General: Install embedded flashing and weep holes in masonry at relieving angles, shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated. Space weeps 16" o.c. unless otherwise shown on drawings.
- B. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing.
- C. Flashing shall be placed, generally, at bottoms of cavity wall construction, over all wall openings, window jambs, at sills of window, and in other locations where indicated on the drawings. At bottoms of cavity walls, the flashing shall be built extending from the exterior face of the brick, up and into the mortar joint 2" at the inner wythe of the CMU

back-up; at sheathed areas attached with pressure bar. At concrete spandrel beams and columns the flashing shall be installed with a termination bar. Extreme care shall be exercised in placing the masonry materials not to damage the flashing. Flashing damaged during the masonry erection shall be repaired or replaced by the Contractor at no additional cost to the Owner. Provide end dams where flashing is discontinuous.

- D. When spanning an air space, flashing shall be supported with a mortar wash, insulation or treated wood blocking.
- E. Where flashing is penetrated by anchors, patch flashings at penetration using adhesive and mastic recommended by the manufacturer to insure watertight seal.
- F. Install flashing in accordance with manufacturer's instructions, using adhesive, primer, thinner, cleaner and mastic as recommended by flashing manufacturer.

3.6 CANTS

- A. Provide specified mortar for cement cants at beams and other projections in elevator shafts, where adjoining wall is of masonry construction. Cants shall slope seventy (70) degrees from the horizontal.

3.7 SETTING STONE

- A. Setting Mortar: Conform to ASTM C 270 Type N, Portland cement/lime mortar.
- B. Pointing Mortar
 - 1. 1 part non-staining white cement with color ingredient.
 - 2. 6 parts clean selected white sand to be compatible with the colored cement; sand to pass No. 16 sieve.
 - 3. 1 part hydrated lime to make as still a mix as can be worked.
 - 4. Water as required.
 - 5. Color: As selected by the Architect.
- C. Mixing
 - 1. Mix cementitious materials, admixtures, and aggregate with the proper amount of water consistency which will result in a homogeneous, still and plastic mix.
 - 2. Mix mortar in small batches by approved mechanical mixes. Monitor volume of materials per batch carefully.
 - 3. Retempering of mortar will not be permitted, and mortar that has been allowed to stand more than one or two hours shall not be used. Mortar shall be mixed and kept tempered so that it will, at all times, contain as much water as it is able to carry.
- D. Anchors
 - 1. A minimum of 2 anchors shall be required on all pieces up to 2 square feet in area.

2. A minimum of 4 anchors shall be required on all pieces up to 20 square feet in area.
 3. A minimum of 2 additional anchors shall be required on each additional 10 square feet.
- E. Set stone and install stone support systems in accordance with drawings and final shop drawings for stonework. Provide anchors, supports, fasteners, and other attachments shown, or necessary to secure stonework in place. Shim and adjust accessories as required for proper setting of stone. Completely fill holes, slots and other sinkages for anchors, dowels, fasteners, and supports with mortar during setting of stones.
 - F. Before setting in the wall, all stones shall be thoroughly cleaned on all exposed surfaces by washing with fiber brush and soap powder, followed by a thorough drenching with clear water.
 - G. All stone joint surfaces not thoroughly wet shall be drenched with clear water just prior to setting.
 - H. Every stone shall be set in full beds of mortar with all joints slushed full. All joints shall be 3/8" unless otherwise noted.
 - I. Lead or plastic setting pads shall be placed under heavy stones., in sufficient quantity to avoid squeezing mortar out. Heavy stones or projecting courses shall not be set until mortar in courses below has hardened sufficiently to avoid squeezing.
 - J. Joints shall be raked out 1" and pointed with pointing mortar. If sealant joints are noted, joint shall be raked out full depth to remove back-up rod and sealant per Section 079200.
 - K. Weep tubes shall be placed in joints where moisture may accumulate within the wall, such as at base of cavity, continuous angles, flashing, etc., or as shown on drawings. Space weeps 24" o.c. unless otherwise noted.
 - L. Projecting stones shall be securely propped or anchored until the wall above is set.
 - M. In cold weather, International Masonry Industry All-Weather Council recommendations for setting from 40 deg. F. to 20 deg. F. shall be followed, except that no additives shall be used in the setting mortar, and below 20 deg. F. all work shall be done in heated enclosures.

3.8 CLEANING, PROTECTION, ADJUSTMENT

- A. Protection
 1. The Contractor shall take adequate precautions for the protection of all surfaces against mortar spatter, and shall immediately remove any such spatter should it inadvertently occur, leaving no stain or discoloration.
 2. Excess mortar shall be wiped off the masonry surfaces as the work progresses.
 3. Wood coverings shall be placed over all such masonry surfaces as are likely to be damaged during the progress of the entire project.

4. Protective measures shall be performed in a manner satisfactory to the Architect.
 5. Damaged masonry units shall be replaced to satisfaction of the Architect.
 6. Exterior masonry walls shall be draped with waterproof covering until copings are in place, to prevent water penetration in cavity.
- B. Cleaning of Masonry: Upon completion, all exposed masonry shall be thoroughly cleaned following recommendations of the BMI Technical Note No. 20. Before applying any cleaning agent to the entire wall, it shall be applied to a sample wall area of approximately 4' x 4' in a location approved by the Architect. No further cleaning work may proceed until the sample area has been approved by the Architect, after which time the same cleaning materials and method shall be used on the remaining wall area. If stiff brushes and water do not suffice, the surface shall be thoroughly saturated with clear water and then scrubbed with a solution of an approved detergent masonry cleaner, equal to "EaCo Chem NMD80" as distributed by TriState Building Materials or equal made by Diedrich or approved equal, mixed as per manufacturer's directions, followed immediately by a thorough rinsing with clear water. All lintels and other corrodible parts shall be thoroughly protected during cleaning.
- C. Cleaning of Stone: Clean stonework after completion of work, using clean water and stiff-bristle brushes. Do not use wire brushes, acid type cleaning agents or other cleaning compounds with caustic or harsh fillers.
- D. Pointing: Point any defective joint with mortar identical with that specified for that joint.

END OF SECTION