

SECTION 04 02 00

UNIT MASONRY

PART 1 - GENERAL

- 1.1 GENERAL CONDITIONS: The General Conditions, Supplementary General Conditions and all Sections of Division 1 shall apply to each and every contract and contractor, person or persons supplying material, labor or entering into the work directly or indirectly.
- 1.2 STANDARDS: All materials and workmanship shall conform to the recommendations of the following:
- A. The Brick Institute of America (BIA)
 - B. American Society of Testing and Materials (ASTM)
 - C. Portland Cement Association (PCA)
 - D. National Concrete Masonry Association (NCMA)
- 1.3 SCOPE:
- A. This Section includes all labor, materials, equipment and related services necessary for the fabrication, delivery and installation of the work shown on the drawings and/or specified herein, including but not limited to the following:
 - 1. Facebrick masonry as indicated.
 - 2. Concrete Masonry Units as indicated
 - 3. Mortar and grout for masonry work, including grout fill of bond and lintel beams.
 - 4. Reinforcing, ties, anchors and other metal accessories for tying masonry work together and to other work, except as otherwise specified herein.
 - 5. Building in of door frames, window frames, steel lintels, louvers, grilles, sleeves, anchors and all other items required to be built into the masonry construction.
 - 6. Control joints, including fillers, occurring in masonry.
 - 7. Cutting and patching of new unit masonry work as required for the work of other Sections.
 - 8. Submission of samples as specified.
 - 9. Cleaning and pointing of masonry work of this Section exposed to view.
 - 10. Cavity wall insulation board.
 - a. Include board insulation within masonry cavity walls.
 - b. Include dampproofing exterior face of inner wythe of cavity walls, and against outer face of structural steel embedded in exterior masonry walls.
 - 11. Through-wall flashing in masonry construction.
 - a. Include flashing under precast items.
 - 12. Provide and maintain all staging required for work of this SECTION 04 20 00, in accordance with the requirements set forth in SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS.
 - B. Items to be Furnished Only: Furnish and deliver following items for installation under designated Sections:
 - 1. Dovetail anchor slots, for installation in concrete: SECTION 03 30 00 - CAST-IN-PLACE CONCRETE.
 - 2. Anchors to be Welded to Structural Steel: SECTION 05 12 00 - STRUCTURAL STEEL.
 - C. Items To Be Installed Only: Install following items furnished under designated Sections:
 - 1. Precast concrete units, including accessories: SECTION 03 45 00 – ARCHITECTURAL PRECAST CONCRETE.
 - a. Include under this SECTION 04 20 00 furnishing and installation of mortar materials, to match mortar as specified hereinafter or the precast units as directed by Architect.

- b. Include under this SECTION 04 20 00 Furnishing and installing of accessories for securing precast concrete to adjacent work.
 - c. Devices and accessories cast-in with precast concrete are specified under SECTION 03 45 00.
 - d. Comply with installation requirements as specified under SECTION 03 45 00, including final shop drawings as specified therein.
- 2. Loose steel angle lintels for openings in masonry walls: DIVISION 5.
 - 3. Flue clean-out doors: SECTION 05 50 00 – METAL FABRICATIONS.
 - 4. Access panels, sleeves for piping and conduit to be built into masonry as furnished under Mechanical and Electrical Sections.
 - 5. Built-in anchors, blocking, plates, anchor bolts, ties and all other items required to be built into masonry as furnished by other trade Sections. Cooperate with all other trades and notify them sufficiently in advance of the time when the material furnished by them is to be built into the masonry so that progress of the work will not be impeded. Every precaution shall be taken to minimize cutting and patching.
 - 6. Vents: DIVISION 23 00 00 – HEATING, VENTILATING AND AIR CONDITIONING
- D. Related Work Specified Elsewhere:
- 1. Unit Pavers: DIVISION 32 Sections.
 - 2. Metal flashing, except as specified herein: SECTION 07 62 00.
 - a. NOTE: Include close coordination of masonry and metal flashing work, particularly at chimney and other points where masonry abuts roof construction.
 - 3. Caulking and sealing of joints in masonry: SECTION 07 92 00 - JOINT SEALANTS.
- E. Alternates: Refer to SECTION 01 21 00 - ALLOWANCES, SECTION 01 22 00 – UNIT PRICES, and SECTION 01 23 00 - ALTERNATES, to determine extent, if any, work of this Section will be affected by Alternates, Unit Prices or Allowances.

1.4 QUALITY ASSURANCE

- A. General: Comply with requirements of SECTION 01 33 00 - SUBMITTALS; SECTION 01 40 00 - QUALITY REQUIREMENTS.
- B. Standards: Comply with applicable recommendations made by following producer associations:
- 1. Facebrick: Brick Institute of America (BIA).
 - 2. Concrete Masonry Units: National Concrete Masonry Association (NCMA).
 - 3. Locate as approved by Architect. Arrange for open southeast exposure so that facing materials will be in sun during morning hours (not under a tree or otherwise covered location).
 - 4. Arrange for panel construction, including related work, to be started in presence of Architect; do not proceed further until beginning portion is approved.
 - 5. Arrange for adequate weather protective covering at top, and covering opposite side and ends with 6-mil clear polyethylene film protection.
 - 6. Upon completion and approval, panel shall remain on site as a standard of acceptance for the permanent exterior wall construction (including all related work).
 - 7. Remove panel when directed by Architect.
- C. Fire-Related Masonry: Wherever a fire-resistance classification is shown or scheduled for unit masonry construction, comply with requirements for materials and installation by the American Insurance Association and governing authorities for the construction shown.

1.5 SUBMITTALS:

- A. General: Provide submittals in compliance with SECTION 01 33 00 – SUBMITTALS.

- B. Manufacturer's Data: For information only (except as indicated) submit 2 copies of manufacturer's specifications and other data for each type of masonry unit and accessory required including certification that each type complies with the specified requirements. Include instruction for handling, storage, installation and protection of each.
- C. Samples: Submit samples of following:
1. Facebrick: Tow sets of brick samples, for each brick type, color and size, including special shapes; each set showing the full range of color and texture of the brick units.
 2. Standard CMU: Two sets of each type to be provided.
 3. Mortar: Two sets of cured mortar samples for all exposed mortar not to be painted or otherwise covered.
 - a. Include for each mortar color.
- D. Certificates of Compliance: Submit certificates of compliance for following materials (designate on certificates the applicable standards including all type, class and other designations as applicable):
1. Facebrick.
 2. Concrete masonry units.
 3. Portland cement.
 4. Lime.
 5. Masonry aggregate.
 6. Insulation materials.
 7. Refractory mortar.
 8. Flue tile.
- E. Test Reports:
1. Submit independent laboratory test reports for face brick and each type of masonry unit, mortar material and other component specified herein.
 2. Include in test reports:
 - a. Compressive strength.
 - b. 24-hour cold water absorption.
 - c. 5-hour boil absorption.
 - d. Saturation coefficient.
 - e. Initial rate of absorption (suction).
 - f. Latent salt content, ASTM C-67.
 - g. Water, if from sources other than local potable water supply.
- F. LEED Submittals:
1. Product Data for Credit MR 2.2: Environmentally Preferable Materials.
 - a. Local production. Provide materials that were extracted, processed, and manufactured within 500 miles of the home.

1.6 TESTING AND INSPECTION; BY OWNER (OPTIONAL):

- A. Following acceptance of initial test reports by Contractor, all masonry work, including specifically but not limited to masonry and mortar materials, shall be subject to testing and inspection to be performed by a Testing Laboratory selected and paid for by Owner.
1. Owner *will not* be required to engage such Testing Laboratory.
 2. Such testing, if Owner so elects, shall be in addition to and not in lieu of testing and test reports required by Contractor.
 3. Costs of additional testing required by failed samples shall be at expense of Contractor, including all related per diem costs.
- B. Use no masonry or mortar materials on the work without prior test and written approval of the Testing Engineer (if applicable) and Architect, unless Architect specifically approves otherwise. If applicable,

materials shall be submitted to the Testing Laboratory at least three weeks, and preferably five weeks, in advance of proposed first use in the structure for subjection to the prescribed basic acceptance test and determination of basic mixtures.

- C. At start of field operations, and periodically during the course of work, the Testing Laboratory may check tests of mortar materials and mortar to assure compatibility with these Specification and the originally approved samples. Number and frequency of tests shall be determined by the Architect.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. General: Protect masonry units and manufactured products of all types for wetting by rain or snow, and keep covered when not in use.
- B. Masonry Face Units: Handle all face materials carefully in transit and on the site so as to keep units whole, edges sharp and faces clean and undamaged. Do not dump masonry face units but deliver on pallets, handled individually or in suitable groups and properly stacked, with minimum protection as follows:
 - 1. Face Brick: Straw and in cubes.
 - 2. Glazed CMU: As recommended by manufacturer.
 - 3. Other Concrete Masonry Units: Careful handling.
- C. Aggregates: Deliver, store and handle aggregate materials so as to prevent contamination with earth or other foreign materials.
- D. Manufactured Items: Deliver all manufactured products in their original containers, plainly marked with product identification and manufacturer's name.
 - 1. Store cement, lime and similar products under cover and from direct contact with earth or floor slabs.
 - 2. Store metal accessories and the like under cover and from direct contact with ground, and in manner to prevent rust.
- E. Damaged Material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages or packages containing water marks or other evidence of damage, unless Architect specifically authorizes correction and use on project.

1.8 JOB CONDITIONS, PROTECTION:

- A. Protection of Work: During erection, cover exposed tops of exterior facebrick or concrete masonry units with heavy waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Do not apply loading for at least 12 hours after building masonry walls or columns.
 - 3. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.
 - 4. Comply as a minimum requirement with recommendations of the referenced producer associations; comply with more stringent requirements for same where options are given; comply with more stringent requirements where specified herein.
 - a. NOTE: Requirements of referenced standards and as specified herein are minimal acceptable, and compliance shall not relieve Contractor of responsibility for providing masonry in sound condition, undamaged by freezing or other action of the elements other than normal weathering following proper curing of mortar. Contractor shall take additional precautions and corrective measures as required.
 - 5. Protect windows, other finished surfaces from mortar droppings.
 - a. Take particular care with window sills and other horizontal surfaces.
 - b. Remove mortar or grout immediately from finished surfaces, rinse and wipe clean.

- B. Staining: Prevent grout or mortar from staining the face of masonry to be left exposed or coated. Remove immediately grout or mortar in contact with such masonry.
- C. Cold Weather Protection:
1. Definitions:
 - a. "Air Temperature" means the lower of (1) the current ambient air temperature at time the masonry work is being erected, or (2) the temperature forecast by the Weather Service within the next four hours.
 - b. "Mean Air Temperature" denotes the expected mean air temperature for the 24 hour period (or other period if applicable) following the completion of each segment of masonry work.
 - c. "Exterior Masonry" means any masonry exposed to the elements, including interior or enclosed masonry in unheated locations.
 2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
 3. Remove all masonry determined to be frozen or damaged by freezing conditions.
 4. Perform following construction procedures while any exterior masonry work is progressing:
 - a. When air temperature is from 40 deg. F to 32 deg. F, heat sand or mixing water to produce mortar temperatures between 50 deg F and 120 deg. F.
 - b. When air temperature is from 32 deg. F to 25 deg. F, heat sand or water to produce mortar temperature between 50 deg. F and 120 deg. F; maintain temperature of mortar on boards above freezing.
 - c. When air temperature is from 25 deg. F to 20 deg. F, heat sand and mixing water to produce mortar temperatures between 40 deg. F and 120 deg. F; maintain temperature of mortar on boards above freezing; use salamanders, infra-red lamps or other heat sources on both sides of walls under construction; use wind breaks when wind is in excess of 15 mph.
 - d. When air temperature is 20 deg. F and below, heat sand and mixing water to produce mortar temperatures between 50 deg. F and 120 deg. F; provide enclosures and auxiliary heat to maintain air temperature above 32 deg. F; do not lay units which have surface temperature lower than 32 deg. F.
 5. Provide following protections for completed exterior masonry or exterior masonry not being worked on:
 - a. When mean daily air temperature is from 40 deg. F to 32 deg. F, protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane; 48 hours for grouted masonry.
 - b. When the mean daily air temperature is between 20 deg. F and 32 deg. F, cover with weather-resistive insulating blankets or equivalent for at least 24 hours; 48 hours for grouted masonry.
 - c. When the mean daily air temperature is 20 deg. F and below, maintain masonry temperature above 32 deg. F for 24 hours (48 hours for grouted masonry) using enclosures and supplementary heat, electric heating blankets, infra-red lamps, or other acceptable methods.
 6. Optional methods of BIA for increasing the mortar strength or use of Type III cement *will not* be allowable.
 7. Use of calcium chloride or other additives to accelerate curing of mortar, or use of anti-freeze additives in the mortar, will not be acceptable.

PART 2: PRODUCTS

2.1 MASONRY UNITS:

- A. Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.
- B. Facebrick: ASTM C-326, Type FBS, Grade SW.
 1. Size: Modular size except as otherwise indicated.

2. Color/Texture: To Match Existing.
 3. Coring: Provide only solid units (uncored) for all specified shapes and sizes, and at other locations where brick extends out from face of wall, or where cores might otherwise be exposed.
- C. Concrete Masonry Units (CMU) - Standard:
1. Size: Manufacturer's standard units with nominal face dimensions of 16 in. long x nominal widths indicated (15-5/8 in. 7-5/8 in. actual face dimensions), unless otherwise shown.
 2. Special Shapes: Provide where shown and where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
 - a. Provide bullnose external corners and rounded tops in general, unless otherwise as indicated.
 3. Type: Hollow load bearing, ASTM C-90, Grade N, Type 1.
 - a. NOTE: Grade N required all locations, including interiors.
 - b. Provide solid block (maximum 25-percent voids) for interior CMU where indicated or required, complying with ASTM C-145.
 4. Weight: Provide only normal weight units, unless otherwise indicated.
 5. Exposed Face: To Match Existing.
- D. Flue Tile: Standard commercial grade fire clay tile, ASTM C-315.

2.2 MORTAR MATERIALS:

- A. Colored Mortar: Provide premixed mortar coloring for all facebrick, Series "H" as manufactured by Solomon Grind-Chemical Service, Inc. (SGS); or approved equal. Provide in quantities and mix as recommended by manufacturer, to provide reasonable but uniform color match with following SGS color selections and approved samples and sample panel:
1. Facebrick and Precast Concrete: To Match Existing
 2. NOTE: Use of mortar without color additive is preferable. Refer to Paragraph Color Uniformity. Subject to approval of Architect, integral coloring additive may be omitted if satisfactory mortar color can be achieved through use of appropriate colored portland cement and aggregates.
- B. Color Uniformity: Take all measures necessary to assure uniform color throughout for all mortar not to receive applied finish. Select portland cement and aggregate materials for color, to match approved samples and sample panel. Obtain cement from same lot shipments. Ascertain that sources of aggregate are sufficient for project. Do not change source of supply of any materials without prior approval of Architect.
1. Mortar to be Colored: Facebrick, mortar for precast concrete.
 2. Color: Architect's intent is to obtain a light colored mortar approximating that of the facebrick.
 3. Aggregate Color: To extent feasible, select buff or other light colored aggregate.
 4. Cement Color: If satisfactory color cannot be obtained with lighter color aggregates and coloring additive, Architect reserves right to direct use of white or buff colored portland cement, or intermix thereof, without increase in Contract Sum.
 5. Contractor Options: Omission of integral coloring additive is preferred. Subject to approval of samples by Architect, Contractor may elect to use lighter colored cement, along with lighter color aggregates, in order to obtain appropriate mortar color without use or with reduced use of integral coloring additive.
- C. Portland Cement: ASTM C-150, Type I or II.
1. For colored mortar provide only Type I portland cement.
 2. Refer also to color requirements under Paragraph Color Uniformity:
 3. For all exterior masonry, provide cement meeting further requirement that it shall exhibit no efflorescence when cast into the form of 2 in. by 7 in. slabs comprising the cement under test. Use Ottawa plastic mortar sand and distilled water (in proportions of 1:2 by weight, with water

added to produce 100 percent flow) and subjected to a 7-day “wick test” in general conformity with the methods described in ASTM C-67.

- D. Aggregate:
 - 1. Sand: ASTM C-144, selected for color where not to be concealed or painted.
 - a. For joints less than 1/4 in. wide use aggregate graded with 100 percent passing the No. 16 sieve.
 - b. Refer also to color requirements under Paragraph Color Uniformity:
 - 2. Course Aggregate for Grout: ASTM C-33, sized between 1/4 in. and 3/8 in. (pea gravel).
- E. Hydrated Lime: ASTM C-207, Type S.
- F. Masonry Cement: Not acceptable.
- G. Water: Obtain from public water system, clean and potable when used.
 - 1. NOTE: If obtained from new well or other below ground surfaces water must be tested by Contractor for calcium content.
- H. Integral Waterproofing: Non-chloride type (only), one of following; or approved equal:
 - 1. Euco Integral Waterpeller (powder), by The Euclid Chemical Co.
 - 2. Drycrete, C. G. Pardee Co., Inc.
 - 3. Acryl 60, by Thoro Systems Products.
 - 4. Laticrete 3701, by Laticrete International, Inc.
- I. Flue Tile Mortar: Standard commercial grade refractory mortar, ASTM C-105.
 - 1. Product: Heat-Stop 2, by Whittacre-Green Brick Co., Alliance, OH; or approved equal.

2.3 MASONRY ACCESSORIES:

- A. Ferrous Metal Materials and Finish: Except as otherwise specified provide ferrous metal materials complying with the following:
 - 1. Wire Products: ASTM A-82, finish as follows except as specified otherwise:
 - a. Exterior Walls: Hot-dipped galvanized, ASTM A-153, Class B-2, minimum 1.5 ounce coating.
 - b. Inner Wythes of Exterior Walls: Same as exterior walls.
 - c. Inner Walls: Regular mill galvanized, ASTM A-641, minimum 0.10 ounce coating; or as specified for exterior walls.
 - 2. Steel Plates and Bar Anchors: ASTM A-36.
 - 3. Sheet Steel: ASTM A-568
 - a. Exterior Walls Including Inner Wythes: Mill galvanized, ASTM A641, Class 1, minimum 0.40 ounce coating.
 - b. Interior Walls: Regular mill galvanized, ASTM A-641, minimum 0.10 ounce coating.
 - 4. Optional Finish: Fusion bonded epoxy in lieu of galvanized, except where stainless steel is specified.
- B. Veneer Anchors:
 - 1. General: Secure to metal studs only, through sheathing.
 - 2. Light Gauge Metal Framing: For securement to light gauge framing provide 14-gauge reinforced stainless steel (only) plate with 3/16 inch steel ties.
 - a. Product, Exterior Walls: Dur-O-Wal Dur-O-Wal D/A 213 System, stainless steel with SFS-SX3 self-drilling stainless steel fasteners (two per anchor); or approved equal.
 - b. Product, Interior Masonry: Same as exterior masonry; or mill galvanized or hot-dipped galvanized construction, with D/A 807 corrosion-resistant coated fasteners; or approved equal.

3. For securement to structural steel, furnish standard weld on steel slots (hot-dipped galvanized) to structural steel fabricator, for welding on in ship, not lighter than 16 gauge. Provide one of the following:
 - a. Heckman No. 315 or 315-B with 316 ties.
 - b. AA Wire Products Co. AA401-G or B with AA400 Series Flex-O-Lok ties.
 - c. Dur-O-Wal D/A 709 with D/A 701-708 Series ties.
 - d. Approved equal.
 4. For securement to concrete provide dovetail anchor slots with matching dovetail insert and wire tie (each hot-dipped galvanized). Furnish dovetail anchor slots (hot-dipped galvanized) to concrete installer. Provide one of following:
 - a. Heckman No. 100 with 103 ties (107 for slot mounted vertically).
 - b. AA Wire Products Co. AA 100 with 200 ties (similar ties to suit horizontal installation if applicable).
 - c. Dur-O-Wal D/A 100 with D/A 720-723 ties (similar ties to suit horizontal installation if applicable).
 - d. Approved equal.
 5. For brick facing at masonry backup cavity wall, provide adjustable pintle ties with 3/16 inch double leg rectangular pintle section and 3/16 inch diameter rectangular eye section, properly sized in compliance with manufacturer's recommendations for particular wythe thickness and cavity depth.
 - a. Product: Dur-O-Wal D/A 515; or approved equal.
 6. Other Anchoring Devices for Masonry: Provide anchors, straps, bars, bolts and rods fabricated from not less than 16 ga. sheet metal or 3/8 in. diameter rod stock, unless otherwise indicated.
- C. Anchors and Precast Concrete: Except as indicated otherwise on Drawings, comply with requirements specified for veneer anchors, and following additional requirements:
1. Unless otherwise indicated, provide all anchorage accessories not lighter than 12-gauge, stainless steel.
 2. For precast bands provide Dur-O-Wal D/A 901 Channel Slot and 911 Series Anchor, not lighter than 12 -gauge, stainless steel.
 3. For panels provide 3/8 inch diameter rods and dowels as indicated, stainless steel.
 4. Provide special shapes as indicated and as required for secure, positive anchorage.
 5. Coordinate anchorage accessories with cast-in devices, as specified under SECTION 03450.
 6. Comply with final shop drawings for precast concrete.
- D. Flashings for Masonry: Provide concealed flashing, shown to be built into masonry, as follows:
1. Product: Wasco/York 3 Ounce Copper Fabric; or approved equal.
 2. Elastomeric Flashing at Brick Shelf: Self adhering, elastomeric flashing material.
 - a. Locate where grade is less than 6 inches from finish floor slab, and as indicated.
 - b. Product: W. R. Grace Perm-A-Shield; or approved equal.
- E. Reinforcement for Bond/Lintel Beams, Vertically Reinforced Masonry: ASTM A-615, Grade 60.
1. Provide sizes as shown, or if not shown provide 2 No. 3 bars in bottom of lintel unit.
 2. Refer to Structural and Architectural Drawings for sizes and locations.
- F. Perforated Plates: Hot-dipped galvanized steel sheet, not lighter than 16 gauge, perforated with 1/8 in. holes at 3/8 in. on centers each way.
- G. Weeps and Vent Tubes: Clear plastic tube, 3/8 inch diameter by 3-1/2 inch long.
1. Product: Dur-O-Wal D/A 1005; or approved equal.

2.4 BOARD INSULATION FOR CAVITY WALLS:

- A. Polyurethane Board Insulation: Foil faced each side, Fed. Spec. HH-I-1972/1, Class 2.
1. R-Value: Aged R-Value at 75 deg. F. 7.0 minimum for 1-inch thick material.
 2. Provide "cyanurate" type board insulation, an industry recognized modification of normal urethane insulation.

- B. Product: Celotex Thermax 600 Series; or approved equal.

2.5 DAMPPROOFING MATERIAL:

- A. Provide emulsion product as approved in writing by the insulation manufacturer as compatible with its product.
- B. Product: Karnak 100; or approved equal.

PART 3 - EXECUTION

3.1 MORTAR PROPORTIONING AND MIXING:

- A. General: Provide mortar complying with the proportion requirements of ASTM C-270, except as otherwise specified or indicated on Drawings.
 - 1. Provide Type N mortar where not otherwise specified or indicated on Drawings.
 - a. Refer also to Structural Drawings.
 - 2. Provide Type M mortar for below grade conditions in contact with earth materials.
 - 3. Provide Type S mortar as indicated on Structural Drawings.
 - 4. For bond beams and vertically reinforced concrete, provide grout complying with ASTM C-476, similar to Type S mortar and following:
 - a. For fine grout provide mixture of 1-part portland cement, 0 to 0.10 parts lime, and 2-1/4 to 3 parts sand.
 - b. For coarse grout provide mixture of 1-part portland cement, 0 to 0.10 parts lime, 2-1/4 to 3 parts fine aggregate and 2-parts coarse aggregate (pea gravel).
 - c. Ordinary concrete (maximum aggregate size 3/4 inch) with compressive strength of 3,000 psi or greater may be used for bond beams where minimum interior dimension exceeds 4 inches.
 - d. Provide fine grout for vertically reinforced masonry where minimum horizontal core dimensions is under 3 inches, coarse grout where minimum core dimension is 3 inches or greater.
 - e. Ordinary concrete (maximum aggregate size 3/4 inch) with compressive strength of 3,000 psi or greater may be used for vertically reinforced concrete where minimum core dimension exceeds 6 inches.
- B. Waterproofing: Add integral waterproofing admixture to mortar used for exterior masonry, in quantity and manner recommended by manufacturer.
 - 1. Include for parging coats, mortar for laying inner wythe backup walls of exterior walls.
- C. Add integral coloring admixtures to mortar as specified.
- D. Machine mix mortar only. Cement and hydrated lime may be batched by the bag. Batch aggregates by weight, except subject to approval of Architect certain small operations may be batched by volume in suitably calibrated containers, provided proper allowance is made for weight per cubic foot, contained moisture, bulking and consolidation.
 - 1. Shovel measurement will not be acceptable.
- E. Provide mortar with just sufficient water for proper workability under the trowel. Provide water for tempering (only) on the scaffold at all times. Discard mortar which has begun to "set" or is not used within two hours after initial mixing. Mortar which has stiffened due to evaporation within the two hour period shall be re-tempered to restore its workability. Re-tempering the mortar at the mixer shall not be permitted.
 - 1. Do not re-temper colored mortar if it adversely affects color uniformity.

3.2 ALLOWABLE TOLERANCES FOR MASONRY WORK:

POWERPAY OFFICES PROJECT

- A. Maximum Variation From Plumb:
 - 1. In lines and surfaces of columns, walls and arrises:
 - a. 1/4 in. in 10 ft
 - b. 3/8 in. in any story or 20 ft maximum
 - c. 1/2 in. in 40 ft
 - 2. For external corners, control joints and other conspicuous lines:
 - a. 1/4 in. in any story or 20 ft maximum
- B. Maximum variation from level or grades for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:
 - 1. 1/4 in. in any bay or 20 ft
 - 2. 1/2 in. in 40 ft
- C. Maximum variation of linear building line from an established position in plan and related portions of columns, walls and partitions:
 - 1. 1/2 in. in any bay or 20 ft maximum
 - 2. 3/4 in. in 40 ft (1:640)
- D. Maximum variation in cross-sectional dimensions of columns in thickness of walls: Not less than 1/4 in. smaller nor more than 1/2 in. larger than walls.

3.3 JOINTS AND BONDING PATTERNS:

- A. Joints: Unless otherwise indicated provide joints as follows:
 - 1. Depth and Width: 3/8 inch for both horizontal and vertical.
 - 2. Facebrick: Strike joints flush when thumb print hard, thoroughly tool with 1/2 inch round tool, to produce a glassy-hard, polished concave joint free from drying cracks.
 - 3. CMU: Same as facebrick.
 - 4. Joints in Precast Concrete: As specified for facebrick.
 - 5. Joints to Receive Sealant: Rake out joints to receive caulking or sealant as specified.
 - 6. Concealed Masonry: Strike joints flush joints in masonry unit walls and partitions concealed from view, tooling not required.
- B. Masonry Bonds: Unless otherwise indicated provide bonding patterns as follows:
 - 1. Exterior Facebrick: Running bond except as indicated.
 - 2. CMU: Running bond.
 - 3. All other masonry, including with joints concealed: Running bond.

3.4 MASONRY INSTALLATION, GENERAL:

- A. Lay all masonry work with skilled workmen under adequate supervision, true to lines and levels with joints of uniform thickness, all surfaces true, and corners straight and plumb.
- B. Lay up walls and partitions which are to remain exposed to view in place within 1/8 inch when measured with a ten foot long straightedge. Where walls are exposed two sides, obtain decision from Architect as to which is to be held to the 1/8 inch tolerance.
- C. Examine all Drawings as to requirements for the accommodation of work of other trades and Contractors and provide all required recesses, chases, slots, cutouts, and built-ins, settling of loose lintels, placement of anchors, bolts, sleeves and other items occurring in the masonry work. Take every precaution to minimize future cutting and patching.
- D. Except as specified otherwise, lay all masonry units dry. Masonry units shall be protected from rain prior to laying, and shall have a moisture absorption ratio less than 35 percent when laid. In hot weather, lightly moisten contact surfaces with water by use of a soft brush.
- E. Brick: Lay all brick with full shove joints in full beds of mortar; fill all vertical joints with mortar.

1. Determine suction properties of brick from manufacturer, wet brick prior to laying as recommended by manufacturer.
 2. Unless otherwise recommended by brick manufacturer, wet brick prior to laying where suction exceeds 30 gm/minute/30 sq in.
 3. If brick manufacturer does not have suction properties or does not recommend a different procedure, testing of suction may be determined by drawing a circle using a 25-cent piece as template with a wax pencil. With a medicine dropper place 20 drops of water within circle, and note time required for water to be absorbed. If time exceeds 1-1/2 minutes, wetting is not required.
 4. Wet brick, where required, by hosing down the day before or at least three hours before laying, so that interior is saturated but surfaces have a chance to become dry. Do not lay brick with wet surfaces.
- F. CMU: Lay all blocks with full bed on shells only, except set bottom course bearing on concrete with full face and webs also; fully butter vertical edges.
- G. Place masonry fitting into bucks and frames as not to distort alignment of such items and slush backs of such items full with mortar. Carefully point around all metal frames with mortar, except where joints are specified or noted to receive sealant, in which case rake out joints to a uniform depth of 3/4 inch and a width of 3/8 inch for proper installation of sealant material.
- H. Take special care in laying up masonry units that will be exposed to view in the finished work to insure a uniform appearance in texture and joint pattern.
- I. Perform all cutting of exposed masonry units with a motor-driven carborundum saw to insure straight, evenly cut edges.
- J. At locations where conduits and pipes are to be concealed by masonry units, install each unit so as to provide a finished appearance with adjacent surface. Wherever possible, cuts shall be hidden from view.
- K. Provide complete protection against breakage and weather damage to all masonry work. Provide substantial wood boxing around door jambs, over window sills and jambs, over the tops of partitions and wherever necessary to protect work at all stages of completion. Masonry, when not roofed over, shall be positively protected at all times when Masons are not working on the walls.
- L. NOTE: Openings other than shown on the Drawings shall not be allowed in masonry walls, without the expressed consent of the Architect.
- M. Wall Heights:
1. Where walls are indicated to extend full height, extend walls from top of structural floor to bottom surface of construction above, or to bottom of parallel steel where applicable. Install joint filler between masonry and bottom surface of floor construction.
 2. Where walls are not required to extend full height, terminate a minimum of 8 inches above finished ceiling line. Where run of wall without intersecting masonry walls exceeds 12 feet provide rigid steel bracing from top of walls to structural system above at not over 12 feet on centers.
- N. Control Joints: Form as indicated.

3.5 WALL TIES AND ANCHORS - INSTALLATION:

- A. Masonry Veneer Anchors: Anchor masonry veneer to metal studs through wall sheathing, and structural steel framing members, with metal ties.
1. Provide minimum of one wall tie for each 2 square feet of wall area.
 2. Stagger ties in alternate courses.
 - a. Stagger ties with joint reinforcement where applicable.

3. Maximum distance between adjacent ties:
 - a. Vertically: 16 inches on centers, not more than 8 inches from bottoms and tops of walls.
 - b. Horizontally: Match stud spacing but not more than 24 inches on centers, not more than 8 inches from ends of any masonry run including control joints.
 4. Embed ties in horizontal joints of masonry.
 5. Provide additional ties at openings:
 - a. Maximum spacing around perimeter: 24 inches
 - b. Install within 8 inches of opening.
 6. NOTE: Use channel slot corrugated anchors to secure masonry veneer to structural steel columns and beams.
- B. Anchor walls abutting concrete members with dovetail anchors inserted in slots built into concrete.
1. Maximum anchor spacing:
 - a. Vertically: 16 inches
 - b. Horizontally: 24 inches
 2. Maintain space not less than 1/2 inch wide between masonry wall and concrete members.
 3. Keep space free of mortar or other rigid material to permit differential movement between concrete and masonry.
- C. For intersecting bearing or shear walls carried up separately provide rigid steel anchors spaced not more than 2 feet apart vertically.
- D. Anchor non-bearing partitions abutting or intersecting other walls or partitions with wall ties at vertical intervals of not more than 16 inches.

3.6 INSTALLATION OF HORIZONTAL WALL REINFORCEMENT:

- A. Unless otherwise shown on the Drawings, install continuous wall reinforcing in following locations, spaced 16 inches on centers commencing at second or third block courses, and terminating within second or third courses from top of wall.
1. Exterior CMU veneer (inner wythe backup walls).
 2. Interior CMU walls and partitions.
 3. NOTE: Terminate continuous wall reinforcing on each side of control joints. Avoid placement of reinforcement in same joint in which thru-wall flashing, anchors or ties occur.
- B. Where openings occur in masonry walls, install reinforcing in bed joints so as to be placed not more than 8 inches on centers for first 16 inches horizontally and vertically below openings, and extending 2 feet beyond the jambs. All other reinforcing shall be continuous. Lap side rods at least 6 in. at splices. Place reinforcing as to assure a 1/2 in. mortar cover on the faces of walls.
- C. Use prefabricated or job fabricated corners and tee sections to form continuous reinforcement around corners, and for anchoring abutting walls and partitions. Material in corner and tee sections shall correspond to type and design of reinforcing used.
- D. Coordinate installation at exterior walls so that reinforcement does not occur in same joint as masonry veneer wall ties.

3.8 EXTERIOR CURTAIN WALL VENEER WALLS:

- A. Construct exterior brick veneer walls as indicated. Take care to keep cavity free of mortar.
1. Use of mortar board or other approved method is required.
- B. Back-up portion of exterior walls, including light-gauge metal framing and sheathing, shall be constructed first. Fasten ties as previously specified. Interior face of masonry veneer shall have flush joints with no mortar projecting.

- C. Lay-up face wythe, filling all joints and incorporating metal ties into joints of exterior veneer walls.
- D. Drain base of cavity as specified under Paragraph DRAINING/VENTING OF CAVITY WALLS.

3.9 MASONRY BACK-UP CAVITY-WALL REQUIREMENTS:

- A. Apply dampproofing to entire exterior surface of inner wythe, complying with manufacturer's recommendations and to achieve a uniform application at rate of 25 to 35 sq. ft. per gallon.
 - 1. Apply also to all surfaces of structural steel flush with or extending beyond the exterior face of the inner wythe.
- B. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
- C. Install small pads of mortar or mastic spaced 1 ft-0 in. o.c. both ways on inside face, as recommended by manufacturer.
- D. Keep air space free of mortar by use of cavity boards, lifted regularly and excess mortar removed.
- E. Drain base of cavity as specified under Paragraph DRAINING/VENTING OF CAVITY WALLS.
- F. Set brick ties as specified and indicated. Coordinate work so that ties do not occur in same joint as reinforcing in CMU backup.

3.10 FLASHING:

- A. Provide concealed through-wall flashing for masonry. Construct masonry to accommodate other flashing. Prepare masonry surfaces smooth and free from projections which might puncture flashing. Place through-wall flashing on bed of mortar and cover with mortar. Seal flashing penetrations with mastic before covering with mortar. Terminate flashing 1/2 in. from face of wall, unless otherwise shown. Extend flashings beyond edge of lintels and sills at least 4 in. and turn up edge on sides to form pan to direct moisture to exterior.
- B. Install flashings in accordance with manufacturer's instructions.
- C. Install nailers for flashing and other related work where shown to be built into masonry work.
- D. NOTE: Coordinate flashing with other related work, in particular with installation of sheathing as specified under SECTION 06 10 00 - ROUGH CARPENTRY, and metal roofing, flashing and siding as specified under SECTION 07 62 00. Note that flashing is to extend up outer face of sheathing minimum of 10 inches, then through horizontal joint in sheathing and up inner face of sheathing a minimum of 4 inches.

3.11 DRAINING/VENTING OF CAVITY WALLS:

- A. Place pea gravel into bottom of cavity, to a depth of 4 in., directly over previously installed membrane flashing.
- B. Drain base of cavity by placing weeps in bottom course of exterior wythe, at approximately 24 in. on centers unless otherwise indicated.
 - 1. Provide also at lintels, other locations where cavity is terminated.

3.12 CONTROL JOINTS:

- A. Build in control joints in masonry as shown and required herein. Generally, control joints shall be placed in all walls with an unbroken length over 30 ft., one (1) vertical joint in walls 40 to 60 ft. long, spaced as directed.

1. Location of control joints not indicated on Drawings must be approved in advance by Architect.
- B. Control joint fillers as specified shall be installed in joints with a set back dimension of 3/4 in. for reception of back-up rod and sealant.

3.13 CLEANING AND REPOINTING OF MASONRY WORK:

- A. Not later than at end of each day's work fill all holes in joints of masonry surfaces to be exposed (except weep holes) with mortar and suitably tooled. Dry brush masonry walls at the end of each day's work after final pointing, leave clean and free from mortar spots and droppings. Repair any cracks in masonry. Cut out and repoint defective joints.
- B. Leave new exposed to view masonry that is not to be painted or coated in clean, satisfactory condition, free of stains, efflorescence or other defacement. Before applying any cleaning agent to the entire wall, apply it to a sample wall area of approximately 20 sq. ft. in an approved location. Do not proceed further with cleaning work until the sample area has been approved, after which time use the same cleaning materials and method on the remaining wall area. If stiff brushes and water do not suffice, thoroughly clean wet surface of masonry with clear water and then scrub with a solution, i.e. Sure-Klean, or equal, followed immediately by a thorough rinsing with clear water. Thoroughly protect all sash and other corrodible elements during cleaning operations.
 1. For mortar stains, use Sure-Klean No. 600, 101 or Vanitrol; or approved equal; as recommended by manufacturer or particular brick type and as determined by prior test samples.
 2. Perform washing and cleaning only during warm weather, from April to November and only when the temperature is above 40 deg. F and rising.
 3. Remove efflorescence, if in evidence, in accordance with brick manufacturer's recommendations. Repeat cleaning as often as required to remove efflorescence to satisfaction of Architect.
 - a. NOTE: Include repeat cleaning during the one year Building Warranty period if necessary.

(Followed by Sketch of Exterior Wall Panel, as Appendix to this Section)

END OF SECTION