

## SECTION 042000 - UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The provisions of the Contract and of the Contract Documents apply to this Section.

#### 1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths of units at twenty-eight (28) days.
  - 1. Determine net-area compressive strength of masonry ( $f_m$ ) from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to ACI 530.1/ASCE 6/TMS 602.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and specified manufactured product.
  - 1. Submit product data for masonry cleaner products recommended by unit masonry manufacturer for proposed unit masonry.
  - 2. Submit product data for SPF cavity-wall insulation and XEPS cavity-wall board insulation and accessory butyl joint tape.
- B. LEED Submittals: Refer to Division 01 Section "Sustainable Design (LEED) Requirements".
- C. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. 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.
  - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- D. Samples: Face brick and mortar color will be verified in mock-up panel.
- E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
  - 1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Architect and approved in writing.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

- B. 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.
    - b. Include test results, measurements, and calculations establishing net-area compressive strength of masonry units.
  2. Mortar complying with property requirements of ASTM C 270.
  3. Grout mixes complying with compressive strength requirements of ASTM C 476. Include description of type and proportions of grout ingredients.
- C. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
1. Each type of masonry unit required.
    - a. Include material test reports substantiating compliance with requirements.
    - b. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include material test report for efflorescence according to ASTM C 67.
    - d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
    - e. For concrete masonry units, include data verifying compliance with ASTM C 33 for normal weight aggregates, ASTM C 331 for lightweight aggregates, and ASTM C 618 for fly ash.
    - f. For concrete masonry units using carbon dioxide sequestration technology, provide manufacturer's certificate verifying sequestered carbon dioxide, including quantity, location and supplier of chemically sequestered CO<sub>2</sub>.
    - g. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
    - h. Include test data, measurements, and calculations establishing net-area compressive strength of masonry units.
  2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
  3. Each combination of masonry unit type and mortar type. Include statement of net-area compressive strength of masonry units, mortar type, and net-area compressive strength of masonry determined according to ACI 530.1/ASCE 6/TMS 602.
  4. Each type and size of joint reinforcement.
  5. Each type and size of anchor, tie, and metal accessory.
- D. Mix Designs: Include test reports for each type mortar and grout. Include description of type and proportions of ingredients.
1. Test reports, per ASTM C 780, confirming mortar mixes meet property specification.
  2. Test reports, per ASTM C 1019, confirming grout mixes meet compressive strength requirement.
  3. Include compliance with appropriate IBC; Chapter 21 requirements and this section.
- E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units,

mortar type, and resulting net-area compressive strength of masonry determined according to ACI 530.1/ASCE 6/TMS 602.

- F. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

#### 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- 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, from single source from 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 single manufacturer for each cementitious component and from single source or producer for each aggregate.
- D. Fire-Resistance Ratings: Provide indicated fire-resistance-rated construction. Provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by UL assemblies, or by another means acceptable to authorities having jurisdiction. Provide materials with classification markings as required by the assembly design.
- E. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- F. Masonry Mockup Panels: Before installing unit masonry, build mockup panels to verify specified masonry products and demonstrate aesthetic effects and qualities of materials and execution. Build mock-up to comply with requirements specified in Division 01 Section "Quality Requirements."
  - 1. Protect accepted mockup panel from the elements with weather-resistant membrane.
  - 2. Approval of mockup panel 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 mockup panel is also for other material and construction qualities specifically approved by Architect in writing.
    - b. Approval of mockup panel does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.

#### 1.7 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.
- 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 use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

#### 1.8 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 of walls 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.
  - 3. Waterproofing sheet covering may be omitted at solid (fully grouted) CMU walls. (Walls with exposed open cells and cavity walls must be covered.)
- B. Do not apply uniform floor or roof loads for at least twelve (12) hours and concentrated loads for at least three (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 spreading coverings 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. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 degrees F and above and will remain so until masonry has dried, but not less than seven (7) days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. When ambient temperature exceeds 100 degrees F, or 90 degrees F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one (1) minute of spreading mortar.

## PART 2 - PRODUCTS

### 2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

### 2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows:
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Provide bullnose units for exposed outside corners unless otherwise indicated. Provide square edge outside corners for all concealed conditions.
  - 3. Provide solid bullnose cap units at top of exposed free-standing walls as indicated on Drawings.
- B. Concrete Masonry Units: ASTM C 90.
  - 1. Density Classification:
    - a. Lightweight, unless otherwise indicated.
  - 2. Aggregates:
    - a. Lightweight Aggregates: Lightweight aggregate used shall strictly comply with ASTM C 331, ASTM C 151, and ASTM C 641. Drying shrinkage of aggregate shall not exceed 0.10 percent (%) at 100 days. The dry net unit weight shall not be more than 105 lbs. per cubic foot unless otherwise indicated. Bottom ash, waste concrete, scoria, or aglite shall not be permitted.
  - 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
  - 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
  - 5. Carbonation of Concrete: At Contractor's option, CMU units may be provided that have undergone carbonation treatment with gaseous carbon dioxide (CO<sub>2</sub>) during the formation of units, such that CO<sub>2</sub> is chemically sequestered into concrete as solid calcium carbonate (CaCO<sub>3</sub>). Basis-of-Design is CarbonCure Technology (Branded either as CarbonCure or CO<sub>2</sub>NVERT).
- C. Concrete Building Brick: ASTM C 55.
  - 1. Density Classification: Lightweight, unless noted otherwise.
  - 2. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.
- D. Fire-Resistant Rated CMU Units: Where indicated in fire-rated assemblies, provide units bearing appropriate classification designation.

### 2.3 MASONRY LINTELS

- A. General: Provide one of the following:

- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured. Provide lintels over all openings of more than an 8-inch span.

## 2.4 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
  - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
  - 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
  - 4. 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 FBX. Minimum compressive strength shall be 4400 psi as determined by ASTM C67.
  - 1. Efflorescence: Provide brick tested according to ASTM C 67 and rated “not effloresced.”
  - 2. Size: Utility, size 3-5/8 inches wide by 3-5/8 inches high by 11-5/8 inches long.
  - 3. Application: Use where brick is exposed, unless otherwise indicated.
  - 4. Color and Texture: Provide the following or substitute brick affording a suitable match to existing face brick colors, and approved by Owner and Architect prior to bidding, and identified by addendum.
    - a. Face Brick Color 1 (Red): General Shale “Red.”
    - b. Face Brick Color 2 (Gray): **Interstate Brick “Tumbleweed.”**
    - c. **Face Brick C” and 2/3 Interstate “Tumbleweed”. (ADDENDUM 3)**
- C. Building (Common) Brick: ASTM C 62, Grade MW or SW.
  - 1. Size: Match size of face brick.
  - 2. Application: At concealed locations. Face brick complying with requirements for grade, compressive strength, and size indicated for building brick may be substituted for building brick.

## 2.5 CAST STONE / ARCHITECTURAL PRECAST CONCRETE

- A. **General: Cast stone masonry veneer units duplicating the appearance of modular stone masonry, meeting the ASTM C 1364 standard specification for Cast Stone.**
- B. **Color: Charlotte Tan**
  - 1. **Or as selected by Architect from full range of manufacturer's available colors.**
- C. **Sizes and Shapes: Refer to drawings for custom profiles and shapes.**
- D. **Products and Textures:**
  - 1. **RockCast Architectural Precast**
    - a. **Color: Charlotte Tan**
    - b. **Smooth Texture with Beveled Edges**

**c. Available Products:**

- 1) **Reading Rock, Inc.; RockCast Architectural PreCast.**
- 2) **Arriscraft International; ARRIS.cast.**
- 3) **Russell Cast Stone; Cast Stone.**
- 4) **Stafford Stone Works; Cast Stone.**

2.6 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C 91.
- B. Colored Cement Product: Packaged blend made from masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
  1. **Basis of Design: Workrite Colored Masonry Cement in color WR2247. (ADDENDUM 3)**
  2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Argos USA; Magnolia Masonry Cement.
    - b. Holcim (US) Inc; Rainbow Mortamix Custom Color Masonry Cement.
    - c. Lehigh Hanson; flamingo Colored Cement.
    - d. Roanoke Cement; a division of Titan America; Colored Masonry Cement.
    - e. York Building Products, a Stewart Company; Workrite Colored Masonry Cement.
  3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
  4. Pigments shall not exceed 10 percent of portland cement by weight.
  5. Pigments shall not exceed 5 percent of masonry cement by weight.
- C. Fire-Resistance Ratings: Provide custom mortar mixture indicated in fire-resistance-rated wall/partition assembly designs.
- D. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4-inch-thick, use washed aggregate graded with 100 percent passing the No. 16 sieve, from the same source.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.
- F. Aggregate for Grout: ASTM C 404.
- G. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- H. Water: Potable.

2.7 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A 951.
  1. Interior Walls: Hot-dip galvanized, carbon steel.
  2. Exterior Walls: Hot-dip galvanized, carbon steel.
  3. Wire Size for Side Rods, Cross Rods, and Veneer Ties: 0.148-inch diameter.
  4. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.

5. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.
- D. Masonry Joint Reinforcement for Multi-wythe Masonry:
  1. Composite Walls: Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches in width, plus 1 side rod at each wythe of masonry 4 inches or less in width.
  2. Cavity Walls: Adjustable (two-piece) type, ladder design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm). Size ties to extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face.
  3. Cavity Wall Alternate: Instead of joint reinforcement with integral adjustable veneer anchors, Contractor may provide ladder joint reinforcement and individual screw-attached adjustable masonry-veneer anchors. (Refer to "Ties and Anchors, General" article of this specification section.)

## 2.8 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with subparagraphs below, unless otherwise indicated.
  1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 641, Class 1 coating.
  2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
  3. Galvanized Steel Sheet: ASTM A 653, Commercial Steel, G60 zinc coating.
  4. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153.
  5. Steel Plates, Shapes, and Bars: ASTM A 36.
  6. Stainless Steel bars: ASTM A 276 or ASTM a 666, Type 304.
- B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.
- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
  1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
  2. Where wythes do not align, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
  3. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
  2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch- diameter, hot-dip galvanized steel wire.



- E. Partition Top anchors: 0.097-inch- thick metal plate with 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins, unless otherwise indicated.
  - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153.
- G. Intersecting Wall Ties: 1/2-inch by 1/2-inch mesh, 16 gage hot dip galvanized wire mesh units; 12-inch or 16-inch length by width to suit masonry wall.

## 2.9 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 metal studs, and as follows:
  - 1. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
  - 2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section designed to be installed prior to cavity insulation or with no cavity insulation as indicated.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Heckmann Building Products Inc.; 213 + 282.
      - 2) Hohmann & Barnard, Inc.; HB-200 Series or BL-407 System.
      - 3) Wire-Bond; RJ-711 or 2407 System.
      - 4) Construction Tie Products; CTP-16.
    - b. Anchor Section, Bent Plate Type: Rib-stiffened, sheet metal plate with screw hole(s) on vertical leg for attachment to backup; with projecting leg having slotted hole(s) for inserting companion triangular wire tie and allowing for vertical adjustment. Size projecting tabs to suit indicated insulation thickness, where insulation is shown.
    - c. Fabricate sheet metal anchor sections and other sheet metal parts from engineered thickness steel sheet, galvanized after fabrication.
    - d. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
  - 3. Connector Section for Concrete: Anchors with dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.097-inch- thick, steel sheet, galvanized after fabrication. Space dovetail anchors at 16 inches o.c. unless otherwise indicated.
    - a. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.1875-inch- diameter, hot-dip galvanized steel wire.

## 2.10 ADJUSTABLE ANCHORS FOR CONNECTING TO STEEL FRAME

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
- B. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.1875-inch- diameter, hot-dip galvanized steel wire.

## 2.11 RIGID ANCHORS

- A. General: Fabricate from steel bars as follows:
  - 1. 1-1/2 inches wide by 1/4-inch-thick by 24 inches long, with ends turned up 2 inches or with cross pins, unless indicated otherwise.
  - 2. Finish: Hot-dip galvanized to comply with ASTM A 153.

## 2.12 MISCELLANEOUS ANCHORS

- A. Dovetail Slots in Concrete: Specified in Division 03 Section "Cast-in-Place Concrete".
- B. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- C. Postinstalled Anchors: Provide torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six (6) times the load imposed when installed in solid or grouted unit masonry and equal to four (4) times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
  - 1. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

## 2.13 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with Division 07 Section "Flashing, Sheet Metal, and Roofing Accessories" and as follows:
  - 1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.40 mm) thick.
  - 2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. (4.9-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick.
  - 3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  - 4. Fabricate through-wall flashing with snap-lock receiver on exterior face where indicated to receive counterflashing.
  - 5. Fabricate through-wall metal flashing with drip edge at exterior face of wall. Fabricate by extending flashing 1/4 inch out from wall, with outer edge bent down 30 degrees and hemmed. Fabricate separate sheet copper drip for use with flexible flashing, extended at least 3 inches into wall, also with outer edge bent down 30 degrees and hemmed.
  - 6. Metal Drip Edge: Fabricate from 16 oz. copper. Extend at least 3 inches into wall and 1/4 inch out from wall, with outer edge bent down 30 degrees and hemmed.
- B. Flexible Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:
  - 1. Copper-Laminated Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) copper sheet bonded between 2 layers of glass-fiber cloth. Provide non-asphalt lamination product. Use only where flashing is fully concealed in masonry and in conjunction with copper drip edge.
    - a. Use polyether based moisture-curing sealer products recommended by flashing manufacturer. Traditional mastic is not acceptable.
    - b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

- 1) Provide manufacturer's recommended one inch wide termination bar, fabricated of 0.125-inch PVC, 0.090-inch extruded aluminum or 0.075-inch stainless steel.
  - c. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) Advanced Building Products Inc.; "Copper Sealtite 2000."
    - 2) Hohmann & Barnard, Inc.; "Copper-Fabric NA."
    - 3) STS Coatings; "Wall Guardian Copper TWF."
    - 4) York Manufacturing, Inc.; "Multi-Flash 500."
  2. Stainless Steel-Laminated Flashing: Minimum 0.002 inch (0.05 mm). Type 304 stainless steel core with polymer fabric laminated to one stainless steel face with non-asphalt adhesive. Use only where flashing is fully concealed in masonry and in conjunction with copper drip edge.
    - a. Use polyether based moisture-curing sealer products recommended by flashing manufacturer. Traditional mastic is not acceptable.
    - b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
      - 1) Provide manufacturer's recommended one inch wide termination bar, fabricated of 0.125-inch PVC or 0.075-inch stainless steel.
    - c. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Hohmann & Barnard, Inc.; "Mighty-Flash Stainless Steel Fabric Flashing."
      - 2) Prosoco; "R-Guard SS ThruWall."
      - 3) STS Coatings; "Wall Guardian Stainless Steel TWF."
      - 4) York Manufacturing, Inc.; "Multi-Flash SS."
  - C. Solder and Sealants for Sheet Metal Flashings: As specified in Division 07 Section "Sheet Metal Flashing and Trim."
  - D. Adhesives, Primers, and Seam Tapes for Flashings: Provide polyether-based, 100% solids, moisture-curing elastomeric products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates, and that are compatible with asphalt-free flashing materials and air barrier materials. Traditional mastic is not acceptable.
    1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - a. York; "GreatSeal LT-100 Liquid Tape."
      - b. BASF; "MasterSeal NP 150."
      - c. STS Coatings; "GreatSeal."
- 2.14 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 or urethane.
  - B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type II (No. 30 asphalt felt).
- D. Weep/Vent Products: Use the following, unless otherwise indicated:
  - 1. Wicking Material: Absorbent rope, made from cotton or UV-resistant synthetic fiber, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity between wythes. Use only for weeps at lintels above openings and at sills below openings.
  - 2. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standards.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Advanced Building Products Inc.; Mortar Break weep mesh.
      - 2) Archovations, Inc.; CavClear Weep Vent.
      - 3) Blok-Lok Limited; Cell-Vent.
      - 4) Heckmann Building Products Inc.; No. 85 Cell Vent.
      - 5) Hohmann & Barnard, Inc.; Quadro-Vent.
      - 6) Wire-Bond; Cell Vent.
- E. Cavity Drainage Material (Mortar Dropping Collection Device): Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  - 1. Provide a configuration of strips, 2-inch thickness for use with cavity-wall insulation and 10 inches tall, with dovetail shaped notches not less than 6 inches deep designed to prevent mesh from being clogged with mortar droppings.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Advanced Building Products, Inc; "Mortar Break DT."
      - 2) Heckmann Building Products; "WallDefender."
      - 3) Hohmann & Barnard, Inc.; "Mortar Trap."
      - 4) Mortar Net Solutions; "MortarNet."
      - 5) Wire-Bond; "Cavity Net DT (3611D)."
- F. 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 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
    - b. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
    - c. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.
- G. Protection Board: ASTM D 6506, semi-rigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
  - 1. Thickness: 1/8-inch, nominal.
  - 2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for type of protection board.

## 2.15 CAVITY-WALL INSULATION

- A. Cavity-wall insulation (SPF) is specified as primary air barrier material in Division 07 Section "Sprayed Polyurethane Foam Air Barrier."
- B. Extruded-Polystyrene Board Insulation ("XEPS"): ASTM C 578, Type IV, 25 psi, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dow Chemical Company.
    - b. Kingspan Insulation.
    - c. Owens Corning.
- C. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
  - 1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.16 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. APOC, Inc; a division of Gardner Industries.
  - 2. BASF Corporation; Construction Systems.
  - 3. Brewer Company (The).
  - 4. ChemMasters, Inc.
  - 5. Euclid Chemical Company (The); an RPM company.
  - 6. Henry Company.
  - 7. Karnak Corporation.
  - 8. Mar-flex Waterproofing & Building Products.
  - 9. W. R. Meadows, Inc.
- B. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
- C. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.
- D. Miscellaneous Dampproofing Materials:
  - 1. Cut-Back Asphalt Primer: ASTM D 41.
  - 2. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.
  - 3. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
  - 4. Patching Compound: Epoxy or latex-modified repair mortar, or manufacturer's fibered mastic of type recommended by dampproofing manufacturer.

## 2.17 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 Manufacturers: Subject to compliance with requirements, provide products of one of the following:
  - a. Diedrich Technologies, Inc.
  - b. EaCo Chem, Inc.
  - c. Prosoco, Inc.

## 2.18 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.
  2. Do not retemper mortar after it has begun to set.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in 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. Provide the following types of mortar for applications stated unless another type is indicated.
  1. For masonry below grade, in contact with earth, and where indicated, use Type S.
  2. For non-security reinforced masonry and where indicated, use Type S.
  3. For concrete masonry unit walls and partitions designated as “secure perimeter,” “interior security wall,” or partitions tagged on Drawings with “S” (secure), use Type M, 2500 psi mortar.
  4. For exterior face brick veneer wythe (non-structural, applied at cavity-wall brick-and-block construction), use Type N.
  5. For interior non-load-bearing partitions, use either Type S or Type N.
  6. Comply with requirements for mortar for fire-resistance rated assemblies.
- D. Pigmented Mortar: Use colored cement product for mortar colors specified.
  1. Application: Use pigmented mortar for exposed mortar joints with the following units:
    - a. Face brick.
- E. Grout for Unit Masonry: Comply with ASTM C 476, Chapter 21; of the IBC, and as indicated. The term “grout” shall mean: “to completely fill-in.”

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  1. Verify that foundations are within tolerances specified.
  2. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated. Protect facing materials from staining. Keep top course of unfinished and finished walls, including brick ledges, covered with waterproof sheeting or other waterproof materials when work is not in progress
- B. Build chases and recesses full height, to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying 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.
- F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- G. Fire-Rated Walls/Partitions: Construct each fire-rated wall/partition in accordance with the indicated requirements. Wall/partition materials shall comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119.
- H. Protection Board: Provide protection board at face of masonry that will be in contact with backfill soils. Trim protection board just below finish grade. Install prior to Division 31 backfill in accordance with manufacturer printed instructions.
- I. When erecting masonry partitions, chases, and pilasters adjacent to steel columns, keep spaces between columns and masonry free of mortar droppings.
- J. Sleeves: Install sleeves in walls to allow for the passage of piping and conduits.

### 3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
  - 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4-inch in a story height or 1/2-inch total.
- B. Lines and Levels:
  - 1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 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: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs. Provide a minimum of 2 brick courses (8") below the exterior finished grade level.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.



- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items. Comply with requirements of fire-stopping systems.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated. Mix mortar (or grout) to a 4-inch maximum slump consistency and hand trowel into place in accordance with Steel Door Institute (SDI-100).
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Provide solid concrete masonry units at changes in wall thickness.
- J. Grout all hollow masonry and cavities solid below grade except where protected by waterproofing.
- K. Build non-load-bearing interior partitions and walls full height of story to underside of solid floor or roof deck above. Anchor partitions and walls as indicated.
  - 1. Fill-in joints of non-load-bearing partitions and walls against structure with neoprene fillers or mineral wool insulation. Where required, fill joint with mortar only after dead-load deflection of structure above approaches final position.
  - 2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with fire-stopping requirements.
  - 3. Provide security terminations at security partitions as indicated on Drawings.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and CMUs as follows:
  - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Provide polyethylene bond-breaker between clay masonry and other masonry types. Rake back joint for sealant.
- C. Lay solid 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.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

### 3.6 COMPOSITE MASONRY

- A. Bond wythes of composite masonry together using the following method:
  - 1. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
    - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.

- B. Bond wythes of composite masonry together using indicated bonding system.
- C. Collar Joints: Solidly fill collar joints by paring face of first wythe that is laid and shoving units of other wythe into place.
- D. Corners: Provide interlocking masonry unit bond in each wythe and course at corners, unless otherwise indicated.
  - 1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.
- E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are indicated at juncture, bond walls together as follows:
  - 1. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
- F. Bond wythes of below-finish-grade foundation masonry together using one of the following methods unless indicated otherwise:
  - 1. Masonry Joint Reinforcement: In horizontal mortar joints.
    - a. Where bed joints of both wythes align, use continuous truss-type or ladder-type reinforcement consisting of four (4) side-rods welded to a continuous diagonally formed cross rod (truss) or individual cross rods (ladder). Install at 8 inches on center vertically maximum below finish grade.
    - b. Where bed joints of wythes do not align, use adjustable two-piece reinforcement.
- G. Tie wythes of below-finish-grade foundation masonry to concrete foundations with rigid anchors at no more than 8 inches on center vertically maximum.
- H. Where insulation between or behind wythes is indicated, coordinate work with insulation installer.
- I. Collar Joints: Solidly fill collar joints, and joints between wythes and rigid insulation, with grout.
- J. Intersecting and Abutting Walls: Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.

### 3.7 BELOW-GRADE FOUNDATION WALLS

- A. Bond wythes of below-finish-grade foundation masonry together using one of the following methods unless indicated otherwise:
  - 1. Masonry Joint Reinforcement: In horizontal mortar joints.
    - a. Where bed joints of both wythes align, use continuous truss-type or ladder-type reinforcement consisting of four (4) side-rods welded to a continuous diagonally formed cross rod (truss) or individual cross rods (ladder). Install at 8 inches on center vertically maximum below finish grade.
    - b. Where bed joints of wythes do not align, bond as indicated in drawings.
- B. Tie wythes of below-finish-grade foundation masonry to concrete foundations with rigid anchors at no more than 8 inches on center vertically maximum.
- C. Where insulation between or behind wythes is indicated, coordinate work with insulation installer.

- D. Collar Joints: Solidly fill collar joints, and joints between wythes and rigid insulation, with grout.
- E. Intersecting and Abutting Walls: Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.

### 3.8 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
  - 1. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Install cavity drainage and ventilation material in the air space within the cavities. Permanent cavity wall insulation shall not be placed in contact with face brick wythe.
  - 1. Provide weep holes as specified elsewhere in this section.
- D. Cavity-wall insulation is included in Division 07 Section "Sprayed Polyurethane Foam Air Barrier." Coordinate masonry and insulation/air barrier construction.
  - 1. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer.
  - 2. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on Drawings. Passes shall be not less than 1/2 inch and not greater than 2 inches.
  - 3. Do not install spray polyurethane foam within 3 inches of heat emitting devices such as light fixtures.
  - 4. Finished surface of foam insulation to be free of voids and embedded foreign objects.
  - 5. Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.
  - 6. Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.
  - 7. Clean and restore surfaces soiled or damaged by work of the section. Consult with section of work soiled before cleaning to ensure methods used will not damage the work.
  - 8. Do not permit adjacent work to be damaged by work of this section. Damage to work of this section caused by other sections shall be repaired by this section at the expense of the subcontractor causing the damage.

### 3.9 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.
  - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
    - a. Reinforcement above is in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

### 3.10 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
  - 1. Provide an open space not less than 1/2 inch (13 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
  - 3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

### 3.11 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
  - 1. Insert adjustable masonry veneer anchors in horizontal masonry reinforcing incorporating separate ties with eyes that engage adjustable veneer anchors.
  - 2. Fasten screw-attached anchors to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener. Coordinate installation of veneer anchor components with XEPS cavity insulation and taped joints and spray-applied polyurethane foam insulation and air/vapor barrier as indicated.
  - 3. Embed tie sections in veneer masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
  - 4. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  - 5. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than one anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 16 inches o.c. horizontally and 8 inches o.c. vertically, around perimeter.

### 3.12 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision for in-plane wall or partition movement. Keep control and expansion joints clean of mortar droppings and other materials during construction.
  - 1. Principal movement joints are indicated on the drawings, generally for exterior masonry veneer, column details, and “aesthetic locations”.
  - 2. Provide control joint spacing in above grade exposed concrete masonry (CMU) wall in accordance with NCMA recommendations (TEK 10-2B) of the lesser of wall length-to-height ration of 1.5 to 1, or 25 feet. Confirm project-specific joint locations and details of additional expansion and control joints with Architect prior to installation to comply with TEK standard.

- a. Provide at least one control joint within 24 inches of door and window openings 6 feet wide or less. Provide a control joint within 24 inches of each jamb for door and window openings over 6 feet wide.
  - B. Form control joints in concrete masonry as follows:
    1. Install preformed control-joint gaskets designed to fit standard sash block.
    2. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
  - C. Form expansion joints in brick as follows:
    1. Build in compressible joint fillers where indicated.
    2. Form open joint full depth of brick wythe and of width indicated, but not less than 1/2 inch for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."
  - D. Build in horizontal, pressure-relieving joints; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod.
- 3.13 LINTELS
- A. Install steel lintels where indicated.
  - B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
  - C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.
- 3.14 FLASHING, WEEP HOLES, CAVITY DRAINAGE, 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. Install flashing as follows unless otherwise indicated:
    1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, 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. Repair damaged flashing as recommended by flashing manufacturer.
    2. At multi-wythe masonry walls, including cavity walls, extend flexible flashing through outer wythe, turned up a minimum of 16 inches and mechanically fasten to back-up wythe with termination bar fastened at 16 inches on center and capped with sealant. Coordinate flashing installation and air barrier continuity and terminations at masonry openings.
    3. At lintels, shelf angles, window sills, and other discontinuous flashing, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams. Turned up portions of the end dam flashing shall stop 1/2 inch back from outside face of wall. Seal flashing joints at end dams with compatible sealant to provide a watertight assembly.
    4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge with a continuous bead of sealant.

5. For window and door head type applications, cut flexible flashing off flush with face of wall after masonry wall construction is completed. Proceed with trimming only after review by Architect.
- C. Install receiver and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
  1. Use specified weep/vent product to form weep holes in brick. Space weep holes 24 inches o.c., unless otherwise indicated.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 “Miscellaneous Masonry Accessories” Article.

### 3.15 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms 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 loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

### 3.16 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

### 3.17 BITUMINOUS DAMPPROOFING

- A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

- C. Apply patching compound for filling and patching tie holes, honeycombs, reveals, and other imperfections.
- D. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.
- E. Apply primer where recommended by manufacturer.
- F. Apply 1 brush or spray coat of dampproofing at not less than 1.25 gal./100 sq. ft. (0.5 L/sq. m).

### 3.18 FIELD QUALITY CONTROL

- A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
  - 1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.
- B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:
  - 1. Payment for these services will be made by Owner.
  - 2. Retest materials failing to comply with specified requirements at Contractor's expense.
- C. Testing Frequency: Tests and Evaluations for masonry units listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof. Other testing will be performed at frequencies required in paragraphs below.
- D. Mortar properties will be tested per ASTM C 780. Perform testing for first three days of construction and whenever mortar mix is altered or mixing techniques differ from accepted material test reports.
- E. Sample and test grout compressive strength per ASTM C 1019. Perform testing for first three days of construction and whenever grout mix is altered or mixing techniques differ from accepted material test reports.
- F. Concrete Masonry Unit Tests: For primary bearing concrete masonry units utilized in project, units will be tested according to ASTM C 140. Primary bearing unit size(s) are 8-inch for project, and additional size units if so required by Architect.

### 3.19 REPAIRING, POINTING, AND CLEANING

- A. Do not use units that are chipped, cracked, or broken in locations where such defects will be exposed in the completed Work. Remove and replace masonry units that are loose, chipped, cracked, 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, where indicated.
- 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 non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's printed instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

END OF SECTION 042000