

MASTERFORMAT SECTION 04-28-23
CONCRETE FORM MASONRY UNITS

This specification is for reference only and can be modified by the designer to meet their specific project requirements. Concrete Form Masonry Units (CFMU) are marketed as the "OneStep Building System". For more information contact your nearest OneStep Licensee or Distributor.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes form unit masonry assemblies consisting of concrete form masonry units including rigid insulation within the units.
- B. Related Sections include the following:
 - 1. Division 4 Section "Concrete Form Masonry Unit Assemblies" for CMU assemblies.
 - 2. Division 6 Section "Rough Carpentry" for rough bucks used at window and other openings.
 - 3. Division 7 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
 - 4. Division 10 Section "Louvers and Vents" for wall vents (brick vents).
 - 5. Division 7 Section "Backer Rod & Caulking of CFMU Expansion and Control Joints."
- C. Products installed, but not furnished, under this Section include the following:
 - 1. Steel lintels for form unit masonry, furnished under Division 5 Section "Metal Fabrications."
 - 2. Hollow-metal frames in form unit masonry openings, furnished under Division 8 Section "Steel Doors and Frames."
- D. Alternates: See Division 1 Section "Alternates" for work of this Section affected by Alternates.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following net-area compressive strengths (f_m) at 28 days. Determine compressive strength of masonry from net-area compressive strengths of masonry units and mortar types according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
 - 1. For Concrete Unit Masonry: $f_m = A_s$ indicated.

1.4 SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
- B. Shop Drawings: Show fabrication and installation details for the following:
 - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
 - 2. Fabricated Flashing: Detail corner units, and other special applications.

C. Samples for Initial Selection: For the following:

1. Unit masonry Samples in small-scale form showing the full range of colors and textures available for each different exposed masonry unit required.
2. Sheet metal flashing colors samples.
3. Color samples of mesh weep vent materials.

D. Samples for Verification: For the following:

1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
2. Sheet Metal Flashing: 12 inches (300 mm) long. Include fasteners, closures, and other attachments
3. Weep holes/vents in color to match mortar color.
4. Accessories embedded in the masonry.

E. Qualification Data:

F. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:

1. Each type of masonry unit required.
 - a. Include test results, measurements, and calculations establishing net-area compressive strength of masonry units.
2. Mortar complying with property requirements of UBC Standard 21-15.
3. Grout mixes complying with compressive strength requirements of UBC Standard 21-19. Include description of type and proportions of grout ingredients.

G. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

H. Letter of Recommendation: Provide a letter of recommendation from the CMU and CFMU manufacturer recommending proprietary cleaners and their use on their products.

1.5 QUALITY ASSURANCE

- A. CFMU Installer Qualifications: An experienced installer who has been licensor trained in the installation of the CFMU product or whose work has resulted in successful CFMU installation(s).
- B. CFMU Manufacturer: An experienced and licensed manufacturer in the manufacture of CFMU described for this project with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delay to the project schedule.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations for Form Masonry Units: Obtain exposed form masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required. Manufacture materials in concurrent batches to

maintain color consistency.

- E. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- F. Preconstruction Testing Service: Engage a qualified independent testing agency to perform the following preconstruction testing:
 - 1. Concrete Masonry Unit Test: For each concrete masonry unit indicated, per ASTM C 140.
 - 2. Mortar Test: For mortar properties per ASTM C109/C109M.
 - 3. Concrete Test: For compressive strength per ASTM C31/C31M.
- G. Mockups: Before installing form unit masonry, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Locate mockups in the locations indicated or, if not indicated, as directed by Architect.
 - 2. Build mockup of typical wall area as shown on Drawings.
 - 3. Build mockups for the following types of masonry in sizes approximately 48 inches long by 48 inches high by full thickness, including accessories. Include a sealant-filled joint at least 16 inches long in each mockup.
 - 4. Clean exposed faces of mockups with masonry cleaner as indicated.
 - 5. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 6. Protect accepted mockups from the elements with weather-resistant membrane.
 - 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 8. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
 - 9. Demolish and remove mockups when directed.
- H. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store CFMU on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
 - 1. Protect CFMU from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.
 - 2. Protect CFMU from direct sunlight/UV rays when stored more than 30 days.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

- A. Protection of CFMU: 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 and hold cover securely in place.
 - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building CFMU walls or columns.
- C. Stain Prevention: Prevent concrete, mortar, and soil from staining the face of CFMU to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
 - 5. Immediately clean cement residue and spills when filling the CFMU walls with concrete.
- 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 CFMU damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in Section 2104.3 of the Uniform Building Code.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until CFMU has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Protect CFMU work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
 - 1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 – PRODUCTS

2.1 PRODUCTS

- A. Products: Subject to compliance with requirements provide CFMU (marketed as the OneStep Building System) manufactured by a licensed OneStep manufacturer.

2.2 CONCRETE FORM MASONRY UNITS

- A. General: Provide concrete form masonry units consisting of two masonry face shells joined with High Strength Polymer cross members dovetailed into the face shells by the manufacturer with rigid insulation insert positioned to create two cavities within the concrete form masonry unit, an air space of not less than 3/4 inch (20mm) and a form cavity to be concrete filled and as follows:

- B. Provide shapes indicated and as follows:

- 1. Provide special shapes for corners, jambs, control joints, expansion joints, bonding, and other special conditions.
- 2. Provide square-edged units for outside corners, unless indicated as bullnose.

- C. Exposed Exterior Concrete Form Masonry Unit Face Shells: ASTM C90-13

- 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
- 2. Weight Classification: Normal weight, unless otherwise indicated.
- 3. Exposed Faces: Type_____.

 - a. Color:_____.

- 4. Water Repellants
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Block Plus W-10; Addiment Inc.
 - 2) Dry-Block; W. R. Grace & Co., Construction Products Division.
 - 3) Rheopel; Master Builders.
 - 4) Rainbloc; ACM

- D. Exposed Interior Concrete Form Masonry Unit Face Shells: ASTM C90-13

- 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
- 2. Weight Classification: Normal weight.
- 3. Finish: Exposed faces of the following general description matching color, pattern, and texture of Architect's samples.
 - a.) Type:_____.
 - b.) Color:_____.

2.3 MORTAR 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.
- B. Hydrated Lime: UBC Standard 21-13, Type S.
- C. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- D. Aggregate for Grout: ASTM C 404.
- E. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.
- F. Water: Potable.
- G. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Water-Repellent Admixture:
 - a. Dry-Block Mortar Admixture; W. R. Grace & Co., Construction Products Division.
 - b. Rainbloc; ACM

2.3 CONCRETE FILL MATERIALS

- A. Portland Cement: ASTM C 150, Type I/II.
- B. Hydrated Lime: ASTM C270 & C207
- C. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
 - 1. Class: Negligible weathering region, but not less than 1N.
 - 2. Nominal Maximum Aggregate Size: 3/8 inch (9 mm).
- D. Water: Potable and complying with ASTM C 94.

2.4 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60.
- B. Smooth Dowel Rods

2.5 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Shall be as specified in Division 7
- B. Joint Sealant for Flashings: Flashing manufacturer's standard products or products recommended by the flashing manufacturer for sealing flashing sheets to each other and to substrates.

- C. Fabrication: Shop fabricate flashings from sheet metal indicated above. Extend into wall, turned up not less than 1/2 inch behind rigid insulation and 1/2 inch out from exterior face of wall, with a hemmed outer edge bent down 30 degrees.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

- A. Bond-Breaker Strips: Manufacturer's standard composite flashing product consisting of a pliable and highly adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of 0.030 inch.

- 1. Products: Subject to compliance with requirements:

- a.
- b.
- c.

- B. Weep Vents: 2.5 by 4.0 by 0.5 inch, 200 denier 100% recycled polyester open weave mesh designed to allow airflow and to deter migration of insect to inside wall cavity.

- 1. Color: To match mortar color.
- 2. Acceptable Product:

- C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Subject to compliance with requirements.

- 1.
- 2.
- 3.

- D. Expanded Polystyrene Board Insulation: Rigid Cellular, polystyrene thermal insulation with closed cells and integral high-density skin; formed by the expansion of polystyrene base resin in a molding process to comply with ASTM C-578 Type IX (2#) with height and width sufficient to abut adjacent insulation inserts in an assembled CFMU wall.
 - 1. Thickness: 2 1/2 inches minimum
 - 2. Aged R-value: Minimum R12 for overall thickness

- E. Polyisocyanurate Board Insulation: Rigid insulation with reflective/radiant barrier quality foil facers on both sides, compliant with ASTM C-236/C-518.
 - 1. Thickness: 2 inches minimum
 - 2. Stabilized R-value: Minimum R14.4 (per manufacturers spec)

2.7 INSULATION MATERIALS

- A. Expanded Polystyrene Insulation: Rigid Cellular, polystyrene thermal insulation with closed cells and integral high-density skin; formed by the expansion of polystyrene base resin in a molding process to comply with ASTM C-578 Type IX (2#) with height and width sufficient to abut adjacent insulation inserts in an assembled CFMU wall.
 - 1. Thickness: 2-1/2inches minimum
 - 2. Aged R-value: Minimum R12 for overall thickness

- B. Foam In Place Insulation: Expanding foam products, commercially available, similar to Dow “Great Stuff” brand (See PART 3: EXECUTION, 3.6)

2.8 MASONRY CLEANERS

- A. Proprietary Commercial Cleaners: Provide proprietary commercial cleaners as recommended by the masonry manufacturer for use on their products.

2.9 MORTAR 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 concrete.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

- C. Mortar for Form Unit Masonry: Comply with ASTM C270, Proportion Specification.
 - 1. Limit cementitious materials in mortar to portland cement, and lime.
 - 2. For CFMU masonry below grade, in contact with earth, and above grade, use Type S.
 - 3. For exposed masonry provide water repellent treated mortar per water repellent manufacturer's recommended rate.

2.10 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Concrete fill: Proportion normal-weight concrete mix as follows:
 - 1. Compressive Strength (28 Days): 3000 psi (20.7 MPa).
 - 2. Minimum Slump: 8 inches (200 mm) Maximum Slump: 11 inches in accordance with ASTM C 143.

2.11 SOURCE QUALITY CONTROL

- A. Owner will engage a qualified independent testing agency to perform source quality-control testing indicated below:
 - 1. Payment for these services will be made by Owner.
 - 2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION, GENERAL

- A. Cut CFMU with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed. For cutting, use "utility" shape CFMU.

- B. Select and arrange units for exposed form unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.

3.3 CONSTRUCTION TOLERANCES

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
- E. For exposed 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. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
- F. 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.

3.4 LAYING CFMU WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
 - 1. One-half running bond with vertical joint in each course centered on units in courses above and below.
- C. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- E. Fill space between hollow-metal frames and masonry solidly with concrete fill, unless otherwise indicated.
- F. Keep cavities clean of mortar droppings and other materials during construction.
- G. Temporary Formwork and Shores: Construct temporary supports, bucks and shores as necessary to support reinforced masonry elements during construction.

1. Do not remove temporary supports, bucks or shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay form masonry units as follows:
 1. With full mortar coverage on horizontal and vertical face shells.
 2. Do not trowel mortar fins protruding into cavity.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
 1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

3.6 FOAM-IN-PLACE INSULATION

- A. Install foam-in-place insulation where indicated and at voids at control joints, window bucks, window and door frames, thermal breaks and voids between rigid insulation inserts and dissimilar material.

3.7 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by form masonry unit assemblies. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 1. Install anchor bolts, accurately located, to elevations required.
 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.8 EXPANSION AND CONTROL JOINTS

- A. General: Install expansion and control joints in form unit masonry where indicated. Place expansion joints at intervals not to exceed 24 ft. Place control joints between the expansion joints, at or near the center of the span.
- B. Form Expansion joints as follows:
 1. Use full and half length units to create a continuous, through the wall vertical joints at expansion joint locations.
 2. Place expansion joint filler strips vertically into the concrete cavity at the expansion joint location.
 3. Keep the head joints of the vertical expansion joint free of mortar.
 4. Discontinue reinforcing at expansion joint. Do not run reinforcing through the expansion joint filler strip.
 5. If required, place greased/capped smooth dowel rods through the expansion joint filler strip as called for on plans.
 6. Do not run horizontal joint wire through expansion joints.

C. Form Control joints as follows:

1. Create continuous vertical joint on exterior face only by laying “center scored control joint units” above head joint of adjoining units below, keeping head joint free of mortar.
2. At the end of each shift, use portable masonry saw to cut through the scored portion of the center scored units to form a continuous 3/8 inch wide vertical joint in the exterior face of the wall.
3. Reinforcing and concrete should be continuous behind control joints.
4. Do not run horizontal joint wire through control joints.

3.9 LINTEL FORMS

- A. Install steel lintel forms where indicated.
- B. Provide minimum bearing of 2 inches (50 mm) at each jamb, unless otherwise indicated.

3.10 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
 1. Extend flashing to inside of rigid insulation and turn up not less than 1/2 inch (25 mm).
 2. Extend flashing a minimum of 2 inches into masonry at each end of lintel, shelf angle, heads and sills.
 3. Extend sheet metal flashing 1/2 inch beyond face of masonry at exterior and turn flashing down to form a hemmed drip.
 4. Seal all laps and splices in flashing to prevent water from leaking through joints in the flashing.
- B. Install vents in vertical head joints at the top of each continuous cavity at spacing indicated. Use plastic weep hole/vents to form vents.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.11 STEEL REINFORCEMENT

- A. Placing Reinforcement: Comply with requirements of Section 2104.5 of the Uniform Building Code.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover of not less than 1/2 inch.
- D. Place reinforcement prior to concrete fill placement.
- E. Splice lap reinforcement not less than 40 bar diameters. Maintain not less than one reinforcement bar diameter between vertical reinforcement installations.

3.12 CONCRETE FILL PLACEMENT

- A. Filling of Concrete Cavity: Do not place concrete fill until entire height of masonry to be filled has attained sufficient strength to resist hydrostatic pressure of concrete fill.
 - 1. Before placement of concrete fill verify that reinforcing bars are correctly positioned with proper lap and alignment, and that the cavity is free from debris, obstructions, and excessive mortar droppings that would create voids in the concrete pour.
 - 2. Solidly fill CFMU cavity with concrete in lifts not to exceed 10 feet in height. Stop concrete pour flush with top of cavity. Trowel concrete at slight angle downward from interior face shells toward the insulation inserts.
 - 3. Use mechanized concrete pump or "grout hog" style concrete dumping system to place concrete.
 - 4. DO NOT USE SITE MIXED CONCRETE TO FILL CFMU WALLS.
 - 5. Consolidate concrete by manually "rodding" vertical rebar, or by using "rebar cap style" mechanical vibrators. DO NOT USE INSERTION STYLE MECHANICAL VIBRATORS IN CFMU WALLS.

3.13 FIELD QUALITY CONTROL

- A. Owner will engage a qualified independent testing agency to perform field quality-control testing indicated below.
 - 1. Payment for these services will be made by Owner.
 - 2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.
- C. Mortar properties will be tested per UBC Standard 21-16.
- D. Concrete fill testing per Division 3 Section "Cast In Place Concrete" for field quality control testing requirements.

3.14 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- C. In-Progress Cleaning: Clean form 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 per masonry manufacturer's written recommendations.

3.15 MASONRY WASTE DISPOSAL

- A. Excess Masonry and Waste: Remove excess masonry and waste and legally dispose of off Owner's property.