

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Concrete and masonry lintels.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry-joint reinforcement.
7. Ties and anchors.
8. Embedded flashing.
9. Miscellaneous masonry accessories.
10. Masonry-cell fill.
11. Masonry cleaners.

B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.
2. Steel shelf angles for supporting unit masonry.
3. Cavity wall insulation.
4. Firesafing Insulation.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.
2. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
3. Section 071113 "Bituminous Dampproofing".
4. Section 072100 "Thermal Insulation" for cavity wall insulation.
5. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
6. Section 079200 "Joint Sealants".

7. Divisions 22 & 23 for work related to Mechanical Trades.
8. Divisions 26 & 28 for work related to Electrical Trades.

D. Products furnished under this section for installation by others includes but is not necessarily limited to the following:

1. Division 05 Sections for connections to structural steel frame with sections of adjustable masonry anchors.

E. Products furnished under other sections for installation under this section includes but is not necessarily limited to the following:

1. Division 03 Sections for reinforcing bars for anchoring concrete floor and/or roof slabs.
2. Division 05 Sections for loose steel lintels, shelf and relieving angles, leveling plates, bars, angles, etc.
3. Division 07 Sections for manufactured reglets for metal flashing
4. Division 08 Sections for hollow metal frames.

1.3 DEFINITIONS

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

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of masonry product and accessory required.
- B. Shop Drawings: For the following:
 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
 4. Thru Wall Flashing: Show layout, joining, profiles, and anchorages of fabricated work; layouts at 1/4" scale, details at 3" scale. Provide details of relationship to contiguous work.
- C. Samples for Verification: For each type and color of the following:

1. Exposed and Decorative CMUs.
2. Pre-faced CMUs.
3. Special brick shapes.
4. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
5. Weep holes and cavity vents.
6. Accessories embedded in masonry, including reinforcing, ties, anchors and flashings.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
 1. Masonry units.
 - a. Include data on material properties and material test reports substantiating compliance with requirements.
 - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
 - d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 2. Integral water repellent used in CMUs.
 3. Cementitious materials. Include name of manufacturer, brand name, and type.
 4. Mortar admixtures.
 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 6. Grout mixes. Include description of type and proportions of ingredients.
 7. Reinforcing bars.
 8. Joint reinforcement.
 9. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- D. 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.

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

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution:
 - 1. Build mockup as indicated on drawings.
 - 2. Build mockup in location as directed by Architect, if not indicated on drawings.
 - 3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
 - 4. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver pre-blended, dry mortar mix in moisture-resistant containers. Store pre-blended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
- F. Limit moisture absorption during delivery and until time of installation of the maximum percentage allowed by ASTM C 90 for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest the Project site.

1.9 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
 2. Where one wythe of multi-wythe 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.
- B. 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.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
1. 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.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
- F. Do not lay masonry units which are wet or frozen.
1. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
 2. Remove all masonry determined to be damaged by freezing conditions.
 3. Protection of masonry against freezing when the temperature of the surrounding air is 40° F. and falling. Heat materials and provide temporary protection of completed portions of masonry work.

- G. Furnish and install all temporary bracing required to prevent damage or stress to new masonry work by reason of wind or other loads which may be superimposed on the work. Provide all bracing rigid, secure and solidly anchored against movement. Remove when no longer required. The Contractor shall be solely responsible for any damage incurred to the masonry work, including contingent and/or related damage, due to failure to properly brace and protect against external forces.
- H. Coordination: Review installation procedures and coordinate with other work that must be integrated with unit masonry.

1.10 COORDINATION

- A. Contractor will cooperate with other trades and Contracts in building their work and equipment as masonry work progresses as follows:
 - 1. Contractor shall thoroughly familiarize himself with Plumbing, Mechanical and Electrical Drawings and build at proper locations and elevations all openings for registers, grilles, louvers slots, chases, pipes, vents, heating units, drinking fountains, ducts, etc. as required. Cut neatly around all ducts, pipes, etc., where required. Mortar solid, seal or firestop joints between cut openings and face of pipe sleeves, conduit runs and ductwork so that no opening exists through the masonry.
 - 2. Set loose lintels, bearing and base plates, joint covers, anchor bolts, expansion assemblies, sleeves, and other miscellaneous work that must be built into masonry in accordance with Drawings.
 - 3. Where so directed, chases are to be filled in solid at floors with masonry after piping is installed to prevent spreading of fire or vermin.
 - 4. Build in conduit, plugs, sleeves, etc. as required for fastening of panels, electric, switches, receptacles, controls, etc. required by Mechanical and Electrical trades.
 - 5. Build carefully against all flashings. All surfaces to receive flashings shall be smooth, hard, free from projection, and satisfactory for work of other trades.
 - 6. Firestop masonry openings after setting sleeves or installation of ducts, conduit and other work in such manner as to maintain the nominal fire resistive rating of the wall or partition.
 - 7. Restore masonry openings after setting sleeves or installation of ducts, conduit, and other work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. 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.

- B. 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.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. 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 or will impair the quality of finished masonry work.
- C. Fire-Resistance Ratings: Where a fire resistance classifications are shown or scheduled for unit masonry construction (1-hr., 2-hr., 3-hr., and similar designations), comply with the requirements for materials and installations established by Underwriters Laboratories, Inc. (UL) Refer to the latest edition of the "Fire Resistance Directory".

2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. At interior locations provide bullnose units for outside corners unless otherwise indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units and where indicated.
 - 1. 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 E 514 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.
 - a. ACM Chemistries; RainBloc.
 - b. BASF; Enviroseal 20.
 - c. Grace Construction Products, W. R. Grace & Co.; Dry-Block.
- C. Insulated CMUs: Where indicated, units shall contain rigid, specially shaped, cellular thermal insulation units complying with ASTM C 578, Type I, designed for installing in cores of masonry units.
 - 1. Concrete Block Insulating Systems; Korfil.

2. Shelter Enterprises, Inc.; OmniCore.

D. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Density Classification: as noted below by type.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's selections.
5. Faces To Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.
 - a. Foundation Units (below grade): Normal weight, load bearing units, (125 lbs/cu ft, or greater, oven dry weight of concrete) with at least 75% cross sectional area at bedding surfaces (bed faces).
 - b. Above grade units (not exposed to exterior): Medium weight, load bearing units, (105 to 125 lbs/cu ft, oven dry weight of concrete, expanded 100% shale, clay or slate aggregate), nominal 4" units at fire-rated walls shall be minimum 75% solid cross sectional area at bedding surfaces (bed faces). Smooth face surface with minimal voids ready to accept painting system.
 - c. Above grade units (exposed to exterior): Normal weight, load bearing, Architectural Faced Units, (125 lbs/cu ft, or greater, oven dry weight of concrete), with integral water repellent.
6. Aggregate for sound deadening CMU walls: Washed natural sands, or manufactured granite, marble, quartz or limestone sands meeting ASTM C33 use to fill cores of interior CMU walls at locations indicated on the drawings.

E. Decorative CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Density Classification: Normal weight.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions or as otherwise listed below.
4. Pattern, Texture and Color:

<u>CMU Type CM-1:</u>	4x8x16 Veneer Block
Manufacturer:	Westbrook Concrete Block
Texture:	Polished Textured Face
Color #:	PFT-349A
Size:	3-5/8"W x 7-5/8"H x 15-5/8"L

<u>CMU Type CM-1S:</u>	6x8x24 Solid Sill Special Shape
Manufacturer:	Westbrook Concrete Block
Texture:	Polished Face
Color #:	PFT-349A
Size:	5-5/8"W x 7-5/8"H x 23-5/8"L
Accessories:	Provide pre-manufactured corner pieces at all locations indicated on drawings

2.4 CONCRETE AND MASONRY LINTELS

- A. General: Provide one of the following:
- B. 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.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, 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.
 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S. Do not use-air entraining additives.

- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
 - 1. Davis Colors; True-Tone.
 - 2. Lanxess Corporation; Bayferrox.
 - 3. Solomon Colors, Inc.; SGS Mortar Colors.
- E. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 1. Colored Portland Cement-Lime Mix:
 - a. Lehigh Hanson, Inc; Custom Color Portland/Lime Cement.
 - 2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - 3. Pigments shall not exceed 10 percent of portland cement by weight.
- F. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C 404.
- H. Epoxy Pointing Mortar: ASTM C 395, 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 Architect from manufacturer's colors.
- I. Refractory Mortar Mix: Ground fireclay or nonwater-soluble, calcium aluminate, medium-duty refractory mortar that passes ASTM C 199 test; or an equivalent product acceptable to authorities having jurisdiction.
- J. Cold-Weather Admixture: Non-chloride, non-corrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Euclid Chemical Company (The); Accelguard 80.
2. Grace Construction Products; W. R. Grace & Co.; Morset.
3. Sonneborn Products, BASF; Trimix-NCA.

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

1. ACM Chemistries; RainBloc for Mortar.
2. Addiment Incorporated; Block Plus W-10.
3. Grace Construction Products, W. R. Grace & Co.; Dry-Block Mortar Admixture.

L. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60.

B. 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.

1. Hohmann & Barnard, Inc.; RB and/or RB-Twin Rebar Positioners, or approved equal. Provide with Spyra-Lox Rebar Lap-Joint Tie where reinforcing bars are lapped.

C. Masonry-Joint Reinforcement, General: ASTM A 951.

1. Interior Walls: Hot-dip galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 0.187-inch diameter.
4. Wire Size for Cross Rods: 0.187-inch diameter.
5. Wire Size for Veneer Ties: 0.187-inch diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Multiwythe Masonry:

1. 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 shall have hooks or clips to engage a continuous horizontal wire in the facing wythe where required for seismic installations.

E. Masonry-Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch diameter, hot-dip galvanized carbon steel continuous wire.

2.7 TIES AND ANCHORS

- A. 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.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82, with ASTM A 153, Class B-2 coating.
 2. Stainless-Steel Wire: ASTM A 580, Type 304.
 3. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, with ASTM A 153, Class B coating.
 4. Stainless-Steel Sheet: ASTM A 240 or ASTM A 666, Type 304.
 5. Steel Plates, Shapes, and Bars: ASTM A 36.
 6. Stainless-Steel Bars: ASTM A 276 or ASTM A 666, Type 304.
- C. 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.
1. Hohmann & Barnard, Inc.; #CWT - Corrugated Wall Tie.
- D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units.
 2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
 3. Wire: Fabricate from 3/16-inch diameter, hot-dip galvanized steel wire.
- E. 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.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
 - a. Hohmann & Barnard, Inc.; #359 – Weld-On Tie, or approved equal.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch diameter, hot-dip galvanized steel wire.
 - a. Hohmann & Barnard, Inc.; #301W – Column Web Tie, or approved equal.
- F. 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.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.105-inch thick steel sheet, galvanized after fabrication.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch diameter, hot-dip galvanized steel wire.
 - a. Hohmann & Barnard, Inc.; #315 – Flexible Dovetail Brick Tie with #305 Dovetail Slot, or approved equal. (Use Hohmann & Barnard, Inc.; #315-BT Flexible Dovetail Brick Tie with Seismiclip with #305 Dovetail Slot for seismic applications.)
- G. 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.
1. Hohmann & Barnard, Inc.; #PTA-420, or approved equal.
- H. Rigid Anchors: Fabricate from hot-dipped galvanized steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
1. Hohmann & Barnard, Inc.; #344 – Rigid Partition Anchor, or approved equal.
- I. Anchor bolts: Galvanized steel, 1/2" diameter x 16" long with 3" leg or as indicated on drawings.
- J. Adjustable Masonry-Veneer Anchors:
1. 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.
 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.105-inch thick steel sheet, galvanized after fabrication.
 3. Fabricate wire ties from 0.187-inch diameter, hot-dip galvanized-steel wire unless otherwise indicated.
 4. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
 5. Screw-Attached, Masonry-Veneer Anchors for stud framed back-up walls: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 5-1/2 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.
 - a. Hohmann & Barnard, Inc.; #DW-10HS, or approved equal. (Use #DW-10HS with Byna-Lok Tie for seismic applications.)
 - b. Hohmann & Barnard, Inc.; #HB-213, or approved equal. (Use SH Series Seismic Hook and continuous wire for seismic applications.)

- c. Hohmann & Barnard, Inc.; #X-Seal Anchor, or approved equal. Combine with manufacturer's recommended self-sealing adhesive backed tape. (Selected Tie Section to be used with this option and whether an SH Series Seismic Hook and continuous wire for seismic application is needed.)

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows. Refer to Section 076200 "Sheet Metal Flashing and Trim" for additional requirements.
- B. Metal Base Flashing: Continuous metal base flashing for through-wall flashing assemblies. Minimum 3" width with foam bottom seal and adhesive top strip to secure through-wall flashing material.
 1. Hohmann & Barnard, Inc.; #DP-FTSA Drip Plate, or approved equal.
 - a. Stainless Steel: Type 304, 26 gauge.
 - b. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide 4" wide splice plates at joints of formed, smooth metal flashing.
 2. 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.
 3. Discontinue base flashing at locations of expansion joints.
 4. Provide pre-manufactured, welded inside and outside corners and end dams to suit project conditions.
- C. Flexible Flashing: Use the following unless otherwise indicated:
 1. Products of manufacturers listed below meeting indicated standards and specified manufacturer's product data characteristics, except as modified below, are acceptable for use, subject to compliance with specified requirements:
 - a. York Manufacturing, Inc.; York 304 SS (Basis of Design)
 - b. Illinois Products, Inc.; IPCO Self-Adhesive Stainless Steel
 - c. STS Coatings, Inc.; Wall Guardian Self Adhering Stainless Steel Flashing
 - d. TK Products, Inc.; TK Self-Adhering Stainless Steel TWF
 - e. Vapro Shield, Inc.; VaproThru-Wall Flashing SA
 2. Characteristics
 - a. Type: stainless steel core with one uncoated (bare) stainless steel face (outward facing) with a butyl block co-polymer adhesive (inward facing).
 - b. Stainless steel: type 304, ASTM A240. Domestically sourced per DFARS 252.225-7008 and/or DFARS 252.225-7009.
 - c. Adhesive: block co-polymer
 - d. Size: Manufacturer's standard width rolls.
 3. Flexible Flashing Accessories:

- a. Polyether Sealant:
 - 1) York Manufacturing, Inc.; UniverSeal US-100 (Basis of Design)
 - 2) STS Coatings; GreatSeal LT-100
 - 3) Prosoco, Inc.; R-Guard Joint Seam Sealer
- b. Splice Tape:
 - 1) York Manufacturing, Inc.; York 304 SS (Basis of Design)
 - 2) Illinois Products, Inc.; IPCO Self Adhering Stainless Steel Flashing
- c. Corner and End Dams: form the stainless steel flashing in the field or use 26 gauge stainless steel pre-manufactured corners.
- d. Mortar deflection: polyester strands that will not degrade and will keep weep vents from clogging with mortar.
 - 1) York Manufacturing; Weep-Armor (Basis of Design)
 - 2) Or approved equal
- e. Termination bar: rigid PVC or stainless steel termination bar with sealant catch lip
 - 1) York Manufacturing; T-96 termination bar (Basis of Design)
 - 2) Or approved equal
- f. Accessories: Provide primers and seaming materials produced by flashing manufacturer.

D. Application: Unless otherwise indicated, use the following:

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

E. Solder and Sealants for Sheet Metal Flashings:

- 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips in thicknesses required, complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

- 1. Hohmann & Barnard, Inc.; NS – Neoprene Sponge, or approved equal.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

- 1. Hohmann & Barnard, Inc.; RS or RS-Tee Rubber Control Joint, or approved equal.

- C. Bond-Breaker Strips: No. 15 Asphalt-saturated felt complying with ASTM D 226, Type I.
- D. Weep/Cavity Vent Products: Cellular Plastic, 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.
 - 1. Hohmann & Barnard, Inc.; Quadro-Vent, or approved equal.
 - a. Spaced 24" o.c. for brick.
 - b. Spaced 32" o.c. for CMU's.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
 - 1. Mortar Net Solutions; Mortar Net, or approved equal.
 - 2. Configuration: Provide the following:
 - a. Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.
- F. Mortar/Grout Screen: Monofilament screen fabricated from high strength, non-corrosive polypropylene polymers used to isolate the flow of mortar/grout in CMU walls. 1/4" square mesh by widths as required for CMU assembly.
 - 1. Hohmann & Barnard, Inc.; MGS – Mortar / Grout Screen, or approved equal.

2.10 MASONRY-CELL FILL

- A. Molded-Polystyrene Insulation Units: Rigid, cellular thermal insulation formed by the expansion of polystyrene-resin beads or granules in a closed mold to comply with ASTM C 578, Type I. Provide specially shaped units designed for installing in cores of masonry units.
 - 1. Concrete Block Insulating Systems; Korfil.
 - 2. Shelter Enterprises Inc.; Omni Core.

2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 - 1. Diedrich Technologies, Inc.

2. EaCo Chem, Inc.
3. ProSoCo, Inc.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. 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.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry].
1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S.
 3. For mortar parge coats, use Type N.
 4. For exterior, above-grade, load-bearing and non-loadbearing walls and parapet walls; for interior load-bearing walls; for interior non-loadbearing partitions; and for other applications where another type is not indicated, use Type N.
 5. For interior non-loadbearing partitions, use Type N.
 6. Use Type M mortar to set anchor bolts and grout base plates.
- D. 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.
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Mix to match Architect's sample.
 3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Clay face brick.
- E. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperature existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night

temperatures. In heating mortar and grout materials, maintaining mixing temperature selected within 10° F.

1. 40°F to 32°F:
 - a. Mortar: Heat mixing water to produce mortar temperature between 40°F and 120°F.
 - b. Grout: Follow normal masonry procedures.
2. 32°F to 25°F:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
 - b. Grout: Heat grout materials to 90°F to produce in place grout temperature of 70°F at end of work day.
3. 25°F to 20°F:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
 - b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
 - c. Heat both sides of wall under construction using salamanders or other heat sources.
 - d. Use windbreaks or enclosures when wind is excess of 15 mph.
4. 20°F and below:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F.
 - b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
 - c. Masonry Units: Heat masonry units so that they are above 20°F at time of laying.
 - d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40°F for 24 hours after laying units.
 - e. Do not heat water for mortar and grout to above 160°F.
 - f. Protect completed masonry and masonry not being worked on in the following manner:
 - g. Temperature ranges indicated apply to mean daily air temperature except for grouted masonry. For grouted masonry temperature ranges apply to anticipated minimum night temperatures.
5. 40°F to 32°F:
 - a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistant membrane.
6. 32°F to 20°F:

- a. Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.
7. 20°F and below:
- a. Except as otherwise indicated, maintain masonry temperature above 32°F for 24 hours using enclosures using and supplementary heat, electric heating blankets, infrared lamps or other methods proved to be satisfactory. For grouted masonry maintain heated enclosure to 40°F for 48 hours.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

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

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

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

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond or bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 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.
- D. 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.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.

2. 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 o.c. unless otherwise indicated.
3. 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.
4. Interior Walls intersecting exterior walls shall not be tied in masonry bond. Terminate interior wall at face of exterior wall with a control joint and rake out 3/8" for caulking. Except at firewalls, tie walls together for lateral support with Rigid Anchors. Bends at the ends of anchors shall be embedded in cores filled with mortar. Place pieces of mortar/grout screen under anchor and over core to support mortar. Anchors are to be spaced every 48 inches o.c. vertically.
5. Wall Bracing: Adequately brace all walls against forces and pressures during entire construction period.
6. Install Safing Insulation to fill gap between deck flutes and top of fire rated wall. Cut safing insulation wider than gap to be filled to ensure compression fit and seal joint between insulation and edges deck and wall with caulking approved by safing insulation manufacturer for this purpose. Leave no voids in completed insulation.
7. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078446 "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

A. Lay brick and CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.
2. Match coursing, bonding, color, and texture of existing masonry.

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

- E. Rake out mortar for joints to receive caulking around door and window frames, and elsewhere as shown.
- F. Maintain joint widths, except for minor variations required to maintain bond alignment, or where applicable to match existing. If not otherwise indicated, lay walls with 3/8" joints. Cut joints flush for masonry walls that are to be concealed or to be covered by other materials. Fill scored joints of masonry units and precast lintels with mortar to be tooled to match other mortar joints. Tool exposed joints slightly concave, including joints in cavity walls and scored joints of masonry units.
- G. Cut joints flush where indicated to receive waterproofing, cavity wall insulation and/or air barriers unless otherwise indicated.
- H. Batch Control:
 - 1. Measure and batch materials either by volume or weight, such that the required proportions for mortar can be accurately controlled and maintained.
 - 2. Mix mortars with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of the mortar.
 - 3. Mix mortar ingredients for a minimum of five minutes in a mechanical batch mixer. Use water clean and free of deleterious materials which would impair the work. Do not use mortar which has begun to set, or if more than 2-1/2 hours has elapsed since initial mixing. Re-temper mortar during 2-1/2 hour period as required to restore workability.

3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together as follows:
 - 1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. 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 required for seismic assemblies.
 - b. 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 where required for seismic assemblies to allow for differential movement regardless of whether bed joints align.
 - 2. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

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

3.7 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and/or concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
1. Fasten screw-attached and seismic anchors through sheathing to wall framing or to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 2. Embed tie sections, connector sections and/or continuous wires into masonry joints.
 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 4. 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.
 5. 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 3.5 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.
 6. 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.
- B. Provide not less than 1 inch of airspace between back of masonry veneer and face of sheathing or insulation.
1. 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.

3.8 MASONRY-CELL FILL

- A. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.9 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.10 BOND BEAMS

- A. Provide deformed bar reinforcing in bond beams and other unit masonry work as shown. Lap reinforcing 24 diameters minimum at splices. Fill cavities containing reinforcing steel with type M mortar, course grout conforming to ASTM C 476, or concrete conforming to the requirements of Section 033000.

3.11 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
 - 1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.
 - 4. Except at fire walls, provide anchoring devices of the type shown and as specified. If not shown or specified, provide standard type for facing and back-up involved.
 - 5. Except at firewalls, anchor masonry to structural members with metal ties embedded in masonry joints and attached to anchors welded to structural steel.
 - 6. Except at firewalls, tie masonry to abutting steel columns or beams except as otherwise indicated. Space ties 24" o.c. vertically and 36" o.c. horizontally, unless otherwise indicated. Where top of wall restraint ties are required at tops of full height masonry walls, space at 32" o.c., unless otherwise indicated, and install down standing leg in head

joints mortared solid. If non-compressible dowel type restraints are used, provide plastic sleeve or other means of bond break in head joint.

3.12 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry by installing temporary foam-plastic filler in head joints, and removing filler when unit masonry is complete for application of sealant.
 - 1. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick as follows:
 - 1. Build in compressible joint fillers where indicated.
 - 2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."
- D. 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.
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.
- E. Provide vertical expansion, control and isolation joints in masonry at junctions to existing masonry, where shown and required, but not to exceed 28'-0" spacing, within 10 feet of one side of a corner, at wall offsets, at changes in wall height and directly below shelf angles. Build in related masonry accessory items as the masonry work progresses.
- F. Provide approved rated expansion joints and/or joints at joints within and between firewalls and intersecting/abutting walls including other rated walls.

3.13 LINTELS

- A. Install steel lintels where indicated.
 - 1. Steel lintels weighing more than 250 lbs. shall be installed by the Steel Contractor. All others shall be installed by the General Contractor or respective trade.
- B. 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.

- C. In firewalls, provide concrete or masonry lintels. Steel lintels are prohibited at firewall locations.
- D. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.
- E. Thoroughly pack space between penetration material and masonry with mortar for full width of wall at fire rated walls or fill space thoroughly with fire-stopping sealant.

3.14 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At multi-wythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 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.
 - 3. 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 or air barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.
 - 4. 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.
 - 5. 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.
 - 6. Install metal drip edges and/or 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.
 - 7. 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.

8. 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.
 9. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
 10. Locations:
 - a. Exterior Door Heads
 - b. Window and Storefront Heads and Sills
 - c. Horizontal Control Joints
 - d. Changes in Veneer Materials, vertically
 - e. Other wall openings
 - f. Where indicated on drawings
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use specified weep/cavity vent products to form weep holes.
 2. Space weep holes 24 inches o.c. for brick and 32 inches o.c. for CMU's, unless otherwise indicated.
 3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
- E. 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.
- F. Place cavity drainage material in cavities or airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- G. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.
- 3.15 REINFORCED UNIT MASONRY INSTALLATION
- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace,

- tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches.
- 3.16 REPAIRING, POINTING, AND CLEANING
- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
 7. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

8. Clean stone trim to comply with stone supplier's written instructions.
9. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.17 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. 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 Owner's property.

END OF SECTION 042000