

## **SECTION 04 20 00 UNIT MASONRY**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

This section specifies requirements for construction of masonry unit walls.

#### **1.2 RELATED WORK**

- A. Mortars and grouts: Section 04 05 13, MASONRY MORTARING, Section 04 05 16, MASONRY GROUTING.
- B. Sealants and sealant installation: Section 07 92 00, JOINT SEALANTS.

#### **1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Samples:
  - 1. Face brick, sample panel, 200 mm by 400 mm (8 inches by 16 inches,) showing full color range and texture of bricks, bond, and proposed mortar joints.
  - 2. Concrete masonry units, when exposed in finish work.
  - 3. Anchors, and ties, one each and joint reinforcing 1200 mm (48 inches) long.
- D. Certificates:
  - 1. Certificates signed by manufacturer, including name and address of contractor, project location, and the quantity, and date or dates of shipment of delivery to which certificate applies.
  - 2. Indicating that the following items meet specification requirements:
    - a. Face brick.
    - b. Solid and load-bearing concrete masonry units, including fire-resistant rated units.

#### **1.4 SAMPLE PANEL: NA**

#### **1.5 WARRANTY**

Warrant exterior masonry walls against moisture leaks and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be five years.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):

- A951-06..... Steel Wire for Masonry Joint Reinforcement.
- C55-06 ..... Concrete Building Brick
- C56-05 ..... Structural Clay Non-Load-Bearing Tile
- C62-05 ..... Building Brick (Solid Masonry Units Made From Clay or Shale)
- C67-07 ..... Sampling and Testing Brick and Structural Clay Tile
- C216-07 ..... Facing Brick (Solid Masonry Units Made From Clay or Shale)
- C476-02 ..... Standard Specification for Grout for Masonry
- F1667-05..... Fasteners: Nails, Spikes and Staples

C. Masonry Industry Council:

All Weather Masonry Construction Manual, 2000.

D. American Welding Society (AWS):

D1.4-05        Structural Welding Code – Reinforcing Steel.

E. Federal Specifications (FS):

FF-S-107C-00 ..... Screws, Tapping and Drive

F. Brick Industry Association - Technical Notes on Brick Construction (BIA):

- 11-1986..... Guide Specifications for Brick Masonry, Part I
- 11A-1988..... Guide Specifications for Brick Masonry, Part II
- 11B-1988..... Guide Specifications for Brick Masonry, Part III Execution
- 11C-1998 ..... Guide Specification for Brick Masonry Engineered Brick Masonry, Part IV
- 11D-1988 ..... Guide Specifications for Brick Masonry Engineered Brick Masonry, Part IV continued

G. Masonry Standards Joint Committee; Specifications for Masonry Structures (ACI 530.1-05/ASCE 6-05/TMS 602-99) (MSJC).

## **PART 2 - PRODUCTS**

### **2.1 BRICK**

A. Face Brick:

1. ASTM C216, Grade SW, Type FBS.
2. Brick when tested in accordance with ASTM C67: Classified slightly efflorescent or better.

3. Size:
  - a. Modular
  - b. Thin Brick: 13 mm (1/2 inch) thick with angle shapes for corners.

## **2.2 CONCRETE MASONRY UNITS**

- A. Hollow and Solid Load-Bearing Concrete Masonry Units: ASTM C90.
  1. Unit Weight; Normal weight.
  2. Sizes: Modular.
  4. For molded faces used as a finished surface, use concrete masonry units with uniform fine to medium surface texture unless specified otherwise.
  5. Use bullnose concrete masonry units at corners exposed in finished work with 25 mm (one inch) minimum radius rounded vertical exterior corners (bullnose units).
  6. Customized units:
    - a. Sound-Absorbing Units:
      - 1) Vertical slots in face to core areas.
      - 2) Acoustical absorption insert: Mineral fiber and metal septum, providing unit with NRC rating of 0.70.
    - b. Split-face Units:
      - 1) Split-Rib Units: Rib shapes as shown.
      - 2) Ground Face Units:
    - c. Glazed Face Units: Facing conform to ASTM C744.
- B. Concrete Brick: ASTM C55.

## **2.3 CLAY TILE UNITS: N NA**

## **2.4 SHEAR KEYS: NA**

## **2.5 REINFORCEMENT:**

- A. Steel Reinforcing Bars: ASTM A615, deformed bars, 420 MPa (Grade 60) for bars No. 10 to No. 57 (No. 3 to No. 18), except as otherwise indicated.
- B. Where 6 mm diameter (No. 2) bars are shown, provide plain, round, carbon steel bars, ASTM A675, 550 MPa (Grade 80).
- C. Shop-fabricate reinforcement bars which are shown to be bent or hooked.
- D. Joint Reinforcement:
  1. Form from wire complying with ASTM A951.
  2. Galvanized after fabrication.
  3. Width of joint reinforcement 40 mm (1 5/8-inches) less than nominal width of masonry wall or partition.

4. Cross wires welded to longitudinal wires.
5. Joint reinforcing at least 3000 mm (10 feet) in length.
6. Joint reinforcing in rolls is not acceptable.
7. Joint reinforcing that is crimped to form drip is not acceptable.
8. Maximum spacing of cross wires 400 mm (16 inches) to longitudinal wires.
9. Ladder Design:
  - a. Longitudinal wires deformed 4 mm (0.16 inch) diameter wire.
  - b. Cross wires 4 mm (0.16 inch) diameter.
10. Trussed Design:
  - a. Longitudinal and cross wires not less than 4 mm (0.16 inch nominal) diameter.
  - b. Longitudinal wires deformed.
11. Multiple Wythes and Cavity wall ties:
  - a. Longitudinal wires 2.6 mm (0.10 inch), two in each wythe with ladder truss wires 2.6 mm (0.10 inch) overlay, welded to each longitudinal wire.
  - b. Longitudinal wires 4 mm (0.16 inch) with U shape 2.6 mm (0.10 inch) rectangular ties extending into other wythe not less than 75 mm (3 inches) spaced 400 mm o.c. (16 inches). Adjustable type with U shape tie designed to receive 4 mm (0.16 inch) pintle projecting into other wythe 75 mm (3 inches) minimum.

## **2.6 ANCHORS, TIES, AND REINFORCEMENT**

- A. Steel Reinforcing Bars: ASTM A615M, deformed bars, grade as shown.
- B. Joint Reinforcement:
  1. Form from wire complying with ASTM A951.
  2. Galvanized after fabrication.
  3. Width of joint reinforcement 40 mm (0.16 inches) less than nominal width of masonry wall or partition.
  4. Cross wires welded to longitudinal wires.
  5. Joint reinforcement at least 3000 mm (10 feet) in length.
  6. Joint reinforcement in rolls is not acceptable.
  7. Joint reinforcement that is crimped to form drip is not acceptable.
  8. Maximum spacing of cross wires 400 mm (16 inch) to longitudinal wires.
  9. Ladder Design:
    - a. Longitudinal wires deformed 4 mm (0.16 inch) h) diameter wire.
    - b. Cross wires 2.6 mm (0.10 inchdiameter).
  10. Trussed Design:

- a. Longitudinal and cross wires not less than 4 mm (0.16 inch nominal) diameter.
  - b. Longitudinal wires deformed.
- 11. Multiple Wythes and Cavity wall ties:
  - a. Longitudinal wires 4 mm (0.16 inch), two in each wythe with ladder truss wires 4 mm (0.16 inch) overlay, welded to each longitudinal wire.
  - b. Longitudinal wires 4 mm (0.16 inch) with U shape 4 mm (0.16 inch) rectangular ties extending into other wythe not less than 75 mm (3 inches) spaced 400 mm o.c. (16 inches). Adjustable type with U shape tie designed to receive 4 mm (0.16 inch) pintle projecting into other wythe 75 mm (3 inches min.).
- C. Adjustable Veneer Anchor for Frame Walls:
  - 1. Two piece, adjustable anchor and tie.
  - 2. Anchor and tie may be either type; use only one type throughout.
  - 3. Loop Type:
    - a. Anchor: Screw-on galvanized steel anchor strap 2.75 mm (0.11 inch) by 19 mm (3/4 inch) wide by 225 mm (9 inches) long, with 9 mm (0.35 inch) offset and 100 mm (4 inch) adjustment. Provide 5 mm (0.20 inch) hole at each end for fasteners.
    - b. Ties: Triangular tie, fabricated of 5 mm (0.20 inch) diameter galvanized cold drawn steel wire. Ties long enough to engage the anchor and be embedded not less than 50 mm (2 inches) into the bed joint of the masonry veneer.
  - 4. Angle Type:
    - a. Anchor: Minimum 2 mm (16 gage) thick galvanized steel angle shaped anchor strap. Provide hole in vertical leg for fastener. Provide hole near end of outstanding leg to suit upstanding portion of tie.
    - b. Tie: Fabricate from 5 mm (0.20 inch) diameter galvanized cold drawn steel wire. Form "L" shape to be embedded not less than 50 mm (2 inches) into the bed joint of the masonry veneer and provide upstanding leg to fit through hole in anchor and be long enough to allow 50 mm (2 inches) of vertical adjustment.
- D. Dovetail Anchors:
  - 1. Corrugated steel dovetail anchors formed of 1.5 mm (0.0598 inch) thick by 25 mm (1 inch) wide galvanized steel, 90 mm (3-1/2 inches) long where used to anchor 100 mm (4 inch) nominal thick masonry units, 140 mm (5-1/2 inches) long for masonry units more than 100 mm (4 inches) thick.

2. Triangular wire dovetail anchor 100 mm (4 inch) wide formed of 4 mm (9 gage) steel wire with galvanized steel dovetail insert. Anchor length to extend at least 75 mm (3 inches) into masonry, 25 mm (1 inch) into 40 mm (1-1/2 inch) thick units.
3. Form dovetail anchor slots from 0.6 mm (0.0239 inch) thick galvanized steel (with felt or fiber filler).

E. Individual ties:

1. Rectangular ties: Form from 5 mm (3/16 inch) diameter galvanized steel rod to a rectangular shape not less than 50 mm (2 inches) wide by sufficient length for ends of ties to extend within 25 mm (1 inch) of each face of wall. Ties that are crimped to form drip are not permitted.
2. Adjustable Cavity Wall Ties:
  - a. Adjustable wall ties may be used at Contractor's option.
  - b. Two piece type permitting up to 40 mm (1-1/2 inch) adjustment.
  - c. Form ties from 5 mm (3/16 inch) diameter galvanized steel wire.
  - d. Form one piece to a rectangular shape 105 mm (4-1/8 inches) wide by length required to extend into the bed joint 50 mm (2 inches).
  - e. Form the other piece to a 75 mm (3 inch) long by 75 mm (3 inch) wide shape, having a 75 mm (3 inch) long bent section for engaging the 105 mm (4-1/8 inch) wide piece to form adjustable connection.

F. Wall Ties, (Mesh or Wire):

1. Mesh wall ties formed of ASTM A82, W0.5, 2 mm, (16 gage) galvanized steel wire 13 mm by 13 mm (1/2 inch by 1/2 inch) mesh, 75 mm (3 inches) wide by 200 mm (8 inches) long.
2. Rectangular wire wall ties formed of W1.4, 3 mm, (9 gage) galvanized steel wire 50 mm (2 inches) wide by 200 mm (8 inches) long.

G. Corrugated Wall Tie:

1. Form from 1.5 mm (0.0598 inch) thick corrugated, galvanized steel 30 mm (1-1/4 inches) wide by lengths so as to extend at least 100 mm (4 inches) into joints of new masonry plus 38 mm (1-1/2 inch) turn-up.
2. Provide 5 mm (3/16 inch) hole in turn-up for fastener attachment.

H. Adjustable Steel Column Anchor:

1. Two piece anchor consisting of a 6 mm (1/4 inch) diameter steel rod to be welded to steel with offset ends, rod to permit 100 mm (4 inch) vertical adjustment of wire anchor.

2. Triangular shaped wire anchor 100 mm (4 inches) wide formed from 5 (3/16 inch) diameter galvanized wire, to extend at least 75 mm (3 inches) into joints of masonry.
- I. Adjustable Steel Beam Anchor:
1. Z or C type steel strap, 30 mm (1 1/4 inches) wide, 3 mm (1/8 inch) thick.
  2. Flange hook not less than 38 mm (1 1/2 inches) long.
  3. Length to embed in masonry not less than 50 mm (2 inches) in 100 mm (4 inch) nominal thick masonry and 100 mm (4 inches) in thicker masonry.
  4. Bend masonry end not less than 40 mm (1 1/2 inches).
- J. Ridge Wall Anchors:
1. Form from galvanized steel not less than 25 mm (1 inch) wide by 5 mm (3/16 inch) thick by 600 mm (24 inches) long, plus 50 mm (2 inch) bends.
  2. Other lengths as shown.

## **2.7 PREFORMED COMPRESSIBLE JOINT FILLER: NA**

## **2.8 ACCESSORIES**

- A. Masonry Cleaner:
1. Detergent type cleaner selected for each type masonry used.
  2. Acid cleaners are not acceptable.
  3. Use soapless type specially prepared for cleaning brick or concrete masonry as appropriate.
- D. Fasteners:
1. Concrete Nails: ASTM F1667, Type I, Style 11, 19 mm (3/4 inch) minimum length.
  2. Masonry Nails: ASTM F1667, Type I, Style 17, 19 mm (3/4 inch) minimum length.
  3. Screws: FS-FF-S-107, Type A, AB, SF thread forming or cutting.

## **PART 3 - EXECUTION**

### **3.1 JOB CONDITIONS**

- A. Protection:
1. Cover tops of walls with nonstaining waterproof covering, when work is not in progress. Secure to prevent wind blow off.
  2. On new work protect base of wall from mud, dirt, mortar droppings, and other materials that will stain face, until final landscaping or other site work is completed.
- B. Cold Weather Protection:
1. Masonry may be laid in freezing weather when methods of protection are utilized.
  2. Comply with MSJC and "Hot and Cold Weather Masonry Construction Manual".

### 3.2 CONSTRUCTION TOLERANCES

- A. Lay masonry units plumb, level and true to line within the tolerances as per MSJC requirements and as follows:
- B. Maximum variation from plumb:
  - 1. In 3000 mm (10 feet) - 6 mm (1/4 inch).
  - 2. In 6000 mm (20 feet) - 10 mm (3/8 inch).
  - 3. In 12 000 mm (40 feet) or more - 13 mm (1/2 inch).
- C. Maximum variation from level:
  - 1. In any bay or up to 6000 mm (20 feet) - 6 mm (1/4 inch).
  - 2. In 12 000 mm (40 feet) or more - 13 mm (1/2 inch).
- D. Maximum variation from linear building lines:
  - 1. In any bay or up to 6000 mm (20 feet) - 13 mm (1/2 inch).
  - 2. In 12 000 mm (40 feet) or more - 19 mm (3/4 inch).
- E. Maximum variation in cross-sectional dimensions of columns and thickness of walls from dimensions shown:
  - 1. Minus 6 mm (1/4 inch).
  - 2. Plus 13 mm (1/2 inch).
- F. Maximum variation in prepared opening dimensions:
  - 1. Accurate to minus 0 mm (0 inch).
  - 2. Plus 6 mm (1/4 inch).

### 3.3 INSTALLATION GENERAL

- A. Keep finish work free from mortar smears or spatters, and leave neat and clean.
- B. Anchor masonry as specified in Paragraph, ANCHORAGE.
- C. Wall Openings:
  - 1. Fill hollow metal frames built into masonry walls and partitions solid with mortar as laying of masonry progresses.
  - 2. If items are not available when walls are built, prepare openings for subsequent installation.
- D. Tooling Joints:
  - 1. Do not tool until mortar has stiffened enough to retain thumb print when thumb is pressed against mortar.
  - 2. Tool while mortar is soft enough to be compressed into joints and not raked out.
  - 3. Finish joints in exterior face masonry work with a jointing tool, and provide smooth, water-tight concave joint unless specified otherwise.



4. Tool Exposed interior joints in finish work concave unless specified otherwise.
- E. Wall, Furring, and Partition Units:
1. Lay out field units to provide for running bond of walls and partitions, with vertical joints in second course centering on first course units unless specified otherwise.
  2. Align head joints of alternate vertical courses.
  3. At sides of openings, balance head joints in each course on vertical center lines of openings.
  4. Use no piece shorter than 100 mm (4 inches) long.
  5. On interior partitions provide a 6 mm (1/4 inch) open joint for caulking between // existing construction, // exterior walls, // concrete work, // and abutting masonry partitions.
  6. Use not less than 100 mm (4 inches) nominal thick masonry for free standing furring unless shown otherwise.
  7. Do not abut existing plastered surfaces except suspended ceilings with new masonry partitions.
- H. Use not less than 100 mm (4 inches) nominal thick masonry for fireproofing steel columns unless shown otherwise.
- I. Before connecting new masonry with previously laid, remove loosened masonry or mortar, and clean and wet work in place as specified under wetting.
- J. When new masonry partitions start on existing floors, machine cut existing floor finish material down to concrete surface.

### 3.4 ANCHORAGE

- A. Veneer to Frame Walls:
1. Use adjustable veneer anchors.
  2. Fasten anchor to stud through sheathing with self drilling and tapping screw, one at each end of loop type anchor.
  3. Space anchors not more than 400 mm (16 inches) on center vertically at each stud.
- B. Veneer to Concrete Walls:
1. Install dovetail slots in concrete vertically at 600 mm (2 feet) on centers.
  2. Locate dovetail anchors at 400 mm (16 inch) maximum vertical intervals.
  3. Anchor new masonry facing to existing concrete with corrugated wall ties spaced at 400 mm, (16 inch) maximum vertical intervals, and at 600 mm (2 feet) maximum

horizontal intervals. Fasten ties to concrete with power actuated fasteners or concrete nails.

C. Masonry Facing to Backup and Cavity Wall Ties:

1. Use individual ties for new work.
2. Stagger ties in alternate courses, and space at 400 mm (16 inches) maximum vertically, and 600 mm (2 feet) horizontally.
3. At openings, provide additional ties spaced not more than 900 mm (3 feet) apart vertically around perimeter of opening, and within 300 mm (12 inches) from edge of opening.
4. Anchor new masonry facing to existing masonry with corrugated wall ties spaced at 400 mm (16 inch) maximum vertical intervals and at every second masonry unit horizontally. Fasten ties to masonry with masonry nails.
5. Option: Use joint reinforcing for multiple wythes and cavity wall ties spaced not more than 400 mm (16 inches) vertically.
6. Tie interior and exterior wythes of reinforced masonry walls together with individual ties. Provide ties at intervals not to exceed 600 mm (24 inches) on center horizontally, and 400 mm (16 inches) on center vertically. Lay ties in the same line vertically in order to facilitate vibrating of the grout pours.

D. Anchorage of Abutting Masonry:

1. Anchor interior 100 mm (4 inch) thick masonry partitions to exterior masonry walls with wall ties. Space ties at 600 mm (2 foot) maximum vertical intervals. Extend ties 100 mm (4 inches) minimum into masonry.
2. Anchor interior masonry bearing walls or interior masonry partitions over 100 mm (4 inches) thick to masonry walls with rigid wall anchors spaced at 400 mm (16 inch) maximum vertical intervals.
3. Anchor abutting masonry walls and partitions to concrete with dovetail anchors. Install dovetail slots vertically in concrete at centerline of abutting wall or partition. Locate dovetail anchors at 400 mm (16 inch) maximum vertical intervals. Secure anchors to existing wall with two 9 mm (3/8 inch) by 75 mm (3 inch) expansion bolts or two power-driven fasteners.
4. Anchor abutting interior masonry partitions to existing concrete and existing masonry construction, with corrugated wall ties. Extend ties at least 100 mm (4 inches) into joints of new masonry. Fastened to existing concrete and masonry construction, with

powder actuated drive pins, nail or other means that provides rigid anchorage. Install anchors at 400 mm (16 inch) maximum vertical intervals.

E. Masonry Furring:

1. Anchor masonry furring less than 100 mm (4 inches) nominal thick to masonry walls or to concrete with corrugated wall ties or dovetail anchors.
2. Space not over 600 mm (2 feet) on centers in both directions.

F. Anchorage to Steel Beams or Columns:

1. Use adjustable beam anchors on each flange.
2. At columns weld the 6 mm (1/4 inch) steel rod to steel columns at 300 mm (12 inch) intervals, and place wire ties in masonry courses at 400 mm (16 inches) maximum vertically.

### **3.5 REINFORCEMENT**

A. Joint Reinforcement:

1. Use as joint reinforcement in CMU wythe of combination brick and CMU, cavity walls, and single wythe concrete masonry unit walls or partitions.
2. Reinforcing may be used in lieu of individual ties for anchoring brick facing to CMU backup in exterior masonry walls.
3. Brick veneer over frame backing walls does not require joint reinforcement.
4. Locate joint reinforcement in mortar joints at 400 mm (16 inch) maximum vertical intervals.
5. Additional joint reinforcement is required in mortar joints at both 200 mm (8 inches) and 400 (16 inches) above and below windows, doors, louvers and similar openings in masonry, except where other type anchors are required for anchorage of masonry to concrete structure.
6. Joint reinforcement is required in every other course of stack bond CMU masonry.
7. Wherever brick masonry is backed up with stacked bond masonry, joint reinforcement is required in every other course of CMU backup, and in corresponding joint of facing brick.

B. Steel Reinforcing Bars:

1. Install in cells of hollow masonry units where required for vertical reinforcement and in bond beam units for lintels and bond beam horizontal reinforcement. Install in wall cavities of reinforced masonry walls where shown.
2. Use grade 60 bars if not specified otherwise.

**3.6 BRICK EXPANSION AND CMU CONTROL JOINTS.: NA****3.7 BUILDING EXPANSION AND SEISMIC JOINTS: NA****3.8 ISOLATION SEAL: NA****3.9 BRICKWORK**

- A. Lay clay brick in accordance with BIA Technical Note 11 series.
- B. Laying:
  - 1. Lay brick in running bond with course of masonry bonded at corners unless shown otherwise. Match bond of existing building on alterations and additions.
  - 2. Maintain bond pattern throughout.
  - 3. Do not use brick smaller than half-brick at any angle, corner, break or jamb.
  - 4. Where length of cut brick is greater than one half but less than a whole brick, maintain the vertical joint location of such units.
  - 5. Lay exposed brickwork joints symmetrical about center lines of openings.
  - 6. Do not structural bond multi wythe brick walls unless shown.
  - 7. Before starting work, lay facing brick on foundation wall and adjust bond to openings, angles, and corners.
  - 8. Lay brick for sills with wash and drip.
  - 9. Build solid brickwork as required for anchorage of items.
- C. Joints:
  - 1. Exterior and interior joint widths: Lay for three equal joints in 200 mm (eight inches) vertically, unless shown otherwise.
  - 2. Rake joints for pointing with colored mortar when colored mortar is not full depth.
  - 3. Arches:
    - a. Flat arches (jack arches) lay with camber of 1 in 200 (1/16 inch per foot) of span.
    - b. Face radial arches with radial brick with center line of joints on radial lines.
    - c. Form Radial joints of equal width.
    - d. Bond arches into backing with metal ties in every other joint.
- D. Weep Holes:
  - 1. Install weep holes at 600 mm (24 inches) on center in bottom of vertical joints of exterior masonry veneer or cavity wall facing over foundations, bond beams, and other water stops in the wall.
  - 2. Form weep holes using wicks made of mineral fiber insulation strips turned up 200 mm (8 inches) in cavity. Anchor top of strip to backup to securely hold in place.

3. Install sand or pea gravel in cavity approximately 75 mm (3 inches) high between weep holes.

E. Solid Exterior Walls:

1. Build with 100 mm (4 inches) of nominal thick facing brick, backed up with // concrete masonry units // cast-in-place concrete // 100 mm (4 inches) nominal thick face brick //.
2. Construct solid brick jambs not less than 20 mm (.8 inches) wide at exterior wall openings and at recesses, except where exposed concrete unit backup is shown.
3. Do not use full bonding headers.
4. Parging:
  - a. For solid masonry walls, lay backup to height of six brick courses, parge backup with 13 mm (1/2 inch) of mortar troweled smooth; then lay exterior wythe to height of backup.
  - b. Make parging continuous over backup, and extend 150 mm (six inches) onto adjacent concrete or masonry.
  - c. Parge, with mortar, the ends and backs for recesses in exterior walls to a thickness of 13 mm (1/2 inch).
  - d. Parge with mortar to true even surface the inside surface of exterior walls to receive insulation.

F. Cavity Type Exterior Walls:

1. Keep air space clean of mortar accumulations and debris.
  - a. Clean cavity by use of hard rubber, wood or metal channel strips having soft material on sides contacting wythes.
  - b. Lift strips with wires before placing next courses of horizontal joint reinforcement or individual ties // or adjustable cavity wall ties.
2. For each lift lay two courses of concrete masonry units, followed by six courses of brick facing.
3. Lay the interior wythe of the masonry wall full height where dampproofing is required on cavity face. Coordinate to install dampproofing prior to laying outer wythe.

### **3.10 CONCRETE MASONRY/ AND STRUCTURAL CLAY TILE : NA**

### **3.11 INSTALLATION OF REINFORCED BRICK MASONRY**

A. Mortar Jointing and Bedding:

1. Pattern Bond: Lay exterior wythes in the pattern bond shown, or if not shown, lay in 1/2 running bond with vertical joints in each course centered on units in courses

- above and below. Lay inner wythes (if any) with all units in a wythe bonded by lapping not less than 50 mm (2 inches). Bond and interlock each course of each wythe at corners and intersections. Do not use units with less than 100 mm (4 inch) nominal horizontal face dimension at corners or jambs.
2. Lay exterior wythes with bed (horizontal) and head (vertical) joints between units completely filled with mortar. Top of bed joint mortar may be sloped toward center of walls. Butter ends of units with sufficient mortar to completely fill head joints and shove into place. Do not furrow bed joints or slush head joints. Remove any mortar fins which protrude into grout space.
  3. Maintain joint widths shown for head and bed joints, except for minor variations required to maintain pattern bond. If not shown, lay with 10 mm (3/8 inch) head and bed joints.
  4. Maintain joint widths shown for head and bed joints, but adjust thickness of bed joints, if required, to allow for not less than 6 mm (1/4 inch) thickness of mortar between reinforcement and masonry units, except 6 mm (1/4 inch) bars (if any) may be laid in 13 mm (1/2 inch) thick bed joints and 4.9 mm diameter (6 gage) or smaller wire reinforcing (if any) may be laid in 10 mm (3/8 inch) thick bed joints.
- B. Two-Wythe Wall Construction: Lay both wythes as previously specified for exterior wythes. Maintain grout space (collar or continuous vertical joint between wythes) of width indicated, but adjust, if required, to provide grout space not less than 13 mm (1/2 inch) wider than the sum of the vertical and horizontal (if any) reinforcement bars shown to be placed in grout space. Do not parge or fill grout space with mortar.
- C. Multi-Wythe Wall Construction: Where walls of 3 or more wythes are indicated, lay exterior wythes as previously specified. Maintain space between wythes as required to allow for laying of the number of wythes of the unit width shown with minimum grout space between wythes. Allow for not less than 19 mm (3/4 inch) of grout between wythes if non-reinforced; if reinforced, allow for a grout space not less than 13 mm (1/2 inch) wider than the sum of the vertical and horizontal (if any) reinforcement bars indicated to be placed in grout space. Place or float interior wythe units in grout poured between exterior wythes as the work progresses. Position units to allow not less than 19 mm (3/4 inch) grout between ends and sides of adjacent units.
- D. Limit extent of masonry construction to sections which do not exceed the maximum pour requirements specified hereafter. Provide temporary dams or barriers to control horizontal flow of grout at ends of wall sections. Build dams full height of grout pour. If

masonry units are used, do not bond into permanent masonry wythes. Remove temporary dams after completion of grout pour.

### **3.12 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY**

- A. Do not wet concrete masonry units (CMU).
- B. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed joint widths shown, or if not shown, provide 10 mm (3/8 inch) joints.
- C. Where solid CMU units are shown, lay with full mortar head and bed joints.
- D. Walls:
  - 1. Pattern Bond: Lay CMU wall units in 1/2-running bond with vertical joints in each course centered on units in courses above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams and other special conditions.
  - 2. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimension indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
  - 3. Where horizontal reinforced beams (bond beams) are shown, use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells of non-reinforced vertical cells, or provide units with solid bottoms.

### **3.13 CLEANING AND REPAIR**

- A. General:
  - 1. Clean exposed masonry surfaces on completion.
  - 2. Protect adjoining construction materials and landscaping during cleaning operations.
  - 3. Cut out defective exposed new joints to depth of approximately 19 mm (3/4 inch) and repoint.
  - 4. Remove mortar droppings and other foreign substances from wall surfaces.

**B. Brickwork:**

1. First wet surfaces with clean water, then wash down with a solution of soapless detergent. Do not use muriatic acid.
2. Brush with stiff fiber brushes while washing, and immediately thereafter hose down with clean water.
3. Free clean surfaces of traces of detergent, foreign streaks, or stains of any nature.

**C. Concrete Masonry Units:**

1. Immediately following setting, brush exposed surfaces free of mortar or other foreign matter.
2. Allow mud to dry before brushing.

**D. Glazed Structural Facing Tile or Brick Units:**

1. Clean as recommended by tile or brick manufacturer. Protect light colored mortar joints from discoloration during cleaning.
2. Prepare schedule of test locations.

**3.14 WATER PENETRATION TESTING: NA**

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