SECTION 04100

MORTAR AND MASONRY GROUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Includes furnishing materials, mixing and application of mortar and masonry grout for masonry work required for the construction of the masonry walls and partitions and masonry veneer.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete: Requirements for aggregate sizes for grout.

B. Section 04150 - Masonry Accessories and Reinforcement: Coordination of the placement/embedment of the masonry accessories and reinforcement with the placement of the mortar and grout.

C. Section 04200 - Reinforced Unit Masonry: Mortar and grout for erection of the concrete unit masonry.

D. Section 04210 - Brick Masonry: Mortar for erection of the brick masonry.

1.03 QUALITY ASSURANCE

A. Mix Design
   1. Proposed mix designs shall be submitted to testing agency for approval prior to commencement of work.
   2. Tests of proposed mixes will be performed to ensure conformance with requirements stated herein.
   3. Where mortar and grout mixes do not conform with requirements stated herein, Contractor must re-submit for further testing, and pay all costs for required retesting.

B. Referenced Standards - Mortar and grout (materials, manufacture and installation) shall comply with the following standards:
   1. ASTM C 150 - Portland Cement
   2. ASTM C 595 - Specifications for Blended Hydraulic Cements
   3. ASTM C 260 - Specifications for Air Entraining Admixtures for Concrete
   4. ASTM C 91 - Masonry Cement
   5. ASTM C 5 - Quicklime for Structural Purposes
   6. ASTM C 207 - Hydrated Lime for Masonry Purposes
   7. ASTM C 144 - Aggregate for Masonry Mortar
   8. ASTM C 387 - Packaged, Dry, Combined Materials for Mortar and Concrete
   9. ASTM C 476 - Grout for Masonry
   10. ASTM C 270 - Mortar for Unit Masonry
   11. ASTM C 404 - Aggregates for Masonry Grout
   12. ASTM E 447 - Methods for Compression Strength of Masonry Prisms

C. Copies of ASTM C 270 and ASTM C 476 shall be kept on the project site for ready reference.

1.04 SUBMITTALS

A. Submit copies of technical data describing materials to be used for review in accordance with Section 01340.

PART 2 - PRODUCTS

2.01 MORTAR MATERIALS - Conform to ASTM C 270 as specified herein.

A. Mortar materials shall consist of the following:
   1. Portland Cement: ASTM C 150, normal-type, white in color as required by project conditions. The free alkali content shall be 0.05 percent or less.
   2. Masonry cement: ASTM C 91, for general and high strength uses. The free alkali content shall be 0.50 percent or less.
   3. Aggregates (sand): ASTM C 144 standard masonry type clean, dry and protected against dampness, freezing and foreign matter.
   4. Hydrated lime: ASTM C 207, Type S
   5. Quicklime: ASTM C 5, non-hydraulic type.
   6. Premixed mortar: ASTM C 387 commercially prepared type, mortar types M or S, using white cement, as required by project conditions.
   7. Water: Shall be potable.

B. Admixtures
   1. Mortar Color
      a. Gray for Concrete Masonry Units.
      b. Colored mortar for brick masonry: Provide pre-blended mortar mix for all brick masonry. Colored mortar shall be SPEC MIX or other manufacturer as accepted or required by Architect.
   2. Plasticizers, accelerators, retardants, water repellent agents, or other admixtures shall not be used in mortar mixes unless otherwise stated in Paragraph C below, or specifically required by project conditions, and then only with approval of the Architect.
   3. Under no circumstances will calcium chloride be added to any mortar.

C. Mortar Mixes shall conform to ASTM C 270, using either the Property or Proportion Specifications:
   1. As required by project conditions, mixes may consist of any of following combinations:
      a. Portland cement, lime and fine aggregate
      b. Masonry cement and fine aggregate
      c. Portland cement, masonry cement and fine aggregate
      d. Commercially prepared premix mortar and fine aggregate
   2. Provide Type M minimum 2,500 psi mortar for masonry walls constructed below grade and for construction of site drainage structures.
   3. Provide Type S minimum 1,800 psi mortar for load-bearing and non-load-bearing unit masonry walls and partitions and brick masonry.
   4. Type N mortar shall not be allowed for any masonry work.

2.02 GROUT MATERIALS

A. Grout shall consist of a 3,000 psi concrete conforming to Section 03300, Cast-In-Place Concrete, using pea gravel for the coarse aggregate.

PART 3 - EXECUTION

3.01 GENERAL

A. Measurement of materials shall be such that the specified proportions are controlled and accurately maintained. Workability or consistency of mortar on the board shall be such that the mortar is sufficiently wet to be worked under the trowel. Mortar which has begun to "set" or is not used within two and one-half (2.5) hours after initial mixing shall be discarded. Mortar which has stiffened due to evaporation within the two and one-half (2.5) hour period shall be retempered to restore its workability.

3.02 MIXING AND PLACING

A. Mortar and grout ingredients shall be thoroughly mixed, in quantities needed for immediate use.

B. For colored mortar, a sample from each lot number shall be mixed and installed in a sample panel to evaluate against the selected color. Care shall be exercised to ensure uniformity of mixes and coloration.

C. Mortar shall be machine mixed in approved type mixer in which quantity of water can be accurately and uniformly controlled. Mixing time shall be not less than 5 minutes, approximately 2 minutes of which shall be for mixing dry materials and not less than 3 minutes continuing mixing after water has been added.

D. For work requiring only small batches of mortar or grout and when specifically approved by the Architect, mortar may be mixed by hand in watertight mortar mixing boxes. Materials of each batch shall be well raked and turned over together before water is added, until mix is an even color throughout mass after which water shall be gradually added until a thoroughly mixed mortar of required plasticity is obtained.

E. Pointing mortar shall be as dry as consistency as will produce mortar sufficiently plastic to be worked into joints.

F. All mixing boxes and equipment shall be kept clean. Mortar and grout shall be prepared in batches or volumes that will be used before initial set takes place, and in no case longer than 45 minutes before delivery to point of use. Mortar must be used within 2 hours of mixing at temperatures over 80 degrees Fahrenheit, and 2-1/2 hours at temperatures under 50 degrees Fahrenheit. Retempering after initial set will not be permitted.

END OF SECTION

SECTION 04150

MASONRY ACCESSORIES AND REINFORCEMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Includes furnishing materials and installation of the masonry accessories and reinforcement required for the construction of the masonry walls and partitions and masonry veneer.

1.02 RELATED SECTIONS

A. Section 04100 - Mortar and Masonry Grout: Coordination of placement of reinforcing with installation of mortar and grout.

B. Section 04200 - Reinforced Unit Masonry: Reinforcing and anchorages for concrete unit masonry. Wall ties for securing the brick masonry to masonry backup.

C. Section 04210 - Brick Masonry: Ties and anchorages for the brick masonry.

D. Section 05400 - Cold Formed Metal Framing: Metal framing for securing of wall ties.

1.03 SUBMITTALS

A. Submit the following to the Architect for review:
   1. Copies of technical data describing the herein specified materials.
   2. Shop Drawings for fabrication, bending and placement of reinforcement bars. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry system.
   3. Shop drawings shall include wall elevations on all load-bearing walls showing placement of all reinforcement and shall indicate size, length, spacing, laps and hooks (field and otherwise). Wall elevations shall show all openings greater than 8"x8" with placement of reinforcement around openings indicated to show size, length and laps as required.

1.04 REFERENCE STANDARDS

A. The following shall be complied with in the materials used, fabrication and placement of the reinforcing steel specified herein:
   1. ASTM A 82 - Cold Drawn Steel Wire for Concrete Reinforcement.
   2. ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   3. ASTM A 615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel reinforcing bars for reinforced masonry, lintel blocks and bond beams and other as shown on the Drawings or otherwise specified, shall be deformed steel bars (conforming to Cast-In-Place Concrete reinforcement in Section 03300) sized as shown on the drawings and in lengths sufficient to run complete length as indicated on the Drawings.

B. Joint reinforcing for concrete masonry units and brick masonry: Provide truss type joint reinforcing 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 (tensile strength of 80,000 and a yield strength of 70,000 psi), with single pair of deformed continuous side rods and plain cross rods, into units with widths approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar with mortar coverage as specified herein. Provide mill finished galvanized 0.10 ounce for interior walls and hot-dipped galvanized for exterior walls, complying with ASTM A 641, Class 3. All joint reinforcement shall comply with seismic requirements for the project.

C. Where brick masonry is backed up with cold-formed metal framing, provide Hohmann & Barnard #DW-10 Anchor with Byna-Lok Wire Tie, Seismic Clip and Continuous Wire.

D. Fabricate devices and reinforcement which extend into masonry from steel with hot-dipped G-90 (1.25 oz.) galvanized coating.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide continuous horizontal joint reinforcing in concrete unit masonry foundation walls and other areas shown. 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 the manufacturer for continuity at returns, offsets, pipe enclosures and other special conditions.

B. All openings in masonry walls resting on footings shall be reinforced with a minimum of one (1) #5 bar at top, bottom and both sides in grouted cells. Continue reinforcing 24" minimum beyond edges of opening.

C. All joint reinforcement shall be placed at 16" o.c. vertical in concrete unit masonry walls.

D. Brick masonry shall be anchored to backup at maximum distances of 16" centers horizontally and 16" centers vertically.

END OF SECTION

SECTION 04200

REINFORCED UNIT MASONRY

PART 1 - PRODUCTS

1.01 SUMMARY: Unit masonry assemblies, complete. Work includes:

A. Concrete masonry units.
B. Mortar and grout.
C. Ties and anchors.
D. Miscellaneous masonry accessories.
E. Installation of stone veneer at cavity and composite walls, and concrete.

1.02 SUBMITTALS:

A. See administrative requirements given by the architect, for submittal procedures.

B. Product Data: Submit manufacturer's technical data and installation instructions for insulation material.

C. Shop Drawings: Submit expansion and control joint layout.

D. Samples: Submit samples of brick units proposed for use for verification and approval.

1.03 QUALITY ASSURANCE:

A. Codes and Standards: Provide material and work complying with referenced codes, regulations, and standards.

B. Manufacturer: Obtain each type of unit from one manufacturer, cured by one process, and of uniform texture and color.

C. Fire-Rated Masonry: Wherever a fire-resistance classification is indicated or scheduled, comply with applicable requirements for materials and installation established by governing authorities.

D. Field Construction Mock-Ups: Prior to installation of masonry work, erect sample wall panels to verify selections made for color and textural characteristics, under sample submittals of masonry units and mortar, and to represent completed masonry work for qualities of appearance, materials, and construction; build mock-ups to comply with the following requirements:
   1. Locate mock-ups as directed.
   2. Build mock-ups for each type of exposed unit masonry work, in sizes of approximately 6' long by 6' high by full thickness, including face and back-up wythes as well as accessories.
   3. Obtain acceptance of visual qualities of mock-up before start of masonry work. Retain mock-up and use as quality standard until work is completed. When directed, demolish mock-ups, and remove from site.
   4. Use sample panels to test proposed cleaning procedures.
   5. Use sample panels to test water repellent coating.

1.04 DELIVERY, STORAGE, AND HANDLING:

A. Deliver masonry materials to project in undamaged condition.

B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes.

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

D. Store aggregates when grading and other required characteristics can be maintained.

E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.05 PROJECT CONDITIONS:

A. Protect masonry materials during storage and construction from wetting by rain, snow, or ground water and from soilage or intermixture with earth or other materials. Do not use metal reinforcing or ties having loose rust or other coatings, including ice, which will reduce or destroy bond.

B. During erection, cover top of wall with heavy waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

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

D. Prevent grout or mortar from staining the face of masonry to be left exposed or painted. Immediately remove grout or mortar in contact with masonry. Protect sills, ledges, and projections from droppings of mortar.

E. Do not lay masonry when the temperature of outside air is below 40°F unless means are provided to heat and maintain temperature of masonry materials and protect completed work from freezing. Protection shall consist of heating and maintaining temperature of masonry materials to at least 40°F and maintaining an air temperature above 40°F on both sides of masonry at least 48 hours.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS:

A. General:
1. Comply with referenced standards and other specified requirements for each type of masonry unit required.
2. Provide special shapes where required for lintels, corners, jambs, sash, control joints, headers, bonding, cap, cove, and other special conditions.

B. Concrete Block: Provide units complying with characteristics specified below for grade, type, face size, exposed face, and weight classifications.
1. Hollow Loadbearing Block: ASTM C 90; lightweight, except use normal weight block for work below grade.
2. Size: Manufacturer's standard units with nominal face dimensions of 16" long X 8" high X thicknesses indicated.
3. Type I, moisture-controlled units; cure units to meet specified requirements, including average dry shrinkage of 0.03% when tested in compliance with ASTM C 426.
4. Exposed Faces: Manufacturer's standard color and texture.
5. Fire-Rated Units: Approved for fire rating indicated.

2.02 MORTAR AND GROUT MATERIALS:

A. See Structural Drawings.

2.03 MASONRY ACCESSORIES: Hohmann & Barnard is specified. Equivalents products from Dur-O-Wal and AA Wire Products are acceptable or approved equal.

A. Continuous Masonry Wire Reinforcing:

1. Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner and tee units. Fabricate from cold-drawn steel wire complying with ASTM A82, with deformed continuous side rods and plain cross rods, and a unit width of 1 1/2" to 2" less than thickness of wall or partition. Provide manufacturer's standard hot dipped galvanized finish.
2. Use truss type fabricated with single pair of 9 gage side rods, and 9 gage continuous diagonal cross rods spaced not more than 16" o.c. above grade and 8"o.c. below grade.

B. Wall Ties And Anchors:
1. At Concrete: 1" wide X 1" deep X 3/4" throat, 24 gage hot dipped galvanized dovetail anchor slot, and dovetail triangle with 1/4" wire and 12 gage hot dipped galvanized dovetail.
2. At Metal Framing: Hohmann & Barnard X-Seal, hot dipped galvanized, 12 gage, with vee-tie, hot dipped galvanized, 1/4" diameter. Attach anchors to metal framing with #10 self-tapping corrosion-resistant screws.
3. At Steel: 9" long X 3/4" wide, 12 gage, flat continuous adjustable weld-on anchor, hot dipped galvanized, and 3/16" gage square nosed beam tie, hot dipped galvanized.
4. At Cavity/Composite Walls With Irregular Coursing: Double eye adjustable truss, with eye sections spaced 16" o.c., hot dipped galvanized; eye and pintle length as required by wall conditions.
5. At Intersecting Walls: 1/2" X 1/2" mesh, 16 gage hot-dipped galvanized wire mesh ties.

2.04 MASONRY CLEANER: Manufacturer's standard strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

A. Available Products: Subject to compliance with requirements, products that may be used to clean unit masonry surfaces, provide one of the following:
1. Cleaners Not Subject to Metallic Staining with Mortar Not Subject to Bleaching:
   a. Diedrich Technologies, Inc. "202 New Masonry Detergent".
   b. ProSoCo, Inc. "Sure Klean No. 600 Detergent".
   c. Approved equal.
2. Cleaners Subject to Metallic Staining:
   a. Diedrich Technologies, Inc. "202V Vana-Stop".
   b. ProSoCo, Inc. "Sure Klean Vana Trol".
   c. Approved equal.

2.05 MORTAR AND GROUT MIXTURES:

A. Mortar Mix: ASTM C 270, Type S; at exterior use integral waterproofing admixture.
1. Use white Portland, white aggregate and mortar pigment as required to produce mortar color selected by Architect
2. At exterior use integral waterproofing admixture.
3. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

B. Grout Mix: ASTM C 476.

C. Measure and batch materials either by volume or weight, such that required proportions can be accurately controlled and maintained. Measurement of sand exclusively by shovel will not be permitted. Mix mortars with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of mortar. Mix ingredients for a minimum of 5 minutes in a mechanical mixer. Do not use mortar or grout which has begun to set, or if more than 2 1/2 hours has elapsed since initial mixing. Retemper mortar during 2-1/2-hour period as required to restore workability. Do not add air-entraining agents or other admixtures to mortar or grout materials.

PART 3 - EXECUTION

3.01 EXAMINATION: Examine the areas and conditions under which masonry is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION:

A. Brick: Wet clay brick having ASTM C67 absorption rates greater than 0.025 oz. per sq. in./minute.

B. CMU: Do not wet concrete masonry units.

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

3.03 CONSTRUCTION TOLERANCES:

A. 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 not to exceed 20', nor 1/2" in 40' or more. For external corner, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story of 20' maximum, nor 1/2" in 40' or more.

B. Variation from Level: For lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 3/4" in 40' or more.

C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls, and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.

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

3.04 INSTALLATION, GENERAL:

A. Thickness: Build cavity/composite wythe walls to full thickness shown. Build single wythe walls to actual thickness of masonry units, using units of nominal thickness indicated.

B. Build chases and recesses as indicated and required for work of other trades. Provide not less than 8" of masonry between chases or recess and jamb openings, and between adjacent chases and recessed.

C. 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.

D. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to fit adjoining work neatly. Use full-side units without cutting wherever possible.

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

F. Provide weepholes in exterior wythes of walls located immediately above ledges and flashing, spaced 24" o.c., unless otherwise indicated.

G. Insulation: Install insulation in strict accordance with manufacturer's recommendations.

H. Flashing: Comply with the manufacturer's instructions for handling and installation of flashing to provide a complete membrane over area to be flashed. Seal projections through sheet and lap and seal seams.

I. Coordinate work with work of other trades.

3.05 LAYING MASONRY WALLS:

A. Lay walls plumb and true to comply with specified tolerances, with courses level, accurately spaced and coordinated with other work.

B. Lay brick 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. Lay in running bond with vertical joint in each course centered on units in course above and below, except where other coursing is indicated.

C. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with grout. Lay CMU in running bond with vertical joint in each course centered on units above and below. Where indicated, fill cells with grout.

D. Build-in items specified under this and other sections of this specification. Fill in solidly with masonry around built-in items. Fill space between hollow metal frames and masonry solidly with mortar.

E. Joints: Lay walls with 3/8" joints. Use as dry a mortar mix as practicable and compress joints as much as possible to produce a dense tight joint.
   1. Concealed joints and joints to receive coatings: Strike flush.
   2. Exposed brick joints: Tooled.
   3. Exposed CMU joints: Tooled.

3.06 HORIZONTAL JOINT REINFORCING:

A. Reinforce walls with continuous horizontal reinforcing. Fully embed longitudinal side rods in mortar for their entire length. Lap reinforcement a minimum of 6" at ends of units. Do not bridge control joints with reinforcing. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcing as directed by manufacturer for special conditions. Space reinforcing 16" o.c. vertically.

B. Reinforce masonry openings greater than 12' wide with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above the lintel and below the sill. Extend reinforcing a minimum of 2' beyond jambs of opening bridging control joints where provided.

3.07 ANCHORING MASONRY WORK:

A. At Concrete: Anchor single wythe masonry veneer to concrete with specified dovetail anchors and triangles spaced 16" o.c. vertically and horizontally.

B. At Metal Framing: Anchor single wythe masonry veneer to metal studs backup with specified anchors spaced 16" o.c. vertically and 16" o.c. horizontally.

C. At Cavity/Composite Wall: Place double eye truss in wall spaced 16" o.c. vertically.

D. At Steel: Place adjustable weld-on anchor attachment of beam tie at 16" o.c.

E. At Intersecting Walls: Place wire mesh tie in intersecting walls every other course.

3.08 CONTROL AND EXPANSION JOINTS: Install vertical expansion control and isolation joints as indicated, at maximum 30' o.c. at long wall runs, and at large openings in wall. Build-in related items as masonry work progresses. Refer to Section 07900 for sealants.

3.09 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 placement.

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

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Clean masonry with specified masonry cleaner applied according to manufacturer's written instructions.
   2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

END OF SECTION

SECTION 04210

BRICK MASONRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Includes furnishing materials, labor and equipment for the installation of the brick masonry. Items required to be built in as the brick masonry work progresses shall be installed under this Section.

B. Installed in conjunction with the work but specified in other Sections of this Specification are the following:
   1. Concrete unit masonry.
   2. Thru-wall flashing.
   3. Loose lintels, bearing plates, hangers, anchor bolts, sleeves, etc., which are anchored to bear on, or built into masonry.
   4. Hollow metal door frames.

1.02 RELATED SECTIONS

A. Section 01020 - Allowances: Allowance for field brick and accent brick.

B. Section 01451 - Mockup Panel Requirements

C. Section 04100 - Mortar and Masonry Grout: Mortar and grout used in the erection of the brick masonry.

D. Section 04150 - Masonry Accessories and Reinforcement: Wall ties for securing brick masonry.

E. Section 04200 - Reinforced Unit Masonry: Concrete block installed as a component of the wall system.

F. Section 05500 - Metal Fabrications: Items built into masonry.

G. Section 07600 - Flashing and Sheet Metal: Thru-wall flashings installed in conjunction with the brick masonry.

H. Section 07920 - Sealants and Caulking: Sealants installed in masonry expansion joints and control joints.

I. Section 08100 - Hollow Metal Doors and Frames: Coordination of the erection of the hollow metal work with the erection of the brick masonry.

J. Section 08640 - Aluminum Clad Windows and Doors: Coordination of the window installations with the erection of the brick masonry.

K. Section 10201 - Building Louvers: Coordination of the louvers installations with the erection of the brick masonry.

1.03 QUALITY ASSURANCE

A. Sample Panel: Prior to the erection of any brick masonry, erect where indicated by the Architect, an 6' x 6' sample wall. Panel face shall show mortar, bond, joint tooling, etc. The approved panel shall represent standards of workmanship for all work covered under this Section and shall remain intact until all masonry has been installed and approved. Coordinate location of panel with Architect. Provide for four mock-ups, one as required above, and three more at 4' x 4' for selection of brick color with various options of brick and mortar.

B. Test brick in accordance with ASTM 67. Brick tested is to be from actual run of brick to be supplied for use on this project; test must indicate "NO EFFLORESCENCE" for the brick to be acceptable. Sample panel shall be approved by Architect prior to order of entire amount of brick for Project.

1.04 SUBMITTALS

A. Submit samples of brick masonry, including field brick, accent brick, and special brick shapes. Include the full range of exposed color and texture expected in the completed work.

B. Certificates attesting compliance with the applicable Specifications for grades, types and classes.

C. Copies of manufacturer's recommended brick cleaning agent and application procedure.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Store brick off ground to prevent contamination by mud, dust or materials likely to cause staining or other defects.

B. Cover materials as necessary to protect from elements.

C. Protect anchors, ties, and reinforcements from elements.

1.06 COLD WEATHER PROTECTION

A. Preparation
   1. Remove ice or snow formed on masonry bed by carefully applying heat until top surface is dry to touch. Remove frozen or damaged masonry.
   2. Sprinkle with heated water when brick suction exceeds 30 gm./min./30 square in.
      a. When units are above 32 degrees Fahrenheit, heat water above 70 degrees Fahrenheit.
      b. When units are below 32 degrees Fahrenheit, heat water above 130 degrees Fahrenheit.
   3. Use only dry masonry units. Do not use frozen.

B. Protection requirements while masonry units are being laid.
   1. Air temperature 25 degrees Fahrenheit to 20 degrees Fahrenheit.
      a. Use salamanders or other heat sources on both sides of walls under construction.
      b. Use wind breaks when wind is in excess of 15 mph.
   2. Air temperature 20 degrees Fahrenheit and below:
      a. Provide enclosures and auxiliary heat to maintain air temperature above 32 degrees Fahrenheit.
      b. Minimum temperature of units when laid shall not be less than 20 degrees Fahrenheit.

C. Protection requirements for completed masonry and masonry not being worked on:
   1. Maintain daily air temperature 48 degrees Fahrenheit to 32 degrees Fahrenheit: Protect masonry from rain or snow for 24 hours by covering with non-staining, weather-resistive membrane.
   2. Maintain daily air temperature 32 degrees Fahrenheit to 25 degrees Fahrenheit: Completely cover masonry with either insulating blankets or equal protection for 48 hours.
   3. Maintain daily air temperature 25 degrees Fahrenheit to 20 degrees Fahrenheit: Maintain masonry temperature above blankets, infra-red lamps, or other acceptable methods.
   4. Cover top of walls with non-staining waterproof coverings at end of each day or shutdown.
   5. Cover partially completed walls with non-staining waterproof membrane when work is not in progress.
   6. Provide minimum 2 ft. overhang of protective covering on each side of wall, securely anchored.
   7. Do not apply uniform floor or roof loading for at least twenty-four (24) hours after completing masonry columns or walls.
   8. Do not apply concentrated loads for at least three days after completing masonry columns or walls.

1.07 HOT WEATHER PROTECTION

A. Protect masonry construction from direct exposure to wind and sun when erected in an ambient air temperature of 99 degrees Fahrenheit in the shade with relative humidity less than 50%.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Face Brick
   1. Field Brick: To be selected by Architect, standard modular size (7-5/8" x 3-5/8" x 2-1/3").
   2. Accent Brick and Shape Brick: To be selected by Architect, standard modular size (7-5/8" x 3-5/8" x 2-1/3").
   3. Provide solid bricks at all areas where the ends of the bricks are exposed to view.
   4. Corner Brick: Provide solid special shape corner brick in rowlocks and soldiers. No mortar joints shall be allowed in exterior corners.

B. Brick Not Exposed to View: Commercial commons conforming to Grade SW.

C. Cleaning agents shall be as recommended by the brick manufacturer.

D. Mortar Net: Provide MortarNet, as manufactured by Mortar Net Solutions of Portage, Indiana, in masonry wall cavities at all lintels, relief angles and at grade, above weep holes. Provide thicknesses as required to suit installation requirements.

E. Weep Holes: CellVent as manufactured by Mortar Net Solutions of Portage, Indiana.

PART 3 - EXECUTION

3.01 INSPECTION

A. Condition of Surfaces: Inspect foundations to assure surfaces to support brick work are as follows:
   1. To proper grades and elevations and free of all dirt and other deleterious material.
   2. All surfaces not properly prepared have been satisfactorily corrected.

B. Verify initial absorption rate of brick is within acceptable limits.

3.02 PREPARATION

A. Reduce initial absorption of bricks by thoroughly wetting bricks with clean water 24 hours prior to placement. During extremely warm weather, wet bricks six to ten hours prior to placement.

B. Remove all dirt, ice, loose rust and scale from all anchors, ties and reinforcement prior to installation.

3.03 INSTALLATION

A. General: Do not install cracked, broken, or chipped masonry units exceeding ASTM allowances.
   1. Use masonry saws to cut and fix exposed units.
   2. No face brick is allowed smaller than one-half a full brick. No brick shall be cut horizontally in running bond.
   3. Lay brick plumb, true to line, and with level courses accurately spaced within allowable tolerances.
   4. Do not furrow bed joints.
   5. Stop off horizontal run by racking back in each course; toothing is not permitted.
   6. Adjust units to final position while mortar is soft and plastic.

7. If units are displaced after mortar has stiffened, remove, clean joints and units of mortar and relay with fresh mortar.
8. Adjust shelf angles to keep work level and at proper elevation. Provide pressure relieving joints by placing a continuous 1/8" foam neoprene pad under the shelf angle.
9. Joints shall be consistent 3/8" width, even in arches and/or radial pattern. Saw cut brick in such pattern.
10. When joining fresh masonry to set or partially set masonry:
    a. Remove loose brick and mortar.
    b. Clean and lightly wet exposed surface of set masonry prior to laying fresh masonry.

B. Protection of Work
1. Protect sills, ledges, and offsets from mortar drippings or other damage during construction.
2. Remove misplaced mortar or grout immediately.
3. Protect face materials against staining.
4. Protect the door jambs and corners from damage during construction.

C. Mortar Beds
1. Lay brick with full mortar coverage on horizontal and vertical joints in all courses. Provide sufficient mortar on ends of brick to fill head joints.
2. Rock closures into place with head joints thrown against two adjacent bricks in place.
3. Do not pound corners or gables to fit stretcher units after setting in place. Where adjustment to corners or jambs must be made after mortar has started to set, remove mortar and replace with fresh mortar.

D. Joints
1. Horizontal and vertical face joints shall be as required to provide brick coursing to agree with concrete unit masonry. Joint widths wider than 3/8" must be approved by the Architect prior to construction of masonry. All joints shall be uniform.
    a. Shove vertical joints tight.
    b. Tool concave type joints when thumbprint hard using jointing tool.
    c. Flush cut all joints not tooled.
    d. Fill horizontal joints between top of masonry and underside of overhead elements.

E. MortarNet Installation
1. Cavity shall be no more than 1/4" wider than the mortar net being installed.
2. The installed mortar net shall touch both the outer wythe and the inner wall/substrate.
3. Install one (1) continuous row of the mortar net at the base of the wall and over all wall openings directly on the flashing.
4. Install flashings under the mortar net, and extend from the bottom of the mortar net to a minimum of 6" above the top of the mortar net.
5. Cut the mortar net to accommodate the wall ties and wall masonry reinforcing and any other item penetrating the masonry cavity.

F. Flashing
1. Clean surface of masonry smooth and free from projections which might puncture or otherwise damage flashing material.
2. Place through-wall flashing on bed of mortar. Cover flashing with mortar. Step flashing on slopes. Refer to Section 07600.

G. Weep Holes
1. Provide weephole in head joints in first course immediately above all flashing, maximum spacing, 24" o.c.
2. Keep weepholes and area above flashing free of mortar droppings.

H. Sealant / Control Joints: Retain sealant joints around outside perimeters of exterior doors, window frames, and other wall openings. Locate masonry control joints as indicated on Drawings. Where not indicated, place control joints at maximum of 20' centers, after consulting with Architect at project site to verify locations. Joints in concrete unit masonry shall be at 40' centers, maximum. Refer to Section 07920 for joint sealants.

3.04 POINTING AND CLEANING

A. Cut out any defective joints and holes in exposed masonry and repoint with mortar.

B. Dry brush masonry surface after mortar has set at end of each day's work and after final pointing. Clean exposed unglazed masonry with stiff brush and clear water.

C. Apply cleaning agent to sample wall area of 20 square feet in location acceptable to the Architect, if cleaning by water does not produce satisfactory results:
   1. Do not proceed with cleaning until sample area is acceptable to the Architect.
   2. Follow manufacturer's recommendation for use of cleaning agent. Thoroughly wet surface of masonry on which no efflorescence appears before using cleaning agent. Scrub with acceptable cleaning agent and immediately rinse with clear water. Work small sections at a time, working from top to bottom.
   3. Protect railings, metal lintels, and other materials which may corrode when masonry is cleaned with recommended solution.
   4. Remove efflorescence in accordance with brick manufacturer's recommendations.

D. Leave work area and surrounding surfaces clean and free of mortar spots, droppings, and broken masonry.

END OF SECTION