SECTION 042000 - UNIT MASONRY

Revise this Section by deleting and inserting text to meet Project-specific requirements.

1. GENERAL
   * + 1. RELATED DOCUMENTS
          1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
       2. SUMMARY
          1. Section Includes:

Concrete masonry units.

Concrete building brick.

Decorative concrete masonry units.

Pre-faced concrete masonry units.

Concrete face brick.

Clay face brick.

Building (common) brick.

Hollow brick.

Glazed brick.

Structural clay facing tile.

Firebox brick.

Clay flue lining units.

"Stone trim units" Subparagraph below is intended for stone lintels and similar units built into masonry. Section 044313.13 "Anchored Stone Masonry Veneer" can also be used to specify stone built into masonry. For stone trim secured with stone anchors, use Section 044200 "Exterior Stone Cladding" instead of requirements in this Section. For thin stone trim set as adhered veneer, use Section 044313.16 "Adhered Stone Masonry Veneer."

Stone trim units.

Mortar and grout.

Steel reinforcing bars.

Masonry-joint reinforcement.

Ties and anchors.

Embedded flashing.

Miscellaneous masonry accessories.

Masonry-cell fill.

* + - * 1. Products Installed but not Furnished under This Section:

Cast-stone trim in unit masonry.

Steel lintels in unit masonry.

Steel shelf angles for supporting unit masonry.

Cavity wall insulation.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Usually delete option in first subparagraph below and specify dovetail slots in concrete Section.

Section 031000 "Concrete Forms and Accessories" for [ **installing**] dovetail slots for masonry anchors.

Section 042300 "Glass Unit Masonry" for glass block.

Section 044200 "Exterior Stone Cladding" for stone trim secured with stone anchors.

Delete first subparagraph below if attachment of anchor sections to structural steel is included in this Section.

Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.

Section 071900 "Water Repellents" for water repellents applied to unit masonry assemblies.

Section 072100 "Thermal Insulation" for cavity wall insulation.

Coordinate first subparagraph below with referenced Section. Metal through-wall flashing is included in this Section.

Section 076200 "Sheet Metal Flashing and Trim" for [ **exposed**] sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

Section 089516 "Wall Vents" for wall vents (brick vents).

Section 096313 "Brick Flooring" for interior brick flooring.

Section 097519 "Stone Trim" for stone window stools.

Section 321400 "Unit Paving" for exterior unit masonry paving.

Section 323223 "Segmental Retaining Walls" for dry-laid, concrete unit retaining walls.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited.

* + - * 1. CMU(s): Concrete masonry unit(s).
        2. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.
      1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Product Data: For each type of product.
         5. Sustainable Design Submittals:
         6. Shop Drawings: For the following:

Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.

Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.

Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.[**Show elevations of reinforced walls.**]

Retain "Fabricated Flashing" Subparagraph below for flashing material that is specially fabricated for corners, end dams, etc.

Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

* + - * 1. Samples for Initial Selection:

Decorative CMUs, in the form of small-scale units.

Pre-faced CMUs.

Concrete face brick, in the form of small-scale units.

[**Clay face] [Hollow] brick[, in the form of straps of five or more bricks**].

Glazed brick.

Glazed structural clay tile.

Stone trim.

Colored mortar.

Weep holes/cavity vents.

Delete "Samples for Initial Selection" Paragraph above if colors and other characteristics are preselected and specified or scheduled. Retain "Samples for Verification" Paragraph below with or without above.

* + - * 1. Samples for Verification: For each type and color of the following:

[**Exposed] [Decorative**] CMUs.

Pre-faced CMUs.

Concrete face brick.

[**Clay face] [Hollow] brick[, in the form of straps of five or more bricks**].

Special brick shapes.

Glazed brick.

Glazed structural clay tile.

Unglazed structural clay tile.

Stone trim.

[**Pigmented**] [**and**] [**colored-aggregate**] mortar. Make Samples using same sand and mortar ingredients to be used on Project.

Weep holes[ **and cavity vents**].

Accessories embedded in masonry.

Retain "List of Materials Used in Constructing Mockups" Paragraph below for critical work where record of mockup materials is desired.

* + - * 1. 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.

Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Director’s Representative and approved in writing.

Coordinate "Qualification Data" Paragraph below with qualification requirements in "Quality Assurance" Article.

* + - * 1. Qualification Data: For testing agency.

Usually retain "Material Certificates" Paragraph below. Material certificates are required for all masonry constructed according to TMS 402/ACI 530/ASCE 5.

* + - * 1. Material Certificates: For each type and size of the following:

Masonry units.

Retain second option in first subparagraph below if required by authorities having jurisdiction or if the added assurance of quality that test reports provide is desired.

Include [**data on material properties] [material test reports substantiating compliance with requirements**].

For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.

For exposed brick, include test report for efflorescence according to ASTM C67.

For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing according to ASTM C67[**or a list of addresses of buildings in Project's area where proposed brick has been used successfully and with a history of durability**].

Retain first subparagraph below only if retaining unit-strength method in "Performance Requirements" Article or if requirements for average net-area compressive strength of units are retained in Part 2.

For masonry units[**used in structural masonry**], include data and calculations establishing average net-area compressive strength of units.

Integral water repellent used in CMUs.

Cementitious materials. Include name of manufacturer, brand name, and type.

Mortar admixtures.

Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

Grout mixes. Include description of type and proportions of ingredients.

Reinforcing bars.

Joint reinforcement.

Anchors, ties, and metal accessories.

* + - * 1. Mix Designs: For each type of mortar[**and grout**]. Include description of type and proportions of ingredients.

Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109 for compressive strength, ASTM C1506 for water retention, and ASTM C91 for air content.

Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

Retain "Statement of Compressive Strength of Masonry" Paragraph below only if retaining unit-strength method in "Performance Requirements" Article.

* + - * 1. 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 TMS 602/ACI 530.1/ASCE 6.
        2. Cold-Weather[**and Hot-Weather**] Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.
      1. QUALITY ASSURANCE

Retain "Testing Agency Qualifications" Paragraph below if Contractor selects testing agency.

* + - * 1. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.

Build sample panels for [**each type of exposed unit masonry construction] [typical exterior wall] [typical interior wall] [typical exterior and interior walls**] in sizes approximately [**48 inches**] [**60 inches**] long by [**36 inches**] [**48 inches**] high by full thickness.

Build sample panels facing south.

Where masonry is to match existing, build panels adjacent and parallel to existing surface.

Clean[**one-half of**] exposed faces of panels with masonry cleaner indicated.

Protect approved sample panels from the elements with weather-resistant membrane.

Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Director’s Representative in writing.

Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Director’s Representative specifically approves such deviations in writing.

* + - * 1. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

Build mockup[ **of typical wall area**] as shown on Drawings.

Retain first subparagraph below for limited mockups.

Build mockups for [**each type of exposed unit masonry construction] [typical exterior wall] [typical interior wall] [typical exterior and interior walls**] in sizes approximately [**48 inches**] [**60 inches**] [**72 inches**] [**96 inches**] long by [**36 inches**] [**48 inches**] [**60 inches**] [**72 inches**] high by full thickness, including face and backup wythes and accessories.

Include a sealant-filled joint at least 16 inches long in [**each**] [**exterior wall**] mockup.

Include lower corner of window opening[**, framed with stone trim,**] at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.

Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).

Include [**metal**] [**wood**] studs, sheathing, [**water-resistive barrier**] [**sheathing joint-and-penetration treatment**] [**air barrier**], veneer anchors, flashing[**, cavity drainage material**], and weep holes in exterior masonry-veneer wall mockup.

Include [**glazed structural clay tile**] [**pre-faced CMUs**] [**clay face brick**] on one face of interior unit masonry wall mockup.

Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.

Clean[**one-half of**] exposed faces of mockups with masonry cleaner as indicated.

Protect accepted mockups from the elements with weather-resistant membrane.

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.

Delete first two subparagraphs below if mockups are only for establishing appearance factors.

Approval of mockups is also for other material and construction qualities specifically approved by Director’s Representative in writing.

Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Director’s Representative specifically approves such deviations in writing.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. 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.

Delete first two paragraphs below if requiring Contractor to use preblended, dry mortar mix.

* + - * 1. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
        2. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

Always retain first paragraph below in case Contractor uses a preblended, dry mortar mix.

* + - * 1. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
        2. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
      1. FIELD CONDITIONS
         1. 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.

Increase extent of cover in first subparagraph below as needed to suit local climatic conditions.

Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.

* + - * 1. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
        2. 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.

Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

Protect sills, ledges, and projections from mortar droppings.

Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

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.

* + - * 1. 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 TMS 602/ACI 530.1/ASCE 6.

Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

* + - * 1. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. PRODUCTS

See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products.

* + - 1. MANUFACTURERS
         1. 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.
         2. 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.
      2. PERFORMANCE REQUIREMENTS

Retain this article for masonry designed by analytical methods when specifying masonry compressive strength rather than specifying compressive strength of masonry units and mortar. Revise paragraph below and insert required compressive strength of masonry if not indicated on Drawings. If retaining option, indicate on Drawings extent of structural unit masonry and nonstructural unit masonry.

* + - * 1. Provide[**structural**] unit masonry that develops indicated net-area compressive strengths at 28 days.

Retain one of two subparagraphs below.

Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C1314.

* + - 1. UNIT MASONRY, GENERAL
         1. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
         2. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work[**and will be within 20 feet vertically and horizontally of a walking surface**].

See BIA Technical Notes 16B and NCMA TEK 7-3 for information on determining fire-resistance ratings of masonry walls.

* + - * 1. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

Retain subparagraph below if required by authorities having jurisdiction.

Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

* + - 1. CONCRETE MASONRY UNITS
         1. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

Provide [**square-edged**] [**bullnose**] units for outside corners unless otherwise indicated.

Retain "Integral Water Repellent" Paragraph below for increased water resistance of units if required. If retaining, also retain water-repellent mortar admixture.

* + - * 1. Integral Water Repellent: Provide units made with integral water repellent [**for exposed units**] [**and**] [**where indicated**].

Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

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:

ACM Chemistries.

BASF Corporation.

Euclid Chemical Company (The); an RPM company.

Approved equivalent.

* + - * 1. Insulated CMUs: Where indicated, units shall contain rigid, specially shaped, molded-polystyrene insulation units complying with ASTM C578, Type I, designed for installing in cores of masonry units.

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:

Concrete Block Insulating Systems.

Shelter Enterprises Inc.

Approved equivalent.

Copy and revise "CMUs" Paragraph below for nonload-bearing CMUs (changing ASTM C90 to ASTM C129) if needed; they are not usually an inventory item and may have to be ordered in large quantities. Indicate load-bearing and nonload-bearing units on Drawings if both are specified.

* + - * 1. CMUs: ASTM C90.

Usually retain "Unit Compressive Strength" Subparagraph below only for masonry designed by analytical methods; delete if retaining "Performance Requirements" Article. Also delete below if compressive strength specified in ASTM C90, which is 1900 psi, is acceptable. See the Evaluations.

Unit Compressive Strength: Provide units with minimum average net-area compressive strength of [**2150 psi**] [**2800 psi**] [**3050 psi**].

Retain one of first three options in "Density Classification" Subparagraph below, or delete subparagraph for Contractor's option. Retain last option below for default requirement if using more than one weight. See the Evaluations.

Density Classification: [**Lightweight] [Medium weight] [Normal weight][ unless otherwise indicated**].

Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

Retain "Exposed Faces" Subparagraph below if color and texture of faces are critical. ASTM C90 requires at least four units for sample, representing the range of color and texture permitted.

Exposed Faces: Provide color and texture matching the range represented by Director’s Representative's sample.

Retain "Faces to Receive Plaster" Subparagraph below if using direct application of portland cement or gypsum plaster.

Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

Concrete building bricks are often used to adjust dimensions in CMU construction.

* + - * 1. Concrete Building Brick: ASTM C55.

Usually retain "Unit Compressive Strength" Subparagraph below only for masonry designed by analytical methods; delete if retaining "Performance Requirements" Article. Also delete subparagraph if compressive strength specified in ASTM C55, which is 2500 psi, is acceptable. See the Evaluations.

Unit Compressive Strength: Provide units with minimum average net-area compressive strength of [**2800 psi**] [**3050 psi**] [**3750 psi**] [**4050 psi**].

Retain one of three options in "Density Classification" Subparagraph below, or delete subparagraph for Contractor's option.

Density Classification: [**Lightweight] [Medium weight] [Normal weight**].

Size (Actual Dimensions): 3-5/8 inches wide by [**2-1/4 inches**] [**2-3/4 inches**] [**3-5/8 inches**] high by 7-5/8 inches long.

* + - * 1. Decorative CMUs: ASTM C90.

Usually retain "Unit Compressive Strength" Subparagraph below only for masonry designed by analytical methods; delete if retaining "Performance Requirements" Article. Also delete subparagraph if compressive strength specified in ASTM C90, which is 1900 psi, is acceptable. See the Evaluations.

Unit Compressive Strength: Provide units with minimum average net-area compressive strength of [**2150 psi**] [**2800 psi**] [**3050 psi**].

Density classification in "Density Classification" Subparagraph below affects appearance and water absorption. Verify availability of lightweight decorative CMUs before specifying.

Density Classification: [**Lightweight] [Medium weight] [Normal weight**].

Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.

Pattern and Texture:

Retain one of first five subparagraphs below, and revise to suit Project. Retain option if appearance is critical.

Standard pattern, ground-face finish.[ **Match Director’s Representative's samples**.]

Standard pattern, split-face finish.[ **Match Director’s Representative's samples**.]

Standard pattern, split-ribbed finish.[ **Match Director’s Representative's samples**.]

Scored vertically so units laid in running bond appear as square units laid in stacked bond, standard finish.[**Match Director’s Representative's samples.**]

Triple scored vertically so units laid in running bond appear as vertical units laid in stacked bond (soldier courses), standard finish.[**Match Director’s Representative's samples.**]

Colors: [**As indicated by manufacturer's designations] [Match Director’s Representative's samples] [As selected by Director’s Representative from manufacturer's full range**].

Retain "Special Aggregate" Subparagraph below if special aggregate is required to match sample.

Special Aggregate: Provide units made with aggregate matching aggregate in Director’s Representative's sample.

Revise "Pre-faced CMUs" Paragraph below if medium- or normal-weight units are required.

* + - * 1. Pre-faced CMUs: Lightweight [**hollow**] [**solid**] concrete units complying with ASTM C90, with manufacturer's standard smooth resinous facing complying with ASTM C744.

Usually retain "Unit Compressive Strength" Subparagraph below only for masonry designed by analytical methods; delete if retaining "Performance Requirements" Article. Also delete subparagraph if compressive strength specified in ASTM C90, which is 1900 psi, is acceptable. See the Evaluations.

Unit Compressive Strength: Provide units with minimum average net-area compressive strength of [2150 psi] [2800 psi] [3050 psi].

Size: Manufactured to dimensions specified in "CMUs" Paragraph but with pre-faced surfaces having 1/16-inch- wide returns of facing to create 1/4-inch- wide mortar joints with modular coursing.

Colors and Patterns: [**As indicated by manufacturer's designations] [Match Director’s Representative's samples] [As selected by Director’s Representative from manufacturer's full range**].

Insert other forms of block (e.g., sound absorbing or preinsulated) where required.

* + - * 1. Concrete Face Brick: ASTM C1634.

Usually retain "Unit Compressive Strength" Subparagraph below only for masonry designed by analytical methods; delete if retaining "Performance Requirements" Article. Also delete subparagraph if compressive strength specified in ASTM C1634, which is 3500 psi, is acceptable. See the Evaluations.

Unit Compressive Strength: Provide units with minimum average net-area compressive strength of [**3750 psi**] [**4050 psi**].

Retain one of three options in "Density Classification" Subparagraph below, or delete subparagraph for Contractor's option.

Density Classification: [**Lightweight] [Medium weight] [Normal weight**].

Size (Actual Dimensions): 3-5/8 inches wide by [**2-1/4 inches**] [**2-3/4 inches**] [**3-5/8 inches**] high by [**7-5/8 inches**] [**11-5/8 inches**] [**15-5/8 inches**] long.

Texture: [**Split-face] [Ground-face] finish <Insert description**>.

Match Director’s Representative's samples.

Colors: [**As indicated by manufacturer's designations] [Match Director’s Representative's samples] [As selected by Director’s Representative from manufacturer's full range**].

Retain "Special Aggregate" Subparagraph below if special aggregate is required to match sample.

Special Aggregate: Provide units made with aggregate matching aggregate in Director’s Representative's sample.

* + - 1. [**CONCRETE] [AND] [MASONRY**] LINTELS

Retain "General" Paragraph below if retaining more than one of the remaining paragraphs in article.

* + - * 1. General: Provide one of the following:

Retain one or more of three paragraphs below, depending on appearance desired.

* + - * 1. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.
        2. Concrete Lintels: Precast or formed-in-place concrete lintels complying with requirements in Section 032000 "Concrete Reinforcing," and with reinforcing bars indicated.
        3. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, 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.
      1. BRICK
         1. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

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.

On Drawings, show details of special conditions and special shapes required. Revise three subparagraphs below to suit Project.

Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.

Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

Retain third option in "Clay Face Brick" Paragraph below if hollow bricks are acceptable. Hollow bricks use less material and energy to make and require less energy to transport.

* + - * 1. Clay Face Brick: [**Facing brick complying with ASTM C216] [or] [hollow brick complying with ASTM C652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area)**].

Grade: [**SW**] [**MW or SW**].

First three options in "Type" Subparagraph below apply to ASTM C216 (facing brick); last three options apply to ASTM C652 (hollow brick).

Type: [**FBX**] [**FBS**] [**FBA**] [**or**] [**HBX**] [**HBS**] [**HBA**].

Usually retain "Unit Compressive Strength" Subparagraph below only for masonry designed by analytical methods; delete if retaining "Performance Requirements" Article. Also delete subparagraph if compressive strength specified in referenced standards is acceptable. Subparagraph is based on net area, as in Table 1 in TMS 602/ACI 530.1/ASCE 6, rather than gross area reported by ASTM C67. Minimum average gross-area compressive strength according to ASTM C216 is 3000 psi for Grade SW and 2500 psi for Grade MW. Minimum average gross-area compressive strength according to ASTM C652 is 3000 psi for Grade SW and 2500 psi for Grade MW. Net-area compressive strength is 1 to 1.33 times gross-area compressive strength for ASTM C216 and 1.33 to 1.66 times gross-area compressive strength for ASTM C652, Class H40V.

Unit Compressive Strength: Provide units with minimum average net-area compressive strength of [**3350 psi**] [**4150 psi**] [**4950 psi**] [**6200 psi**] [**6600 psi**] [**8250 psi**].

Consider retaining "Initial Rate of Absorption" Subparagraph below; it eliminates the need to wet brick before laying. Before retaining, verify that brick selected complies with requirements. See the Evaluations.

Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C67.

Requirement in "Efflorescence" Subparagraph below does not, by itself, prevent efflorescence. See the Evaluations.

Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."

Delete "Surface Coating" Subparagraph below if not using surface-coated brick.

Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C67 with no observable difference in the applied finish when viewed from 10 feet [**or shall have a history of successful use in Project's area**].

Sizes in remaining subparagraphs below are examples only. Verify availability of sizes with local suppliers and revise to suit Project.

Retain one of first 13 subparagraphs below for IP sizes with equivalent SI (metric) dimensions.

Retain one of first three "Size (Actual Dimensions)" subparagraphs below for three courses in 8 inches.

Size (Actual Dimensions): [**3-1/2 inches** wide by **2-1/4 inches** high by **7-1/2 inches** long] [or] [**3-5/8 inches** wide by **2-1/4 inches** high by **7-5/8 inches** long].

Size (Actual Dimensions): [**3-1/2 inches**] [**or**] [**3-5/8 inches**] wide by 2-1/4 inches high by 8 inches long.

Size (Actual Dimensions): [**3-1/2 inches wide by 2-1/4 inches high by 11-1/2 inches long] [or] [3-5/8 inches wide by 2-1/4 inches high by 11-5/8 inches long**].

Retain one of first two "Size (Actual Dimensions)" subparagraphs below for nominal bed depth of 3 inches and five courses in 16 inches.

Size (Actual Dimensions): [**2-3/4 inches wide by 2-3/4 inches high by 8 inches long] [or] [3 inches wide by 2-3/4 inches high by 8 inches long**].

Size (Actual Dimensions): [**2-3/4 inches wide by 2-5/8 inches high by 9-5/8 inches long] [or] [3 inches wide by 2-3/4 inches high by 9-5/8 inches long**].

Retain one of first four "Size (Actual Dimensions)" subparagraphs below for nominal bed depth of 4 inches and five courses in 16 inches.

Size (Actual Dimensions): [**3-1/2 inches wide by 2-3/4 inches high by 7-1/2 inches long] [or] [3-5/8 inches wide by 2-13/16 inches high by 7-5/8 inches long**].

Size (Actual Dimensions): [**3-1/2 inches wide by 2-3/4 inches high by 8 inches long] [or] [3-5/8 inches wide by 2-13/16 inches high by 8 inches long**].

Size (Actual Dimensions): 3-5/8 inches wide by 2-5/8 inches high by 9-5/8 inches long.

Size (Actual Dimensions): [**3-1/2 inches wide by 2-3/4 inches high by 11-1/2 inches long] [or] [3-5/8 inches wide by 2-13/16 inches high by 11-5/8 inches long**].

Retain first "Size (Actual Dimensions)" Subparagraph below for nominal bed depth of 3 inches and course height of 4 inches.

Size (Actual Dimensions): [**2-3/4 inches** wide by **3-5/8 inches** high by **11-5/8 inches** long] [or] [**3 inches** wide by **3-5/8 inches** high by **11-5/8 inches** long].

Retain one of first two "Size (Actual Dimensions)" subparagraphs below for nominal bed depth of 4 inches and course height of 4 inches.

Size (Actual Dimensions): [**3-1/2 inches wide by 3-1/2 inches high by 7-1/2 inches long] [or] [3-5/8 inches wide by 3-5/8 inches high by 7-5/8 inches long**].

Size (Actual Dimensions): [**3-1/2 inches wide by 3-1/2 inches high by 11-1/2 inches long] [or] [3-5/8 inches wide by 3-5/8 inches high by 11-5/8 inches long**].

Retain first "Size (Actual Dimensions)" Subparagraph below for square brick, 8 inches in nominal size.

Size (Actual Dimensions): [**3-1/2 inches wide by 7-1/2 inches high by 7-1/2 inches long] [or] [3-5/8 inches wide by 7-5/8 inches high by 7-5/8 inches long**].

Retain "Size (Actual Dimensions)" Subparagraph below for products manufactured to metric sizes.

Size (Actual Dimensions): 90 mm wide by [**57**] [**70**] [**90**] [**190**] mm high by [**190**] [**290**] mm long.

Application: Use where brick is exposed unless otherwise indicated.

[**Where shown to "match existing,"**]provide face brick matching color range, texture, and size of existing adjacent brickwork.

<**Insert information on existing brick if known**>.

Delete "Color and Texture" Subparagraph below if brick is specified by product name. First three options are examples of descriptive requirements for appearance where proprietary specifications and allowances cannot be used. Retain last option if using allowance.

Color and Texture: [**Medium brown, wire cut] [Full-range red, sand molded] [Buff, velour] [Match Director’s Representative's samples] [As selected by Director’s Representative**].

* + - * 1. Building (Common) Brick: ASTM C62, [**Grade SW**] [**Grade MW or SW**] [**Grade NW, MW, or SW**].

Usually retain "Unit Compressive Strength" Subparagraph below only for masonry designed by analytical methods; delete if retaining "Performance Requirements" Article. Also delete subparagraph if compressive strength specified in ASTM C62 is acceptable. Subparagraph is based on net area, as in Table 1 in TMS 602/ACI 530.1/ASCE 6, rather than gross area reported by ASTM C67. Minimum average gross-area compressive strength according to ASTM C62 is 3000 psi for Grade SW, 2500 psi for Grade MW, and 1500 psi for Grade NW. Net-area compressive strength is 1 to 1.33 times gross-area compressive strength for ASTM C62.

Unit Compressive Strength: Provide units with minimum average net-area compressive strength of [**1700 psi**] [**2100 psi**] [**3350 psi**] [**4150 psi**] [**4950 psi**] [**6200 psi**] [**6600 psi**] [**8250 psi**].

Retain one of two "Size" subparagraphs below, or delete both and allow Contractor to select size to suit conditions.

Size: Match size of face brick.

Size (Actual Dimensions): [**3-1/2 inches** wide by **2-1/4 inches** high by **7-1/2 inches** long] [or] [**3-5/8 inches** wide by **2-1/4 inches** high by **7-5/8 inches** long].

Revise "Application" Subparagraph below if building brick is used in exposed locations.

Application: Use where brick is indicated for concealed locations.[ **Face brick complying with requirements for grade, compressive strength, and size indicated for building brick may be substituted for building brick**.]

Hollow brick is not simply face brick with the usual cores (holes); it is brick that has voids (cores and cells) exceeding 25 percent of gross cross-sectional area. Products described below are also called "through-wall brick." See the Evaluations.

* + - * 1. Hollow Brick: ASTM C652, [**Grade SW] [Grade MW or SW], [Class H40V (void areas between 25 and 40 percent of gross cross-sectional area)] [Class H60V (void areas between 40 and 60 percent of gross cross-sectional area)], [Type HBX] [Type HBS] [Type HBA] [Type HBB**].

Usually retain "Unit Compressive Strength" Subparagraph below only for masonry designed by analytical methods; delete if retaining "Performance Requirements" Article. Also delete subparagraph if compressive strength specified in ASTM C652 is acceptable. Subparagraph is based on net area, as in Table 1 in TMS 602/ACI 530.1/ASCE 6, rather than gross area reported by ASTM C67. Minimum average gross-area compressive strength according to ASTM C652 is 3000 psi for Grade SW and 2500 psi for Grade MW. Net-area compressive strength is 1.33 to 1.66 times gross-area compressive strength for Class H40V and 1.66 to 2.5 times gross-area compressive strength for Class H60V.

Unit Compressive Strength: Provide units with minimum average net-area compressive strength of [**3350 psi**] [**4150 psi**] [**4950 psi**] [**6200 psi**] [**6600 psi**] [**8250 psi**].

Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."

Delete "Surface Coating" Subparagraph below if not using surface-coated brick.

Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C67 with no observable difference in the applied finish when viewed from 10 feet [**or shall have a history of successful use in Project's area**].

Sizes in five "Size (Actual Dimensions)" subparagraphs below are examples only. Verify availability of sizes with local suppliers, and revise to suit Project.

Size (Actual Dimensions): [**5-1/2 inches wide by 3-1/2 inches high by 11-1/2 inches long] [or] [5-5/8 inches wide by 3-5/8 inches high by 11-5/8 inches long**].

Size (Actual Dimensions): [**7-1/2 inches wide by 3-1/2 inches high by 11-1/2 inches long] [or] [7-5/8 inches wide by 3-5/8 inches high by 11-5/8 inches long**].

Size (Actual Dimensions): [**5-1/2 inches wide by 3-1/2 inches high by 15-1/2 inches long] [or] [5-5/8 inches wide by 3-5/8 inches high by 15-5/8 inches long**].

Size (Actual Dimensions): [**7-1/2 inches wide by 3-1/2 inches high by 15-1/2 inches long] [or] [7-5/8 inches wide by 3-5/8 inches high by 15-5/8 inches long**].

Size (Actual Dimensions): 4-5/8 inches wide by 2-3/4 inches high by 9-5/8 inches long.

Application: Use where brick is exposed unless otherwise indicated.

[**Where shown to "match existing,"**]provide hollow brick matching color range, texture, and size of existing adjacent brickwork.

<**Insert information on existing brick if known**>.

Delete "Color and Texture" Subparagraph below if brick is specified by product name. First three options are examples of descriptive requirements for appearance where proprietary specifications and allowances cannot be used. Retain last option if using allowance.

Color and Texture: [**Medium brown, wire cut] [Full-range red, smooth texture] [Buff, velour] [Match Director’s Representative's samples] [As selected by Director’s Representative**].

Retain applicable options in "Glazed Brick" Paragraph below. Options include solid brick (75 percent or more solid) and hollow brick (60 percent or more solid). Hollow brick requires less material and energy to make and less energy to transport.

* + - * 1. Glazed Brick: [**Facing brick complying with ASTM C216, with glaze complying with ASTM C126;] [Single-fired glazed brick complying with ASTM C1405, Division Solid;] [Hollow brick complying with ASTM C652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area), with glaze complying with ASTM C126;] [or] [single-fired glazed brick complying with ASTM C1405, Division H40V (void areas between 25 and 40 percent of gross cross-sectional area)].**

ASTM C216: [**Grade SW] [Grade MW or SW**].

ASTM C216: [**Type FBX] [Type FBS] [Type FBA**].

ASTM C652: [**Grade SW] [Grade MW or SW**].

ASTM C652: [**Type HBX] [Type HBS] [Type HBA**].

ASTM C1405: [**Class Exterior] [Class Interior**].

ASTM C1405 Grade: [**Grade S (Select)] [Grade SS (Select Sized**)].

Copy requirement for unit compressive strength from "Clay Face Brick" Paragraph and insert here if required.

Sizes in remaining subparagraphs below are examples only. Verify availability of sizes with local suppliers, and revise to suit Project.

Retain first "Size (Actual Dimensions)" Subparagraph below for three courses in 8 inches.

Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by [**7-5/8 inches**] [**8 inches**] [**11-5/8 inches**] long.

Retain first "Size (Actual Dimensions)" Subparagraph below for five courses in 16 inches.

Size (Actual Dimensions): 3-5/8 inches wide by 2-3/4 inches high by [**7-5/8 inches**] [**8 inches**] [**11-5/8 inches**] long.

Retain first "Size (Actual Dimensions)" Subparagraph below for 4-inch courses.

Size (Actual Dimensions): 3-5/8 inches wide by 3-5/8 inches high by [**7-5/8 inches**] [**11-5/8 inches**] long.

Retain first "Size (Actual Dimensions)" Subparagraph below for square brick, 8 inches nominal size.

Size (Actual Dimensions): 3-5/8 inches wide by 7-5/8 inches high by 7-5/8 inches long.

Retain first subparagraph below if units with two opposite exposed faces are required.

Provide Type I (single-faced units) where only one finished face is exposed when units are installed, and Type II (double-faced units) where two opposite finished faces are exposed when units are installed.

Application: Use where [**brick is exposed unless otherwise indicated] [indicated**].

Retain one of three options in "Colors" Subparagraph below; otherwise, retain second subparagraph.

Colors: [**As indicated by manufacturer's designations] [Match Director’s Representative's samples] [As selected by Director’s Representative from manufacturer's full range**].

[**Where shown to "match existing,"**]provide glazed brick matching color range, texture, and size of existing adjacent brickwork.

<**Insert information on existing brick if known**>.

Insert calcium silicate (sand-lime) brick if required. See the Evaluations.

* + - 1. STRUCTURAL CLAY FACING TILE
         1. General:

Provide solid, multicored, or hollow units, with shape and direction of cores optional unless otherwise indicated.

Retain first subparagraph below for reinforced applications.

Where reinforced masonry is indicated, provide multicored units designed for use in reinforced, grouted masonry, either with vertical cores and with webs notched to receive horizontal reinforcement, or with horizontal cores and with holes in bed shells for placement of grout and to receive vertical reinforcement.

Where indicated for exterior applications, provide units recommended by manufacturer for exterior use in Project's location.

Provide special shapes where required for corners, jambs, coved bases, sills, and other special conditions indicated, including applications that cannot be produced by sawing standard units.

Provide [**bullnose**] [**square-edged**] units for outside corners unless otherwise indicated.

Provide coved internal corners.

Revise first subparagraph below if nonrecessed, coved base units are required and available from manufacturers.

Provide recessed, coved base units.

Where direct application of plaster is indicated or where bonded to backup masonry, provide units with rough, combed, or scored faces.

Grade S is for use with comparatively narrow joints, and Grade SS is for use where variation of face dimension must be small, such as in stacked bond. Grade SS applies primarily to 8W Series units.

* + - * 1. Glazed Structural Clay Facing Tile: ASTM C126, [**Grade S (Select)] [Grade SS (Select Sized or Ground Edge)].**

Retain one of four "Sizes" subparagraphs below, or insert other sizes. Verify availability and coordinate with manufacturers' lists of sizes.

Sizes: 6P Series actual face dimensions of 3-5/8 inches high by 11-5/8 inches long by widths indicated.

Sizes: 6T Series with actual face dimensions of 5 inches high by 11-11/16 inches long by widths indicated.

Sizes: 4W Series (8-Square) with actual face dimensions of 7-5/8 inches high by 7-5/8 inches long by widths indicated.

Sizes: 8W Series with actual face dimensions of 7-5/8 inches high by 15-5/8 inches long by widths indicated.

Width: Manufactured to dimensions [**5/16 inch**] [**3/8 inch**] less than nominal dimensions.

Retain first subparagraph below if units with two opposite exposed faces are required.

Provide Type I (single-faced units) where only one finished face is exposed when units are installed, and Type II (double-faced units) where two opposite finished faces are exposed when units are installed.

Provide special units glazed on ends and tops, as well as faces for corners, jambs, sills, pilasters, columns, and other applications indicated, where glazed units are exposed on other surfaces and faces.

Colors and Patterns: [**As indicated by manufacturer's designations] [Match Director’s Representative's samples] [As selected by Director’s Representative from manufacturer's full range**].

[**Where shown to "match existing,"**]provide glazed structural clay tile matching color range, texture, and size of existing adjacent glazed structural clay tile.

<**Insert information on existing glazed structural clay tile if known**>.

Verify availability of products for type, class, and other characteristics retained in "Unglazed Structural Clay Facing Tile" Paragraph below. See the Evaluations.

* + - * 1. Unglazed Structural Clay Facing Tile: ASTM C212, [**Type FTX**] [**Type FTS**], [**Standard**] [**Special-Duty**] class.

Number of Faces: Single faced[, **where only one finished face is exposed when units are installed. Double faced, where both finished faces are exposed when units are installed**].

Size: [**As indicated] [Match existing**].

* + - 1. FIREPLACE AND CHIMNEY LINING UNITS

Retain "Firebox Brick" Paragraph below for residential fireplaces if required.

* + - * 1. Firebox Brick: ASTM C1261, size required to produce lining thickness indicated.
        2. Clay Flue Lining Units: ASTM C315.
      1. STONE TRIM UNITS

This article is intended for stone lintels and similar units built into masonry. Section 044313.13 "Anchored Stone Masonry Veneer" can also be used to specify stone built into masonry. For stone trim secured with stone anchors, use Section 044200 "Exterior Stone Cladding" instead of requirements in this Section. For thin stone trim set as adhered veneer, use Section 044313.16 "Adhered Stone Masonry Veneer."

* + - * 1. Granite: ASTM C615.

Retain "Description" Subparagraph below for a generic specification, or delete and specify by naming one or more acceptable varieties.

Description: [**Fine] [Medium]-grained, [white] [pink] [gray] [black] stone.[ Uniform pattern, without veining**].

First option in "Limestone" Paragraph below generally applies to very porous limestone that is used only in mild climates; second option applies to oolitic and some dolomitic limestone; third option applies to dolomitic limestone.

* + - * 1. Limestone: ASTM C568, [**Classification I Low] [Classification II Medium] [Classification III High**] Density.

Retain "Variety and Sources" Subparagraph below if Indiana limestone is required. If retaining, retain second option in "Limestone" Paragraph above.

Variety and Sources: Indiana oolitic limestone quarried in Lawrence, Monroe, or Owen Counties, Indiana.

Retain "Grade and Color" Subparagraph below for Indiana limestone. Select and Standard grades are hard to get in large sizes; gray is more plentiful than buff. Verify availability with producers.

Grade and Color: [**Select, buff**] [**Select, gray**] [**Standard, buff**] [**Standard, gray**] [**Rustic, buff**] [**Rustic, gray**] [**Variegated**], according to grade and color classification established by ILI.

* + - * 1. Marble: ASTM C503, [**Classification I Calcite] [Classification II Dolomite**].

Retain "Description" Subparagraph below for a generic specification, or delete and specify by naming oneor more acceptable varieties.

Description: Uniform, fine- to medium-grained white stone with only slight veining.

* + - * 1. Quartz-Based Stone: ASTM C616, [**Classification I Sandstone] [Classification II Quartzitic Sandstone] [III Quartzite**].

Retain "Varieties and Sources" Paragraph and list below for semiproprietary or proprietary specification. See Section 016000 "Product Requirements."

* + - * 1. Varieties and Sources: Subject to compliance with requirements, provide[**one of**] the following:

<**Insert, in separate subparagraphs, names of varieties and producers, distributors, or importers**>.

Some finishes in "Finish" Paragraph below are not suitable for all stone varieties. For additional finishes, see Section 044313.13 "Anchored Stone Masonry Veneer."

* + - * 1. Finish: [**Polished] [Honed] [Smooth] [Machine tooled, four bats per 1 inch] [Machine tooled, six bats per 1 inch] [Machine tooled, eight bats per 1 inch] [Chat sawed] [Split face] [Rock face (pitched face**)].

Finish for [T**ops of Sills] [Jamb Returns] [and] [Soffits of Lintels]: [Sand rubbed] [Split face**].

* + - * 1. Provide stone units accurately shaped, with exposed faces dressed true, and with beds and joints at right angles to faces.

For limestone, comply with recommendations in ILI's "Indiana Limestone Handbook."

For marble, comply with recommendations in MIA's "Dimensional Stone - Design Manual VII."

* + - 1. MORTAR AND GROUT MATERIALS

Coordinate requirements in this article with those in "Mortar and Grout Mixes" Article.

* + - * 1. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

Requirement in subparagraph below can help reduce the likelihood of efflorescence.

Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.

* + - * 1. Hydrated Lime: ASTM C207, Type S.

Mix in "Portland Cement-Lime Mix" Paragraph below allows better control of color than job-mixed, portland cement-lime mortar. If retaining below, also retain "Portland Cement" and "Hydrated Lime" paragraphs above.

* + - * 1. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
        2. Masonry Cement: ASTM C91.

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:

Cemex, Inc.

Holcim US.

Lehigh Hanson; Heidelberg Cement Group.

Approved equivalent.

* + - * 1. Mortar Cement: ASTM C1329.

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:

Cemex, Inc.

Lafarge North America Inc.

Approved equivalent.

Retain "Mortar Pigments" Paragraph below for colored cement or for pigments added at Project site.

* + - * 1. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979. Use only pigments with a record of satisfactory performance in masonry mortar.

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:

Davis Colors.

Euclid Chemical Company (The); an RPM company.

Solomon Colors, Inc.

Approved equivalent.

Mixes in "Colored Cement Products" Paragraph below allow better control of color than job-mixed colored mortar. If retaining, also retain paragraphs above that specify materials included in the mixes retained below.

* + - * 1. Colored Cement Products: Packaged blend made from portland cement and hydrated lime or masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

Colored Portland Cement-Lime Mix:

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:

Essroc.

Holcim US.

Lehigh Hanson; Heidelberg Cement Group.

Approved equivalent.

Colored Masonry Cement:

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Cemex, Inc.

Essroc.

Holcim US.

Lehigh Hanson; Heidelberg Cement Group.

Approved equivalent.

Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

Retain one or both subparagraphs below to suit types of cement retained above. Percentages are for pigments containing only metallic oxides. If using pigments containing carbon black, carbon black must be limited to 2 percent of portland cement by weight or 1 percent of masonry or mortar cement.

Pigments shall not exceed 10 percent of portland cement by weight.

Pigments shall not exceed 5 percent of [**masonry cement**] [**or**] [**mortar cement**] by weight.

* + - * 1. Aggregate for Mortar: ASTM C144.

For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

White-Mortar Aggregates: Natural white sand or crushed white stone.

Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

* + - * 1. Aggregate for Grout: ASTM C404.

Delete "Epoxy Pointing Mortar" Paragraph below if not needed for pre-faced CMUs, glazed brick, or glazedstructural clay facing tile.

* + - * 1. Epoxy Pointing Mortar: ASTM C395, epoxy-resin-based material formulated for use as pointing mortar for glazed or pre-faced masonry units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Director’s Representative from manufacturer's colors.

Retain "Refractory Mortar Mix" Paragraph below if using firebox brick and clay flue linings.

* + - * 1. Refractory Mortar Mix: Ground fireclay or nonwater-soluble, calcium aluminate, medium-duty refractory mortar that passes ASTM C199 test; or an equivalent product acceptable to authorities having jurisdiction.

"Cold-Weather Admixture" Paragraph below is an example of a requirement for a concrete admixture often used in cold weather as an antifreeze. Appendix X1 in ASTM C270 and BIA generally recommend not using admixtures unless they are known to have no adverse effects. Before approving the use of cold-weather admixtures, verify their acceptability by laboratory testing with mortar mix used.

* + - * 1. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

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:

Euclid Chemical Company (The); an RPM company.

GCP Applied Technologies Inc.

Approved equivalent.

Retain "Water-Repellent Admixture" Paragraph below if integral water repellent is used in CMUs.

* + - * 1. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

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:

BASF Corporation.

Euclid Chemical Company (The); an RPM company.

GCP Applied Technologies Inc.

Approved equivalent.

* + - * 1. Water: Potable.
      1. REINFORCEMENT

Retain "Uncoated-Steel Reinforcing Bars" Paragraph below for reinforcing bars in grouted cells. Revise if another grade of steel is required. Revise to specify epoxy-coated, stainless steel, or galvanized bars if required.

* + - * 1. Uncoated-Steel Reinforcing Bars: ASTM A615 or ASTM A996, Grade 60.
        2. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold 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.

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:

Heckmann Building Products, Inc.

Hohmann & Barnard, Inc.

Wire-Bond.

Approved equivalent.

Standard in "Masonry-Joint Reinforcement, General" Paragraph below includes requirements for mill-galvanized carbon steel, hot-dip galvanized carbon steel, and stainless steel. Specifying these materials separately is unnecessary.

* + - * 1. Masonry-Joint Reinforcement, General: ASTM A951.

Mill-galvanized coating is not as thick as hot-dip galvanized coating. According to ASTM A951, mill-galvanized coating may be applied to wire before fabricating, but hot-dip galvanized coating must be applied after fabricating.

Interior Walls: [**Mill-**] [**Hot-dip**] galvanized carbon steel.

Exterior Walls: [**Hot-dip galvanized carbon] [Stainless**] steel.

Wire Size for Side Rods: [**0.148-inch**] [**0.187-inch**] diameter.

Wire Size for Cross Rods: [**0.148-inch**] [**0.187-inch**] diameter.

First option in "Wire Size for Veneer Ties" Subparagraph below is minimum wire size for tab-type ties and for eye units in adjustable ties; second option is minimum for pintle units in adjustable ties.

Wire Size for Veneer Ties: [**0.148-inch**] [**0.187-inch**] diameter.

Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.

Provide in lengths of not less than 10 feet [**, with prefabricated corner and tee units**].

Where grouted cells contain reinforcing bars, ladder-type reinforcement works better than truss type.

* + - * 1. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder[**or truss**] type with single pair of side rods.

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:

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

* + - * 1. Masonry-Joint Reinforcement for Multiwythe Masonry:

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:

Heckmann Building Products, Inc.

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

Retain one or more of three subparagraphs below and coordinate with requirements in Part 3. More than one type may be needed; "Composite Masonry" and "Cavity Walls" articles specify types required for various applications.

Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus [**one side rod**] [**two side rods**] at each wythe of masonry 4 inches wide or less.

Tab type, either ladder or truss design, with one side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe, but with at least 5/8-inch cover on outside face.

Adjustable (two-piece) type, either ladder or truss 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 horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.[**Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.**]

* + - * 1. Masonry-Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch- diameter, [**hot-dip galvanized carbon**] [**stainless**] steel continuous wire.
      1. TIES AND ANCHORS
         1. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
         2. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

Retain subparagraphs below only for those materials referenced in subsequent paragraphs.

"Mill-Galvanized, Carbon-Steel Wire" Subparagraph below is allowed only for anchors and ties in interior walls where humidity is less than 75 percent.

Mill-Galvanized, Carbon-Steel Wire: ASTM A82, with ASTM A641, Class 1 coating.

Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82, with ASTM A153, Class B-2 coating.

Retain first option in "Stainless Steel Wire" Subparagraph below unless higher corrosion resistance of Type 316 is required.

Stainless Steel Wire: ASTM A580, [**Type 304**] [**Type 316**].

"Galvanized-Steel Sheet" Subparagraph below is allowed only for anchors and ties in interior walls where humidity is less than 75 percent.

Galvanized-Steel Sheet: ASTM A653, Commercial Steel, G60 zinc coating.

Steel Sheet, Galvanized after Fabrication: ASTM A1008, Commercial Steel, with ASTM A153, Class B coating.

Retain first option in "Stainless Steel Sheet" Subparagraph below unless higher corrosion resistance of Type 316 is required.

Stainless Steel Sheet: ASTM A240 or ASTM A666, [**Type 304**] [**Type 316**].

Retain "Steel Plates, Shapes, and Bars" Subparagraph below if required for rigid anchors.

Steel Plates, Shapes, and Bars: ASTM A36.

Retain "Stainless Steel Bars" Subparagraph below if required for anchors for stone trim.

Stainless Steel Bars: ASTM A276 or ASTM A666, Type 304.

TMS 402/ACI 530/ASCE 5 requires that corrugated-metal veneer ties be at least 0.030 inch thick and requires closer spacing for veneer ties less than 0.060 inch thick.

* + - * 1. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from [**0.030-inch-thick steel sheet, galvanized after fabrication**] [**0.060-inch-thick steel sheet, galvanized after fabrication**] [**0.031-inch-thick, stainless steel sheet**] [**0.062-inch-thick, stainless steel sheet**].
        2. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

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.

Where wythes [**do not align**] [**are of different materials**], use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.

If retaining last option in "Wire" Subparagraph below, note that TMS 402/ACI 530/ASCE 5 does not allow ties made from mill-galvanized wire for interior use in spaces where humidity exceeds 75 percent.

Wire: Fabricate from [**3/16-inch-**] [**1/4-inch-**] diameter, [**hot-dip galvanized steel] [stainless steel] wire.[ Mill-galvanized wire ties may be used in interior walls unless otherwise indicated.**]

* + - * 1. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

If retaining last option in "Anchor Section for Welding to Steel Frame" Subparagraph below, note that TMS 402/ACI 530/ASCE 5 does not allow ties made from mill-galvanized wire for interior use in spaces where humidity exceeds 75 percent.

Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, [**hot-dip galvanized steel] [stainless steel] wire.[ Mill-galvanized wire may be used at interior walls unless otherwise indicated**.]

If retaining last option in "Tie Section" Subparagraph below, note that TMS 402/ACI 530/ASCE 5 does not allow ties made from mill-galvanized wire for interior use in spaces where humidity exceeds 75 percent.

Tie Section: Triangular-shaped wire tie made from [**0.187-inch-**] [**0.25-inch-**] diameter, [**hot-dip galvanized steel] [stainless steel] wire.[ Mill-galvanized wire may be used at interior walls unless otherwise indicated**.]

* + - * 1. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

Retain "Connector Section" and "Tie Section" subparagraphs below; otherwise, retain "Corrugated-Metal Ties" Subparagraph below.

Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from [**0.060-inch- thick steel sheet, galvanized after fabrication] [0.105-inch- thick steel sheet, galvanized after fabrication] [0.062-inch- thick, stainless steel sheet] [0.109-inch- thick, stainless steel sheet**].

Note that TMS 402/ACI 530/ASCE 5 does not allow ties made from galvanized-steel sheet for interior use in spaces where humidity exceeds 75 percent.

[**0.064-inch-**] [**0.108-inch-**] thick, galvanized-steel sheet may be used at interior walls unless otherwise indicated.

If retaining last option in "Tie Section" Subparagraph below, note that TMS 402/ACI 530/ASCE 5 does not allow ties made from mill-galvanized wire for interior use in spaces where humidity exceeds 75 percent.

Tie Section: Triangular-shaped wire tie made from [**0.187-inch-**] [**0.25-inch-**] diameter, [**hot-dip galvanized steel] [stainless steel] wire.[ Mill-galvanized wire may be used at interior walls unless otherwise indicated**.]

Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from [**0.060-inch- thick steel sheet, galvanized after fabrication**] [**0.075-inch--thick steel sheet, galvanized after fabrication**] [**0.105-inch- thick steel sheet, galvanized after fabrication**] [**0.062-inch- thick, stainless steel sheet**] [**0.078-inch- thick, stainless steel sheet**] [**0.109-inch- thick, stainless steel sheet**] with dovetail tabs for inserting into dovetail slots in concrete.

[**0.064-inch-**] [**0.079-inch-**] [**0.108-inch-**] thick galvanized sheet may be used at interior walls unless otherwise indicated.

* + - * 1. Partition Top Anchors: 0.105-inch- thick metal plate with a 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**] [**stainless steel**].

Rigid anchors can be used to connect T-intersections of CMU shear walls in lieu of masonry bonding or bond beams. They are also often used at T-intersections of other CMU walls, although masonry bonding and T-shaped masonry-joint reinforcement may be used.

* + - * 1. 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] [bent to configuration indicated**].

Retain one of three options in "Corrosion Protection" Subparagraph below. Rigid anchors may not be fully embedded in mortar or grout and therefore require a coating for corrosion protection. TMS 602/ACI 530.1/ASCE 6 requires hot-dip galvanized or epoxy coating.

Corrosion Protection: [**Hot-dip galvanized to comply with ASTM A153] [Epoxy coating 0.020 inch thick] [Rust-inhibitive paint**].

* + - * 1. Adjustable Masonry-Veneer Anchors:

General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.

Fabricate sheet metal anchor sections and other sheet metal parts from [**0.075-inch-** thick steel sheet, galvanized after fabrication] [**0.105-inch- thick steel sheet, galvanized after fabrication] [0.078-inch- thick, stainless steel sheet] [0.109-inch- thick, stainless steel sheet**].

Fabricate wire ties from [**0.187-inch-**] [**0.25-inch-**] diameter, **[hot-dip galvanized-steel] [stainless steel**] wire unless otherwise indicated.

Usually retain "Contractors Option" Subparagraph below along with the acceptable types of anchors.

Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.

Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with a projecting vertical tab having a slotted hole for inserting wire tie.

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:

FERO Corporation.

Hohmann & Barnard, Inc.

PROSOCO, Inc.

Wire-Bond.

Approved Equivalent.

Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section.

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:

Heckmann Building Products, Inc.

Hohmann & Barnard, Inc.

Quality Steel and Wire LLC.

Wire-Bond.

Approved Equivalent.

Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 9 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 5-1/2 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.

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:

Hohmann & Barnard, Inc.

Approved Equivalent.

Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.

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:

Heckmann Building Products, Inc.

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for inserting wire tie. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs.

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:

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

Screw-Attached, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing.

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:

Heckmann Building Products, Inc.

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

Anchors in first "Seismic Masonry-Veneer Anchors" Subparagraph below may be used for other than seismic conditions.

Seismic Masonry-Veneer Anchors: Connector section and rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having slotted holes for inserting vertical leg of connector section. Connector section consists of a rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire.

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:

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

Anchors in first "Seismic Masonry-Veneer Anchors" Subparagraph below may be used for other than seismic conditions.

Seismic Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section. Wire tie has sheet metal clip welded to it with integral tabs designed to engage continuous wire.

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:

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

Anchors in "Seismic Masonry-Veneer Anchors" Subparagraph below may be used for other than seismic conditions.

Seismic Masonry-Veneer Anchors: Connector section and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for inserting connector section. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs. Connector section consists of a triangular wire tie and rigid PVC extrusion with snap-in grooves for inserting continuous wire. Fabricate wire connector sections from [**0.187-inch-**] [**0.25-inch-**] diameter, [**hot-dip galvanized, carbon**] [**stainless**] steel wire.

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:

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

Fasteners in "Polymer-Coated, Steel Drill Screws for Steel Studs" Subparagraph below are for steel studs from 0.033 to 0.112 inch thick.

Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B117.

See the Evaluations and BIA Technical Notes 28B for use of stainless steel screws.

Stainless Steel Drill Screws for Steel Studs: ASTM C954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads; either made from Type 410 stainless steel or made with a carbon-steel drill point and 300 Series stainless steel shank.

* + - 1. EMBEDDED FLASHING MATERIALS

See the Evaluations for discussion of flashing materials before revising this article.

* + - * 1. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

Insert terne-coated stainless steel or lead-coated copper if required.

Stainless Steel: ASTM A240 or ASTM A666, Type 304, 0.016 inch thick.

Copper: ASTM B370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch thick or ASTM B370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162 inch thick.

Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.

Delete first subparagraph below if plain (flat) sheet metal flashing is acceptable. Revise if dovetail pattern is required for interlocking bond.

Fabricate through-wall metal flashing embedded in masonry from [**stainless steel**] [**copper**], with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.

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:

Cheney Flashing Company.

Hohmann & Barnard, Inc.

Keystone Flashing Company, Inc.

Approved Equivalent.

Delete first subparagraph below if not required.

Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.

Usually retain one or both of first two subparagraphs below if metal through-wall flashing is used. See the Evaluations.

Fabricate through-wall flashing with drip edge [**where**] [**unless otherwise**] indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees[**and hemmed**].

Fabricate through-wall flashing with sealant stop [**where**] [**unless otherwise**] indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 1/4 inch to form a stop for retaining sealant backer rod.

Retain first subparagraph below if either of last two subparagraphs above is used with ribbed metal flashing.

Fabricate metal [**drip edges**] [**and**] [**sealant stops**] for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam sheds water.

Retain one or both of first two subparagraphs below for use with flexible flashing if required. See the Evaluations.

Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees[**and hemmed**].

Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.

Fabricate metal expansion-joint strips from [**stainless steel**] [**copper**] to shapes indicated.

Solder metal items at corners.

Delete "Flexible Flashing" Paragraph below if only metal flashing is allowed. If concealed metal flashing is required at certain locations, indicate those locations on Drawings or revise paragraph.

* + - * 1. Flexible Flashing: Use[**one of**] the following unless otherwise indicated:

"Copper-Laminated Flashing" Subparagraph below is an example only; revise if other laminated products are required.

Copper-Laminated Flashing: [**5-oz./sq. ft.**] [**7-oz./sq. ft.**] copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.

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:

Advanced Building Products Inc.

Hohmann & Barnard, Inc.

STS Coatings, Inc.

Wire-Bond.

York Manufacturing, Inc.

Approved Equivalent.

Asphalt-Coated Copper Flashing: **[5-oz./sq. ft.] [7-oz./sq. ft.]** copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.

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:

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

Some rubberized-asphalt flashing products are 0.040 inch thick; some are 0.030 inch thick; others are 0.025 inch thick. BIA recommends 0.030 inch as a minimum thickness.

Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than [**0.030 inch**] [**0.040 inch**].

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:

Advanced Building Products Inc.

Carlisle Coatings & Waterproofing Inc.

GCP Applied Technologies Inc.

Heckmann Building Products, Inc.

Hohmann & Barnard, Inc.

Polyguard Products, Inc.

Wire-Bond.

Approved Equivalent.

Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

Self-adhesive flashing using butyl rubber is more expensive than that made with rubberized asphalt and must not be used in contact with asphalt; however, it is more adhesive than rubberized asphalt at cold temperatures and does not soften and run as readily at high temperatures.

Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than [**0.030 inch**] [**0.040 inch**].

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:

DuPont de Nemours, Inc.

GCP Applied Technologies Inc.

Protecto Wrap Company.

Raven Industries, Inc.

Wire-Bond.

Approved Equivalent.

Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.

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:

Hohmann & Barnard, Inc.

Mortar Net Solutions.

Wire-Bond.

Approved Equivalent.

Retain one or more of "Monolithic Sheet," "Self-Adhesive Sheet," and "Self-Adhesive Sheet with Drip Edge" subparagraphs below, or show on Drawings where each is required.

Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch thick.

Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch- thick coating of adhesive.

"Self-Adhesive Sheet with Drip Edge" Subparagraph below is for applications where flashing extends to face of masonry. This material may be unsuitable for use at sealant joints, because it is difficult to removethe sealant for replacement without damaging the flashing.

Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch- thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches from edge.

Color: [**Gray] [White] [Tan/buff] [Black**].

Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D4637, 0.040 inch thick.

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:

Carlisle Coatings & Waterproofing Inc.

Firestone Specialty Products.

Heckmann Building Products, Inc.

Hohmann & Barnard, Inc.

Wire-Bond.

Approved Equivalent.

* + - * 1. Application: Unless otherwise indicated, use the following:

Where flashing is indicated to receive counterflashing, use metal flashing.

Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.

Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing [**with a drip edge] [with a sealant stop] [or flexible flashing with a metal drip edge] [or elastomeric thermoplastic flashing with a drip edge] [or flexible flashing with a metal sealant stop**].

Where flashing is fully concealed, use [**metal flashing**] [**or**] [**flexible flashing**].

* + - * 1. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.
        2. Solder and Sealants for Sheet Metal Flashings:[ **As specified in Section 076200 "Sheet Metal Flashing and Trim."]**

Retain option in "Solder and Sealants for Sheet Metal Flashing" Paragraph above or one or more of "Solder for Stainless Steel," "Solder for Copper," and "Elastomeric Sealant" subparagraphs below. Grade Sn60 solder is 40 percent lead; Grade Sn96 is 0.10 percent lead; and Grade Sn50 is 50 percent lead.

Solder for Stainless Steel: ASTM B32, [**Grade Sn60**] [**Grade Sn96**], with acid flux of type recommended by stainless steel sheet manufacturer.

Solder for Copper: ASTM B32, [**Grade Sn50] [with maximum lead content of 0.2 percent**].

Revise "Elastomeric Sealant" Subparagraph below if sealant of specific type, grade, class, and use is required.

Elastomeric Sealant: ASTM C920, chemically curing [**urethane**] [**polysulfide**] [**silicone**] sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

* + - * 1. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
        2. Termination Bars for Flexible Flashing: [**Aluminum] [Stainless steel**] bars [**0.075 inch by 1 inch**] [**1/8 inch by 1 inch**].
        3. Termination Bars for Flexible Flashing: Stainless steel sheet 0.019 inch by 1-1/2 inches with a 3/8 inch sealant flange at top.
        4. Termination Bars for Flexible Flashing: Aluminum sheet 0.064 inch by 1-1/2 inches with a 3/8-inch sealant flange at top.
      1. MISCELLANEOUS MASONRY ACCESSORIES
         1. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from [**neoprene**] [**urethane**] [**or**] [**PVC**].
         2. Preformed Control-Joint Gaskets: Made from [**styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805] [or] [PVC, complying with ASTM D2287, Type PVC-65406**] and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
         3. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226, Type I (No. 15 asphalt felt).
         4. Weep/Cavity Vent Products: Use[**one of**] the following unless otherwise indicated:

Retain one or more of "Wicking Material," "Round Plastic Weep/Vent Tubing," "Rectangular Plastic Weep/Vent Tubing," "Cellular Plastic Weep/Vent," "Mesh Weep/Vent," "Aluminum Weep Hole/Vent," and "Vinyl Weep Hole/Vent" subparagraphs below; delete all if open-head joints are used for weep holes and cavity vents.

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. Use only for weeps.

Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch OD by 4 inches long.

Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 by 3-1/2 inches long.

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 less than depth of outer wythe, in color selected from manufacturer's standard.

Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.

Mortar will corrode aluminum unless protected with paint.

Aluminum Weep Hole/Vent: Units made from sheet aluminum, designed to fit into a head joint and consisting of a vertical channel, with louvers stamped in web and with a top flap to keep mortar out of the head joint; factory primed and painted before installation to comply with Section 099113 "Exterior Painting" in color selected by Director’s Representative.

Vinyl Weep Hole/Vent: Units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color selected by Director’s Representative.

Products described in "Cavity Drainage Material" Paragraph below can be used to keep weep holes clear.See the Evaluations.

* + - * 1. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

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:

Advanced Building Products Inc.

Hohmann & Barnard, Inc.

Keene Building Products.

Mortar Net Solutions.

Wire-Bond.

York Manufacturing, Inc.

Approved Equivalent.

"Configuration" Subparagraph below can be retained to maximize competition in bidding. If only one configuration is used, revise subparagraph by inserting the selected configuration.

Configuration: Provide one of the following:

Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.

Strips, not less than [**3/4 inch**] [**1-1/2 inches**] thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.

Sheets or strips, full depth of cavity and installed to full height of cavity.

Sheets or strips not less than [**3/4 inch**] [**1 inch**] <**Insert thickness**> thick and installed to full height of cavity, with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.

Insert other masonry accessories to suit Project.

* + - 1. MASONRY-CELL FILL
         1. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).
         2. Lightweight-Aggregate Fill: ASTM C331.
      2. MASONRY CLEANERS

Verify acceptability of cleaner for cleaning masonry with pigmented mortar joints and for types of masonryunits specified.

* + - * 1. 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. MORTAR AND GROUT MIXES
         1. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

Do not use calcium chloride in mortar or grout.

Retain one or more of first three subparagraphs below to indicate acceptable mortar types.

Use [**portland cement-lime**] [**masonry cement**] [**or**] [**mortar cement**] mortar unless otherwise indicated.

For exterior masonry, use [**portland cement-lime] [masonry cement] [or] [mortar cement**] mortar.

For reinforced masonry, use [p**ortland cement-lime] [masonry cement] [or] [mortar cement**] mortar.

Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

Preblended, dry mortar mix can help ensure uniformity, but is inappropriate for small projects.

* + - * 1. 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.
        2. Mortar for Unit Masonry: Comply with ASTM C270, [**Proportion**] [**Property**] Specification. Provide the following types of mortar for applications stated unless another type is indicated[**or needed to provide required compressive strength of masonry**].

Before retaining mortar types in subparagraphs below, see Appendix X1 in ASTM C270 and BIA Technical Notes 8A and 8B for recommendations; coordinate with requirements for masonry compressive strengths.

For masonry below grade or in contact with earth, use Type M.

For reinforced masonry, use [**Type M**] [**Type S**] [**Type N**].

For mortar parge coats, use [**Type S**] [**or**] [**Type N**].

For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.

For interior nonload-bearing partitions, Type O may be used instead of Type N.

* + - * 1. Pigmented Mortar: Use colored cement product[ **or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products**].

Retain first three subparagraphs below if retaining option in "Pigmented Mortar" Paragraph above. Percentages in first two subparagraphs are for pigments containing only metallic oxides. If pigments containing carbon black are used, carbon black must be limited to 2 percent of portland cement by weight or 1 percent of masonry cement or mortar cement.

Pigments shall not exceed 10 percent of portland cement by weight.

Pigments shall not exceed 5 percent of [**masonry cement**] [**or**] [**mortar cement**] by weight.

Insert materials and proportions used for sample in first subparagraph below if known.

Mix to match Director’s Representative's sample.

Application: Use pigmented mortar for exposed mortar joints with the following units:

Decorative CMUs.

Pre-faced CMUs.

Concrete face brick.

Clay face brick.

Hollow brick.

Glazed brick.

Glazed structural clay facing tile.

Stone trim units.

Cast-stone trim units.

* + - * 1. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

Insert materials and proportions used for sample in first subparagraph below if known.

Mix to match Director’s Representative's sample.

Application: Use colored-aggregate mortar for exposed mortar joints with the following units:

Decorative CMUs.

Pre-faced CMUs.

Concrete face brick.

Clay face brick.

Hollow brick.

Glazed brick.

Glazed structural clay facing tile.

Stone trim units.

Cast-stone trim units.

* + - * 1. Grout for Unit Masonry: Comply with ASTM C476.

Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.

Proportion grout in accordance with ASTM C476, [**Table 1] [or] [paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi**].

Provide grout with a slump of [**8 to 11 inches**] [**10 to 11 inches**] as measured according to ASTM C143.

* + - * 1. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.

Application: Use epoxy pointing mortar for exposed mortar joints with the following units:

Pre-faced CMUs.

Glazed brick.

Glazed structural clay facing tile.

1. EXECUTION
   * + 1. EXAMINATION
          1. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

Verify that foundations are within tolerances specified.

Verify that reinforcing dowels are properly placed.

Verify that substrates are free of substances that impair mortar bond.

* + - * 1. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
        2. Proceed with installation only after unsatisfactory conditions have been corrected.
      1. INSTALLATION, GENERAL
         1. 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.
         2. Build chases and recesses to accommodate items specified in this and other Sections.
         3. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
         4. 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.
         5. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
         6. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

Retain "Wetting of Brick" Paragraph below for high-suction brick. A simple test to determine if wetting is required consists of drawing a circle the size of a quarter on a brick and placing 20 drops of water in the circle; if water is absorbed within 1-1/2 minutes, the brick requires wetting.

* + - * 1. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C67. Allow units to absorb water so they are damp but not wet at time of laying.
      1. TOLERANCES
         1. Dimensions and Locations of Elements:

For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.

For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.

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.

* + - * 1. Lines and Levels:

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.

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.

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.

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.

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.

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.

If using Type FBS Rough brick or Type FBA brick, revise tolerance in subparagraph below to allow for variation in brick size.

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.

* + - * 1. Joints:

If using Type FBS Rough brick or Type FBA brick, revise tolerances in five subparagraphs below to allow for variation in brick size. Consider restricting tolerances if Type FBX brick is used.

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.

For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

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.**]

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.

* + - 1. LAYING MASONRY WALLS
         1. 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.

Pattern is usually running bond. If other bond patterns are required, specify in "Bond Pattern for Exposed Masonry" Paragraph below or indicate on Drawings.

* + - * 1. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in [**running bond**] [**stack bond**] [**one-third running bond**] [**Flemish bond**] [**English bond**] [**bond pattern indicated on Drawings**]; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
        2. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than [**2 inches**] [**4 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.
        3. Stopping and Resuming Work: Stop work by stepping 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.
        4. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

Revise first paragraph below if flexible perimeter joint or thermal break is required.

* + - * 1. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
        2. 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.
        3. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
        4. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

Retain one or more of first three subparagraphs below or revise to suit Project. Coordinate with firestopping requirements. Retain first subparagraph if live-load deflection of structure above will produce stress in masonry. Indicate on Drawings or insert descriptive requirements in this Section for building walls around steel joists and similar construction if required. Indicate joint-filler thickness on Drawings as well as details of connection required if structure acts as lateral support for partitions.

Install compressible filler in joint between top of partition and underside of structure above.

Spacing in first subparagraph below is an example only.

Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors [**48 inches**] <**Insert spacing**> o.c. unless otherwise indicated.

Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.

At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

* + - 1. MORTAR BEDDING AND JOINTING

If hollow bricks are used, retain appropriate option in either of first two paragraphs below. Hollow through-wall bricks are laid similarly to hollow CMUs, whereas, according to the BIA, hollow face bricks are full-bedded in same manner as solid face bricks.

* + - * 1. Lay [**hollow brick**] [**and**] [**CMUs**] as follows:

Bed face shells in mortar and make head joints of depth equal to bed joints.

Bed webs in mortar in all courses of piers, columns, and pilasters.

Bed webs in mortar in grouted masonry, including starting course on footings.

Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

* + - * 1. Lay solid masonry units[**and hollow brick**] 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.
        2. Lay structural clay tile as follows:

Lay vertical-cell units with full head joints unless otherwise indicated. Provide bed joints with full mortar coverage on face shells and webs.

Lay horizontal-cell units with full bed joints unless otherwise indicated. Keep drainage channels, if any, free of mortar. Form head joints with sufficient mortar so excess will be squeezed out as units are placed in position. Butter both sides of units to be placed, or butter one side of unit already in place and one side of unit to be placed.

Maintain joint thicknesses indicated except for minor variations required to maintain bond alignment. If not indicated, lay walls with 1/4- to 3/8-inch- thick joints.

* + - * 1. Set firebox brick in full bed of refractory mortar with full head joints. Form joints by buttering both surfaces of adjoining brick and sliding it into place. Make joints just wide enough to accommodate variations in size of brick, approximately 1/8 inch. Tool joints smooth on surfaces exposed to fire or smoke.
        2. Install clay flue liners to comply with ASTM C1283. Install flue liners ahead of surrounding masonry. Set clay flue liners in full bed of refractory mortar 1/16 to 1/8 inch thick. Strike joints flush on inside of flue to provide smooth surface. Maintain expansion space between flue liner and surrounding masonry except where surrounding masonry is required to provide lateral support for flue liners.
        3. Set [**stone**] [**cast-stone**] trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.

Allow cleaned surfaces to dry before setting.

Retain last subparagraph above for relatively impervious stones, such as granite; retain first subparagraph below for absorptive stones, such as limestone and sandstone, and for cast stone.

Wet joint surfaces thoroughly before applying mortar.

Rake out mortar joints for pointing with sealant.

* + - * 1. Rake out mortar joints at [**pre-faced CMUs**] [**glazed brick**] [**and**] [**glazed structural clay tile**] to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.

If another joint profile is used, revise first paragraph below or show on Drawings.

* + - * 1. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

* + - * 1. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
        2. Cut joints flush where indicated to receive [**waterproofing**] [**cavity wall insulation**] [**air barriers**] unless otherwise indicated.
      1. COMPOSITE MASONRY

Delete first paragraph below and retain "Individual Metal Ties" Paragraph if bonding system is indicated on Drawings.

* + - * 1. Bond wythes of composite masonry together [**using one of the following methods**] [**as follows**]:

Retain one or more bonding methods in "Individual Metal Ties," "Masonry-Joint Reinforcement," and "Header Bonding" subparagraphs below; revise methods retained to suit Project and office practice.

Revise spacings in "Individual Metal Ties" Subparagraph below to suit coursing, to comply with requirements of authorities having jurisdiction, or to comply with structural requirements imposed by wind or seismic forces. Spacings are for wire ties 0.187 inch in diameter, wire ties 0.148 inch in diameter, and adjustable two-piece ties, respectively.

Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for [**4.5 sq. ft.**] [**2.67 sq. ft.**] [**1.77 sq. ft.**] of wall area spaced not to exceed [**36 inches**] [**24 inches**] [**16 inches**] o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

Where bed joints of wythes do not align, use adjustable-type (two-piece-type) ties.

Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

Where bed joints of both wythes align, use [**ladder-type reinforcement extending across both wythes] [tab-type reinforcement**].

Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement[**with continuous horizontal wire in facing wythe attached to ties**].

First option in "Header Bonding" Subparagraph below provides headers equal to 4 percent of wall area for standard modular-size brick; second option provides 4 percent coverage for thicker brick.

Header Bonding: Provide masonry unit headers extending not less than 3 inches into each wythe. Space headers not more than [**8 inches**] [**12 inches**] clear horizontally and 16 inches clear vertically.

* + - * 1. Bond wythes of composite masonry together using bonding system indicated on Drawings.
        2. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.

Solid collar joints are required if sum of all wythes is needed to comply with height-to-thickness ratio requirements.

* + - * 1. Collar Joints in Clay Tile Masonry: After each course is laid, fill the vertical, longitudinal joint between wythes solidly with mortar at [**exterior walls, except cavity walls**] [**, and**] [**interior walls and partitions**].
        2. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.

Provide continuity with masonry-joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

* + - * 1. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:

Retain one of three subparagraphs below and revise to suit Project. If more than one type of bonding is required, revise subparagraphs and show locations of each on Drawings.

Provide individual metal ties not more than [**8 inches**] [**16 inches**] o.c.

Provide continuity with masonry-joint reinforcement by using prefabricated T-shaped units.

Provide rigid metal anchors not more than [**24 inches**] [**48 inches**] o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

* + - 1. CAVITY WALLS

Delete first paragraph below and retain second paragraph if bonding system is indicated on Drawings.

* + - * 1. Bond wythes of cavity walls together [**using one of the following methods] [as follows**]:

Retain one or more bonding methods in "Individual Metal Ties," "Masonry-Joint Reinforcement," "Header Bonding," and "Masonry-Veneer Anchors" subparagraphs below; revise methods retained to suit Project and office practice.

Revise spacings in "Individual Metal Ties" Subparagraph below to suit coursing, to comply with requirements of authorities having jurisdiction, or to comply with structural requirements imposed by wind or seismic forces. Spacings are for wire ties 0.187 inch in diameter, wire ties 0.148 inch in diameter, and adjustable two-piece ties, respectively.

Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for [**4.5 sq. ft.**] [**2.67 sq. ft.**] [**1.77 sq. ft.**] of wall area spaced not to exceed [**36 inches**] [**24 inches**] [**16 inches**] o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

Where bed joints of wythes do not align, use adjustable-type (two-piece-type) ties.

Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) ties to allow for differential movement regardless of whether bed joints align.

Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

Where bed joints of both wythes align, use [**ladder-type reinforcement extending across both wythes] [tab-type reinforcement**].

Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement[**with continuous horizontal wire in facing wythe attached to ties**].

Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) reinforcement[**with continuous horizontal wire in facing wythe attached to ties**] to allow for differential movement regardless of whether bed joints align.

First option in "Header Bonding" Subparagraph below provides headers equal to 4 percent of wall area for standard modular-size brick; second option provides 4 percent coverage for thicker brick.

Header Bonding: Provide masonry unit headers extending not less than 3 inches into each wythe. Space headers not more than [**8 inches**] [**12 inches**] clear horizontally and 16 inches clear vertically.

Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

* + - * 1. Bond wythes of cavity walls together using bonding system indicated on Drawings.

Attempting to remove mortar fins from cavity or to trowel them flat against brick usually results in increased mortar droppings at base of cavity.

* + - * 1. 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.
        2. Parge cavity face of backup wythe in a single coat approximately 3/8 inch thick. Trowel face of parge coat smooth.

Revise "Installing Cavity Wall Insulation" Paragraph below if adhesive is not used.

* + - * 1. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches 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.

Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

* + - 1. ANCHORED MASONRY VENEERS
         1. Anchor masonry veneers to [**wall framing**] [**and**] [**concrete and masonry backup**] with[**seismic**] masonry-veneer anchors to comply with the following requirements:

Fasten [**screw-attached**] [**and**] [**seismic**] anchors [**through sheathing to wall framing**] [**and**] [**to concrete and masonry backup**] with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

Embed [tie sections] [connector sections and continuous wire] in masonry joints.

Locate anchor sections to allow maximum vertical differential movement of ties up and down.

Retain one of three subparagraphs below to suit Project. First subparagraph below is BIA recommendation for metal-stud construction. Second subparagraph below is based on TMS 402/ACI 530/ASCE 5 requirement for less than 40-psf wind load. First option is for adjustable two-piece anchors, wire anchors 0.148 inch in diameter, and corrugated sheet metal anchors; second is for all other anchors. Third subparagraph below is based on TMS 402/ACI 530/ASCE 5 requirement for 40- to 55-psf wind load for adjustable two-piece anchors, wire anchors 0.148 inch in diameter, and corrugated sheet metal anchors. Revise spacing to suit coursing, comply with requirements of authorities having jurisdiction, or comply with structural requirements imposed by wind or seismic forces.

Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

Space anchors as indicated, but not more than 16 inches o.c. vertically and 25 inches o.c. horizontally, with not less than one anchor for each [**2.67 sq. ft.**] [**3.5 sq. ft.**] of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

Space anchors as indicated, but not more than 18 inches o.c. vertically and horizontally. Install additional anchors within 12 inches of openings and at intervals, not exceeding 24 inches, around perimeter.

BIA Technical Notes 28B recommends 2 inches of airspace. Wider airspaces require closer tie spacing.

* + - * 1. Provide not less than [**2 inches**] [**1 inch**] <**Insert distance**> of airspace between back of masonry veneer and face of [**sheathing**] [**insulation**].

Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

* + - 1. MASONRY-CELL FILL
         1. Pour [**loose-fill insulation**] [**lightweight-aggregate fill**] into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 20 feet.
         2. Install molded-polystyrene insulation units into masonry unit cells before laying units.
      2. MASONRY-JOINT REINFORCEMENT
         1. 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.

Revise three subparagraphs below if different spacing is required; delete if shown on Drawings.

Space reinforcement not more than 16 inches o.c.

Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.

Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings[**in addition to continuous reinforcement**].

* + - * 1. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

First paragraph below can be deleted if rigid anchors are used to bond walls at intersections.

* + - * 1. Provide continuity at wall intersections by using prefabricated T-shaped units.
        2. Provide continuity at corners by using prefabricated L-shaped units.

Retain last paragraph above or option in paragraph below.

* + - * 1. Cut and bend reinforcing units as directed by manufacturer for continuity at[**corners,**] returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
      1. ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE
         1. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

Provide an open space not less than [**1/2 inch**] [**1 inch**] [**2 inches**] wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

Anchor masonry with anchors embedded in masonry joints and attached to structure.

Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

* + - 1. CONTROL AND EXPANSION JOINTS
         1. 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 to allow for in-plane wall or partition movement.

Show locations of joints on Drawings.

* + - * 1. Form control joints in concrete masonry [**as follows**] [**using one of the following methods**]:

Retain one or more of four subparagraphs below.

Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.

Install preformed control-joint gaskets designed to fit standard sash block.

Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.

Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

* + - * 1. Form expansion joints in brick as follows:

Retain one or more of first three subparagraphs below.

Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.

Build flanges of factory-fabricated, expansion-joint units into masonry.

Build in compressible joint fillers where indicated.

Form open joint full depth of brick wythe and of width indicated, but not less than [**3/8 inch**] [**1/2 inch**] <**Insert minimum width**> for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

* + - * 1. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than [**3/8 inch**] <**Insert minimum width**>.

Revise subparagraph below to suit Project. Show locations of joints on Drawings.

Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

* + - 1. LINTELS
         1. Install steel lintels where indicated.
         2. Provide [**concrete**] [**or**] [**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.

Delete paragraph below if bearing is shown on Drawings.

* + - * 1. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.
      1. FLASHING, WEEP HOLES, AND CAVITY VENTS

Retain option in "General" Paragraph below if wall is designed on rain-screen principle with cavity vents acting to equalize air-pressure differential between cavity and exterior. Indicate spacing of cavity vents and blocking on Drawings. See the Evaluations.

* + - * 1. 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.[**Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.**]
        2. Install flashing as follows unless otherwise indicated:

Retain option in first subparagraph below for manufactured flashing; delete if only metal flashing is used.

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**].

Retain any of nine subparagraphs below and revise to suit wall configurations used. Arrangement of flashing can be communicated better by detailing on Drawings rather than by relying on any of the nine subparagraphs.

At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of [**4 inches**] [**8 inches**], and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.

Retain last subparagraph above or first subparagraph below if multiwythe masonry walls are used. NCMA recommends against extending flashing through inner wythe. Delete last option in subparagraph below if metal is not used.

At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of [**4 inches**] [**8 inches**], and 1-1/2 inches into the inner wythe.[**Form 1/4-inch hook in edge of flashing embedded in inner wythe.**]

At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under [**water-resistive barrier**] [**air barrier**], lapping at least 4 inches.[**Fasten upper edge of flexible flashing to sheathing through termination bar.**]

At lintels and shelf angles, 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.

Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.

Install metal [**drip edges**] [**and**] [**sealant stops**] with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.

Retain one of three subparagraphs below if flexible flashing materials are used. See the Evaluations.

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.

Install metal flashing termination 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 flashing termination.

Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

* + - * 1. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
        2. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
        3. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

Use [**specified weep/cavity vent products] [or] [open-head joints**] to form weep holes.

Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.

Space weep holes 24 inches o.c. unless otherwise indicated.

Retain last subparagraph above if weep holes other than those made of plastic tubing or wicking are used. Retain first subparagraph below if weep holes made of plastic tubing or wicking are used.

Space weep holes formed from [**plastic tubing**] [**or**] [**wicking material**] 16 inches o.c.

Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

Trim wicking material flush with outside face of wall after mortar has set.

* + - * 1. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches, to maintain drainage.

Delete subparagraph below if pea gravel is not used full height in cavities.

Fill cavities full height by placing pea gravel in cavities as masonry is laid, so that at any point, masonry does not extend more than 24 inches above top of pea gravel.

* + - * 1. Place cavity drainage material in [**cavities**] [**airspace behind veneers**] to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

Retain paragraph below if wall is designed with vents acting to equalize air-pressure differential between cavity and exterior. Indicate spacing of vents and blocking on Drawings. See the Evaluations.

* + - * 1. Install cavity vents in head joints in exterior wythes at spacing indicated. Use [**specified weep/cavity vent products**] [**or**] [**open-head joints**] to form cavity vents.

Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

* + - 1. REINFORCED UNIT MASONRY

Usually retain "Temporary Formwork and Shores" Paragraph below only if reinforced masonry beams, slabs, soffits, and similarly formed elements are required.

* + - * 1. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

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.

Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

* + - * 1. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
        2. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

Retain subparagraph below unless high-lift grouting is allowed. See the Evaluations. TMS 602/ACI 530.1/ASCE 6 limits grout lifts to 60 inches unless masonry has cured for at least 4 hours, grout slump is between 10 and 11 inches, and there are no intermediate bond beams between top and bottom of pour height.

Limit height of vertical grout pours to not more than [**60 inches**] [**12.67 ft.**] <**Insert height**>.

* + - 1. FIELD QUALITY CONTROL
         1. Testing and Inspecting: Director’s Representative will engage a special inspector and a qualified testing agency to perform tests and inspections in accordance with the requirements of BDC 406 Summary of Special Inspections and BDC 406.1 Statement of Special Inspections and as directed by the Code Compliance Manager.
      2. PARGING
         1. Parge exterior faces of below-grade masonry walls, where indicated, in two 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.
         2. 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.
         3. Damp-cure parging for at least 24 hours and protect parging until cured.
      3. REPAIRING, POINTING, AND CLEANING
         1. 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.
         2. 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.
         3. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
         4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Director’s Representative's approval of sample cleaning before proceeding with cleaning of masonry.

Delete first two subparagraphs below if cleaners are not specified in Part 2 or if cleaners are not allowed.

Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

Retain either or both of last two subparagraphs above, or retain first subparagraph below. Coordinate with products retained in Part 2. If high-pressure water cleaning or other methods are acceptable, delete or revise subparagraph below and insert applicable requirements.

Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

Clean stone trim to comply with stone supplier's written instructions.

Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

* + - 1. MASONRY WASTE DISPOSAL
         1. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

Retain "Waste Disposal as Fill Material" Paragraph below if clean masonry waste can be used as fill in footing trenches, etc. This diverts some material from waste stream, conserving landfill space and energy required to haul waste away.

* + - * 1. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

Crush masonry waste to less than 4 inches in each dimension.

Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."

Generally, retain subparagraph below. If required, increase limit if acid-soil plants are used for foundation plantings.

Do not dispose of masonry waste as fill within 18 inches of finished grade.

* + - * 1. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
        2. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Director’s Representative's property.

END OF SECTION 042000