

SECTION 04810

UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
  - 1. Concrete masonry units.
  - 2. Face brick.
  - 3. Mortar and grout.
  - 4. Reinforcing steel.
  - 5. Masonry joint reinforcement.
  - 6. Ties and anchors.
  - 7. Embedded flashing.
  - 8. Miscellaneous masonry accessories.
  - 9. Cavity-wall insulation.
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Dovetail slots for masonry anchors, installed under Division 3 Section "Cast-in-Place Concrete."
- C. Products installed, but not furnished, under this Section include the following:
  - 1. Precast concrete trim, furnished under Division 3 Section "Plant-Precast Architectural Concrete."
  - 2. Steel lintels for unit masonry, furnished under Division 5 Section "Metal Fabrications."

1.2 SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
  - 1. Provide product Data indicating location of material manufacturer for regionally manufactured materials.
- B. Shop Drawings: Show fabrication and installation details for the following:
  - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
  - 2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Selection: For the following:
  - 1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
  - 2. Weep holes/vents in color to match mortar color.
  - 3. Accessories embedded in the masonry.

- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- E. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:
  - 1. Each type of masonry unit required.
    - a. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
- F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
  - 1. Each type of masonry unit required.
    - a. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
    - b. Equivalent thicknesses and materials used for rating of CMU for each rating indicated on the drawings.
  - 2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
  - 3. Each type and size of anchor, tie, and metal accessory.
- G. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements. Coordinate with General Contractor's procedures for enclosures and heating.

### 1.3 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Mockups: Before installing unit masonry, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Locate mockups in the locations indicated or, if not indicated, as directed by Architect.
  - 2. Build mockups for the following types of masonry in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness, including face and backup wythes and accessories. Include a sealant-filled joint at least 16 inches (400 mm) long in each mockup.
    - a. Typical exterior masonry-veneer wall complete with wood studs, sheathing, veneer ties, flashing, precast concrete sill, and weep holes.
  - 3. Clean exposed faces of mockups with masonry cleaner as indicated.

4. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  5. Protect accepted mockups from the elements with weather-resistant membrane.
  6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  7. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
  8. Demolish and remove mockups when directed.
  9. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conferences: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
1. At least 7 days prior to starting veneer masonry, conduct a meeting to review detailed requirements for mortar mixes and to determine procedures for satisfactory construction and curing operations. Review requirements of submittals, status of coordinating work, and availability of materials. Review requirements tenting and heating. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Require representatives of each entity directly concerned with masonry construction to attend, including the following:
    - a. Contractor's superintendent.
    - b. Masonry foreman.
    - c. Architect.
- F. UL Listing:
1. Provide concrete masonry units that has been tested and listed to UL Standards.
- 1.4 DELIVERY, STORAGE, AND HANDLING
- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
    1. Protect Type I concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.
  - B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
  - C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
  - D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on

elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

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

## 1.5 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, 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 inches (600 mm) down both sides and hold cover securely in place.
  - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. 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 from 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 onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates or setting beds. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with the following requirements:
  - 1. Cold-Weather Construction: When the anticipated daytime low temperature is within the limits indicated, use the following procedures:
    - a. 40 to 32°F (4 to 0°C): Heat mixing water or sand to produce mortar temperatures between 40 and 120°F (4 and 49°C).
    - b. 32 to 25°F (0 to -4°C): Heat mixing water and sand to produce mortar temperatures between 40 and 120°F (4 and 49°C). Heat grout materials to produce grout temperatures between 40 and 120°F (4 and 49°C). Maintain mortar and grout above freezing until used in masonry. Use heat on both sides of walls under construction. Coordinate with General Contractor for heating both sides of walls under construction.
    - c. 25 to 20°F (-4 to -7°C): Heat mixing water and sand to produce mortar temperatures between 40 and 120°F (4 and 49°C). Heat grout materials to produce grout temperatures between 40 and 120°F (4 and 49°C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40°F (4°C) if grouting. Coordinate with General Contractor to provide enclosures and

- heat both sides of walls under construction to maintain temperatures above 32°F (0°C) within the enclosures.
- d. 20°F (-7°C) and Below: Heat mixing water and sand to produce mortar temperatures between 40 and 120°F (4 and 49°C). Heat grout materials to produce grout temperatures between 40 and 120°F (4 and 49°C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40°F (4°C). Coordinate with General Contractor to provide enclosures and heat both sides of walls under construction to maintain temperatures above 32°F (0°C) within the enclosures.
  2. Cold-Weather Protection: When the anticipated daytime low temperature is within the limits indicated, coordinate with the General Contractor to provide the following protection. This is in addition to construction procedures specified above:
    - a. 40 to 32°F (4 to 0°C): Cover masonry with insulating blankets for 48 hours after construction.
    - b. 32°F (0°C) and Below: Provide enclosure and heat to maintain temperatures above 32°F (0°C) within the enclosure for 72 hours after construction.
  3. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40°F (4°C) and above and will remain so until masonry has dried out, but not less than 7 days after completion of cleaning.
- E. Hot-Weather Requirements: Coordinate with the General Contractor to 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.
1. When ambient temperature exceeds 100 deg F (38 deg C), or 90 deg F (32 deg C) with a wind velocity greater than 8 mph (13 km/h), do not spread mortar beds more than 48 inches (1200 mm) ahead of masonry. Set masonry units within one minute of spreading mortar.

## PART 2 - PRODUCTS

### 2.1 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and as follows:
1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
  2. Provide bullnose units for outside corners, unless otherwise indicated.
  3. Provide square-edged units for outside corners, unless indicated as bullnose.
  4. Provide masonry units for fire-rated construction that conform to National Concrete Masonry Association (NCMA) TEK 7-1, fire resistance (1995) including materials and equivalent thicknesses as established therein.
- B. Concrete Masonry Units: ASTM C 90 and as follows:
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi (13.1 MPa).
  2. Weight Classification: Normal weight.
  3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
  4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
    - a. Where units are to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

- b. Where units are to be left exposed, provide color and texture matching the range represented by Architect's sample.
5. Provide product that is manufactured within 300 miles of project site.

## 2.2 BRICK

- A. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
  1. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
  2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick: ASTM C 216, Grade SW, Type FBA (molded), and as follows:
  1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 8000 psi (55.2 MPa).
  2. Surface Coloring: Brick with surface coloring, other than flashed or sand-finished brick, shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet (3 m).
  3. Size: Manufactured to the following actual dimensions:
    - a. Modular: 3-1/2 to 3-5/8 inches (89 to 92 mm) wide by 2-1/4 inches (57 mm) high by 7-1/2 to 7-5/8 inches (190 to 194 mm) long.
  4. Application: Use where brick is exposed, unless otherwise indicated.
  5. Products: Subject to compliance with requirements, provide one of the following:
    - a. Old Port Blend by Morin Brick Company.
  6. Provide product that is manufactured within 300 miles of project site.

## 2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
  1. Blue Circle Cement, Inc.: Eaglebond High Strength Type "S".
  2. Ciment Quebec, Inc.: Portland and Lime / Type S.
  3. Dragon Cement and Concrete: Type S Masonry Cement.
- D. Aggregate for Mortar: ASTM C 144.
- E. Water: Potable.

## 2.4 ADJUSTABLE MASONRY-VENEER ANCHORS

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
  - 1. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).
- B. Masonry-Veneer Anchors: Screw-attached units consisting of a wire tie section and a metal anchor section. Formed steel strap, 14 gage, ASTM 666, Type 304 stainless steel finish. Provide Textro seal tape under anchor.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Duro-wall; D/A 210 with D/A 701.
    - b. Hohmann & Barnard; DW-10 with 3/16 inch Vee Tie.
    - c. Wire-Bond; Type III, 1004, Screw-on Strap with 3/16 inch triangular tie.
- C. Stainless-Steel Drill Screws for Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 (4.8-mm) diameter by length required to penetrate wood stud not less than 1-1/2 inch.

## 2.5 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Refer to Division 7 Section "Sheet Metal Flashing and Trim".
- B. Copper Fabric Flashing: For base flashing in veneer masonry, and for head flashing at doors and windows, use the following, unless otherwise indicated:
  - 1. Copper-Laminated Flashing: Manufacturer's standard laminated flashing consisting of 5-oz./sq. ft. (1.5-kg/sq. m) sheet copper bonded with asphalt between 2 layers of glass-fiber cloth.
    - a. Asphalt-Free copper-laminated flashing products will also be acceptable. Similar to Multi-Flash 500 Series by York.
  - 2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Copper Fabric Flashing; Advanced Building Products, Inc.
    - b. Copper Fabric; AFCO Products, Inc.
    - c. H & B C-Fab Flashing; Hohmann & Barnard, Inc.
    - d. Copper Fabric Flashing; Polytite Manufacturing Corp.
    - e. Copper Fabric Flashing; Sandell Manufacturing Co., Inc.
    - f. York Copper Fabric Flashing; York Manufacturing, Inc.
- C. Flexible Flashing: Manufacturer's standard rubberized-asphalt composite flashing product consisting of a pliable and highly adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of 0.040 inch (1.0 mm).
  - 1. Available Products:
    - a. Dur-O-Barrier; Dur-O-Wal, Inc.

- b. Perm-A-Barrier Wall Flashing; W. R. Grace & Co., Construction Products Division.
- c. Poly-Barrier Self-Adhering Wall Flashing; Polytite Manufacturing Corp.

## 2.6 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.
  - 1. Holmann & Barnard: #NS – Closed Cell Neoprene.
  - 2. Wire Bond: 3000 Horizontal.
- B. Weep Hole/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, designed to fill head joint with outside face held back 1/8 inch (3 mm) from exterior face of masonry, in color selected from manufacturer's standard.
  - 1. Available Products: Subject to compliance with requirements, cavity drainage materials that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cell Vent; Dur-O-Wal, Inc.
    - b. #QV-Quadro-Vent; Hohmann & Barnard.
- C. Cavity Drainage Material: 2-inch- (50-mm-) thick, free-draining mesh; made from polyethylene strands and shaped to avoid being clogged by mortar droppings.
  - 1. Available Products: Subject to compliance with requirements, cavity drainage materials that may be incorporated into the Work include, but are not limited to, the following:
    - a. Mortar Net by Mortar Net USA, LTD.; Model MN10-2.
    - b. Mortar Break by Advanced Building Products; Mortar Break II.
- D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch (3.6-mm) steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
  - 1. Available Products: Subject to compliance with requirements, positioners that may be incorporated into the Work include, but are not limited to, the following:
    - a. D/A 811; Dur-O-Wal, Inc.
    - b. D/A 816; Dur-O-Wal, Inc.
    - c. No. 376 Rebar Positioner; Heckman Building Products, Inc.
    - d. #RB Rebar Positioner; Hohmann & Barnard, Inc.
    - e. #RB-Twin Rebar Positioner; Hohmann & Barnard, Inc.
    - f. Double O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.
    - g. O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.
- E. Grout Screen: Monofilament screen fabricated from high-strength, non-corrosive, polypropylene polymers.
  - 1. Available Products: Subject to compliance with requirements, grout screen materials that may be incorporated into the Work include, but are not limited to, the following:
    - a. AA3260; AA Wire Products.
    - b. Dur-O-Stop; Dur-O-Wal, Inc.
    - c. MGS; Hohmann and Barnard.



- F. Felt Paper: Asphalt-saturated organic felt, ASTM D226.
  - 1. Type 1: No. 30 asphalt felt, unperforated.

## 2.7 CAVITY-WALL INSULATION

- A. Refer to Division 7 Section "Building Insulation" for cavity-wall insulation material.

## 2.8 MASONRY CLEANERS

- A. Proprietary Acidic 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.
  - 1. Available Products: Subject to compliance with requirements, products that may be used to clean unit masonry surfaces include, but are not limited to, the following:
    - a. 202V Vana-Stop; Diedrich Technologies, Inc.
    - b. Sure Klean Vana Trol; ProSoCo, Inc.

## 2.9 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification.
  - 1. For concrete masonry units, Type S.
  - 2. For brick veneer, Type N
- D. Grout for Unit Masonry: Comply with ASTM C 476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  - 2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
  4. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

### 3.2 PREPARATION

- A. Felt Paper Application: Cover sheathing with felt as follows:
1. Cut back felt paper 1/2 inch (13 mm) on each side of break in supporting members at expansion- or control-joint locations.
  2. Apply felt paper horizontally with 2-inch (50-mm) overlap and 6-inch (150-mm) end lap; fasten to sheathing with corrosion-resistant staples.
  3. Apply felt paper to comply with manufacturer's written installation instructions.
  4. Apply felt paper to cover vertical flashing with 4-inch (100-mm) overlap.
- B. Coordinate with General Contractor for enclosures and heating requirements.

### 3.3 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.
- B. Build recesses to accommodate items specified in this Section and in other Sections of the Specifications.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
- D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
1. Mix units from several pallets or cubes as they are placed.

### 3.4 CONSTRUCTION TOLERANCES

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch (12 mm) maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), nor 1/2 inch (12 mm) maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch (12 mm) maximum.
- E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm). Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
- F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).

### 3.5 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
  - 1. One-half running bond with vertical joint in each course centered on units in courses above and below.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches (50 mm). Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.
- G. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

- H. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
  - 1. At non-fire-rated partitions, install compressible filler in joint between top of partition and underside of structure above.
  - 2. Install partition top anchors, 4 foot on center, at tops of masonry partitions.

### 3.6 MORTAR BEDDING AND JOINTING

- A. Lay hollow masonry units as follows:
  - 1. With full mortar coverage on horizontal and vertical face shells.
  - 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
  - 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
- B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
  - 1. At cavity walls, bevel beds away from cavity, to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against the cavity face of the brick.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.

### 3.7 CAVITIES

- A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.
  - 1. Install the specified cavity drainage material in thickness to fill the cavity above flashings as work progresses.
- B. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. 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.
  - 1. Fill cracks and open gaps greater than 1/4 inch (6 mm) in insulation with foam insulation specified in Division 7 section "Building Insulation".

### 3.8 MASONRY JOINT REINFORCEMENT

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
  - 1. Space reinforcement not more than 16 inches (406 mm) o.c. unless noted otherwise.

2. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings.
  - a. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### 3.9 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
  1. Fasten each anchor section through sheathing to wall framing with two metal fasteners of type indicated.
  2. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  3. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 16 inches (406 mm) o.c. horizontally with not less than 1 anchor for each 1.77 sq. ft. (0.16 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

### 3.10 CONTROL AND EXPANSION JOINTS

- A. Install control joints in veneer masonry as indicated on the drawings or, if not indicated, at a maximum spacing of 24 feet on center. Locate joints at door and window jambs inasmuch as possible.
  1. Provide joints at both sides of windows and doors 6 foot wide or wider.
- B. Form expansion joints in brick as follows:
  1. Build in joint fillers where indicated.
  2. Form open joint of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants." Keep joint free and clear of mortar.

### 3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
  1. Provide built-in-place masonry lintels. Use specially formed bond beam units with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured.
  2. Extend horizontal reinforcement beyond the opening a minimum of 40 bar diameters, but not less than 24 inches.

3. Where steel lintels are utilized in concrete masonry openings, construct a bond beam above the steel with 2 #4 bars. Extend 24 inches beyond the opening.
- C. Provide minimum bearing of 8 inches (200 mm) at each jamb, unless otherwise indicated.

### 3.12 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
- C. Install masonry flashing as follows:
1. At masonry-veneer walls, extend metal flashing from exterior face of veneer, through veneer, up face of sheathing at least 8 inches (200 mm), install copper fabric flashing over vertical leg of metal flashing and behind air-infiltration barrier or felt paper.
  2. At lintels, extend flashing a minimum of 4 inches (100 mm) into masonry at each end. At heads and sills, extend flashing 4 inches (100 mm) at ends and turn flashing up not less than 2 inches (50 mm) to form a pan.
- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
1. Use plastic weep hole/vents to form weep holes.
  2. Space weep holes 24 inches (600 mm) o.c. for brick veneers.
  3. Place cavity drainage material immediately above flashing in cavities.
- E. Install vents in vertical head joints at the top of each continuous cavity. Use plastic weep hole/vents to form vents.
1. Space weep holes 32 inches (900 mm) o.c.
- F. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

### 3.13 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

- B. Placing Reinforcement: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.
1. Layout vertical reinforcement with specified jamb reinforcement 4" from each corner, control joint, and opening jamb. Space bars between at a uniform spacing that does not exceed the spacing specified, rounded to the nearest 8". Maximum spacing shall not exceed 48" in any location.
  2. Minimum splice length for deformed bar reinforcement shall be 48 bar diameters. Secure lap splices by tying with wire.
  3. Secure reinforcement in place before placing grout, For vertical reinforcement, use one of the following methods:
    - a. Secure bar at the bottom of each grout lift by tying to dowels. Build masonry around reinforcement. Install rebar positioners at the top of each bar and at a maximum spacing of 192 bar diameters.
    - b. Install rebar positioner at the bottom course of the grout lift, located within 4 inches of the dowel to be spliced. Lay up masonry units. Set vertical bar in the rebar positioner. Install additional rebar positioners at the top of the bar, and at a maximum spacing of 192 bar diameters.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
1. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  2. Definitions:
    - a. Grout Lift - Grout placed in one continuous operation. The maximum time span for the grout placement in one lift is 1-1/2 hours measured from the time water is added to the grout mix. The minimum time span between successive grout lifts is one hour.
    - b. Grout Pour - The height of masonry to be grouted prior to the erection of additional masonry.
  3. Provide cleanout holes at least 3 inches (76 mm) in least dimension for grout pours over 60 inches (1524 mm) in height.
    - a. Provide cleanout holes at each vertical reinforcing bar.
  4. Where grouting of cells does not extend the full height of the wall, install specified grout stop at the bottom of lift.
  5. Consolidate grout with a mechanical vibrator.
    - a. Use a low velocity vibrator with a 3/4 inch head.
    - b. Vibrate each cell in concrete masonry units twice. Insert vibrator to bottom of lift and activate for 1 to 2 seconds.
    - c. Perform initial consolidation at each cell immediately after grout placement.
    - d. Perform reconsolidation in each cell by reinserting vibrator when grout is still plastic.

### 3.14 FIRESTOPPING

- A. Firestopping: Refer to Division 7 Section "Through-Penetration Firestop Systems" for installation requirements. Provide firestopping, as part of the work of this section, at the top of fire-rated masonry walls between top of partition and underside of structure above, both for new and existing conditions. Where gypsum wallboard is installed at the top of rated existing masonry walls, the firestopping will be provided by others.
1. Bearing walls, not subject to vertical movement, may be grouted solid between top of wall and underside of structure, in lieu of firestopping.

3.15 INSTALLATION OF PRECAST CONCRETE

- A. Install precast architectural concrete. Provide temporary supports and bracing as required to maintain position, stability, and alignment.
  - 1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
- B. Anchor precast architectural concrete units in position with mortar, or as otherwise indicated. Remove temporary shims, wedges, and spacers as soon as possible after anchoring is completed.

3.16 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- 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. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
  - 5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces. Where efflorescence occurs, clean as recommended in NCMA TEK 8-3A.
  - 6. Clean brick masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
  - 7. Clean brick masonry by the bucket-and-brush hand-cleaning method described in BIA Technical Notes No. 20 Revised and the cleaning compound manufacturer's written instructions.

3.17 MASONRY WASTE DISPOSAL

- A. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.



3.18 WASTE MANAGEMENT

- A. Separate and recycle waste materials in accordance with the Waste management Plan and to the maximum extent economically feasible.
- B. Fold up metal banding; flatten and place in designated area for recycling.
- C. Collect wood packing shims and pallets; place in designated area.
- D. Place unused mixed mortar in designated locations where lower strength mortar meets the requirements for bulk fill; for example, use as retaining wall footing ballast or underground utility pipe kickers.
- E. Separate masonry waste and place in designated area for use as structural fill or in landscaping of Project.

END OF SECTION