

## ARCHITECTURE

### SECTION 04800

#### UNIT MASONRY ASSEMBLIES

#### 1.0 GENERAL

##### 1.1 SECTION REQUIREMENTS

- A. Extent of each type of masonry work is indicated on Drawings.
  - 1. Reinforced, unit masonry, fire walls and stair, elevator and shaft walls, where indicated.
  - 2. Coordination with other trades abutting masonry.
  - 3. Repair of existing masonry to remain after demolition.
- B. Types of masonry work required include:
  - 1. Concrete Masonry Units.
  - 2. Required Accessories, Masonry Anchors, Burn clips, etc.

##### 1.2 SUBMITTALS

- A. Submittals: Samples for decorative concrete masonry units, face brick, and colored mortar. Submit design calculations stamped by a NH licensed Structural Engineer.
- B. Comply with ACI 530.1/ASCE 6/TMS 602.
- C. Fire-resistance ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- D. Shop Drawings:
  - 1. Provide for special shapes that may be required, showing sizes and profiles of each unit.
    - a. Bullnose block is required at all door openings and ends of walls to be left exposed.

##### 1.3 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: When ambient temperature exceeds 100 deg F (38 deg C), or 90 deg F (32 deg C) with a wind velocity greater than 8 mph (13 km/h), do not spread mortar beds more than 48 inches (1200 mm) ahead of masonry. Set masonry units within one minute of spreading mortar.

##### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver building units to the site in approved protective film. Prevent damage to units. Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners. Conform to OSHA requirements.
- B. Store building units in a manner designed to prevent damage and staining of units. Stack units on timbers or platforms at least 3" above grade. Place polyethylene or other plastic film between wood and other finished surfaces of units when stored for extended periods of time. Cover stored units with protective enclosure if exposed to weather.
- C. Store or pile sand on a plank platform and protect from dirt and rubbish. Store mortar materials and sand in such a manner as to prevent deterioration or contamination by foreign materials. Deliver mortar materials in original unbroken and undamaged packages with the maker's name and brand distinctly marked thereon, and upon delivery store in a shed until used on the work.

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- D. Do not use salt or calcium-chloride to remove ice from masonry surfaces or on adjacent surfaces near stored materials.

### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 52 degrees F prior to and 48 hours after completion of masonry work
- B. Cold Weather Requirements: to [CSA A371] [IMIAC - Recommended Practices and Specifications for Cold Weather Masonry Construction] [MAC – Hot and Cold Weather Construction].

## 2.0. PRODUCTS

### 2.1. UNIT MASONRY STANDARD

- A. Concrete Masonry Units: Comply with ASTM C 90; Standard Specification for Load-bearing Masonry Units, and ACI 530.1/ASCE 6, "Specifications for Masonry Structures", except as otherwise indicated.
- B. Fire Resistance Ratings Provide materials and construction which are identical to those of assemblies with fire-resistance ratings determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization, by equivalent concrete masonry thickness, or by another means, as acceptable to authority having jurisdiction. Where fire resistance rated concrete masonry units are required for assemblies, provide units meeting the requirements of ANSI/ACI 216.1/TMS-0216 "Standard Method for Determining Fire Resistance of Concrete and Masonry Construction Assemblies."
  - 1. 3 hour rated masonry units required at fire wall.
  - 2. 2 hour rated masonry units required at stair, elevator, and shaft wall locations
- C. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each different product required for each continuous surface or visually related surfaces.
- D. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- E. Weight Classification, Medium Weight.
- F. Provide bullnose units for outside corners, unless otherwise indicated. Provide special shapes where required for lintels, corners, jambs, sash, control joints, and other special conditions.

### 2.3. JOINT REINFORCEMENT, TIES AND ANCHORING DEVICES

- A. Provide reinforcing in single wythe veneer walls as noted on the drawings.
- B. Zinc-Galvanized Steel Wire: ASTM C 641 - zinc coating Class 1 (0.40 oz. per s.f. wire surface).

Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units. Wire Size #9 Gauge. For single-wythe masonry, provide type as follows with single pair of side rods.

Approved Manufacturers:

"AA525"; Hohmann & Barnard, Inc.

"Lox-all Adjustable Eye Wire"; Hohmann & Barnard, Inc.

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- C. Steel Reinforcing Bars: ASTM A 615, Grade 60.
- D. Joint Reinforcement: ASTM A 951, hot-dip galvanized at both interior and exterior walls.
  - 1. Wire Diameter for Side Rods: W2.8 or 0.188 inch (4.8 mm).
  - 2. Wire Diameter for Cross Rods: W2.8 or 0.188 inch (4.8 mm).
- E. For single-wythe masonry, provide either ladder design or truss design.
- F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins.
- G. Breakaway Fire Anchors (Meltaway Anchors): Fabricate structural anchors from rolled zinc alloy 710 which provides a melting point of under 800° F.

### 2.4 EMBEDDED FLASHING MATERIALS

- A. Sheet Metal Flashing: Lead coated copper, 16-oz./sq. ft. (5-kg/sq. m) weight or 0.0216 inch (0.5 mm) thick.
- B. Rubberized Asphalt Sheet Flashing: Pliable and highly adhesive rubberized asphalt compound, 26 mils thick, bonded to a polyethylene film, 4 mils thick, to produce an overall thickness of 30 mils.
- C. Self-adhering rubber minimum 40 mil thickness.

### 2.5 Control Joint Keys

- A. Control Joint Keys: Acceptable manufacturers.
  - 1. "AA 2000-2001 Blocktite"-AA Wire Products Company, Chicago, IL.
  - 2. "Rapid Poly-Joint"- Dur-O-Wal Inc., Morthbrook, IL.

### 2.7 MASONRY CLEANERS

- A. Where required by local environmental criteria, Job-Mixed Masonry Cleaner: 1/2-cup tetra sodium polyphosphate and 1/2-cup laundry detergent dissolved in 1 gal. of water.
- B. Where allowed by local environmental criteria: Proprietary Acidic Cleaner: Manufacturer's standard strength general purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated; composed of blended organic and inorganic acids combined with special wetting systems and inhibitors; expressly approved for intended use by manufacturer of masonry units being cleaned without damaging or discoloring masonry surfaces.
  - "Sure Klean No. 600 Detergent"; ProSoCo, Inc.
  - "202 New Masonry Detergent"; Diedrich Technologies, Inc.

### 2.11 LINTELS

- A. Install hot dip galvanized steel lintels at all openings where indicated or where scheduled. Provide lintels at all opening in excess of 1 1/3 building unit.
- B. Minimum bearing of 8 inches at each jamb, unless otherwise indicated.
- C. Provide masonry lintels where shown. Use pre-cast lintels made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcement bars indicated or required to support loads indicated.

### 2.12 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Pre-molded strips complying with ASTM D 1056, Grade 2A1.

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- B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.
- E. Job-Mixed Masonry Cleaner: 1/2-cup tetra sodium polyphosphate and 1/2-cup laundry detergent dissolved in 1 gal. of water.

### PART 3 - EXECUTION

#### 3.1. GENERAL:

- A. The execution of the work includes initial inspection, preparation, masonry erection, reinforcement installation, grout placement, field quality control testing and cleaning procedures. Dimensional tolerances for foundations on which masonry is built are to be measured prior to the start of masonry work. Standard requirements for good workmanship are required by the MSJC Specification. These include the requirement for completely filled mortar joints and grouted spaces. Proper support of masonry and bracing during construction is required but is not prescribed. Dimensional tolerances for the masonry are listed to ensure structural performance.
- B. Inspection of reinforcement and metal accessories is required to ensure that they have been properly placed and are free of materials that hinder bond. Tolerances for locating and placing reinforcing steel and adjustable wall ties to be per MSJC Code.
- C. Delivery, Storage and Handling: Masonry units shall be delivered to jobsite in shrink wrapped cubes. Decorative units shall have foam spacers and delivered on wooden pallets to prevent product damage. Products shall remain shrink wrapped until time of installation

#### 3.2 FIELD QUALITY CONTROL

- A. Owner will engage a qualified independent testing agency to perform the following tests for each 5000 sq. ft. of wall area or portion thereof.
  - Mortar: ASTM C 780
  - Grout: ASTM C 1019.
  - Concrete Masonry Units: ASTM C 140.

#### 3.3 PREPARATION

- A. Protection:
  - 1. Keep walls dry during erection by covering at end of each work period with non-staining waterproof membrane covering angles and required locations.
  - 2. Protect partially completed walls not being worked on with non-staining waterproof membrane until construction activities specified in other sections completes protection of walls.
  - 3. Covering: Overhang at least 2'-0" on each side of wall; anchor on each side of wall.
  - 4. Protect finished exposed work from stains.
  - 5. Remove misplaced mortar or grout immediately.
  - 6. Protect face materials against staining and etching.
  - 7. Protect sills, ledges, and offsets from mortar droppings during construction.

#### 3.4 INSTALLATION

- A. Workmanship:
  - 1. Installation of cracked, broken, or chipped units exceeding ASTM allowances is prohibited.
  - 2. Use abrasive power saws to cut block. Avoid slivers less than 2" wide. Install with cut surfaces and, where possible, cut edges concealed. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures

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3. Lay block plumb, true to line, and with level courses; space within allowable tolerances.
  4. Furrowing bed joints is prohibited.
  5. Stop off horizontal run by racking back in each course; toothing is prohibited.
  6. Adjust units to final position while mortar is soft and plastic.
  7. Units displaced after mortar has stiffened: Remove, clean joints and units of mortar; relay with fresh mortar.
  8. Cut and patch finish masonry to accommodate work of other sections without marring finished surface appearance.
  9. Adjust shelf angles to keep work level and at proper elevation.
  10. Mix units from pallets in work to diminish noticeable variation in color and texture between pallets.
  11. Build non-load-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above. Provide channels, angles, etc bracing at slab above as indicated on the drawings
  12. Provide compressible closed cell materials vertically at one side of all control joints as shown to compartmentalize the cavity of the building as indicated on the drawings.
  13. Tool exposed joints slightly concave when thumbprint hard, unless otherwise indicated.
  14. Keep cavities clean of mortar droppings and other materials during construction. Trowel protruding mortar fins in cavity flat to inner wythe face.
  15. A waterproof non-staining cover shall be extended over walls and down face sufficient to protect walls from wind driven rains after each work day.
  16. Install pressure relieving joint material continuous by adhering material under shelf.
  17. When joining fresh masonry to set or partially set masonry, remove loose block and mortar; clean and dampen exposed surface of set masonry prior to laying fresh masonry.
- B. Building in other work:
1. Build in work of other sections indicated to be built-in with block as work progresses; include anchors, wall plugs, expansion joints, and accessories. Space and align built-in parts; exercise care not to disturb other materials from position.
  2. Fill hollow metal frames in block masonry walls with fine grout as wall is laid. Rake back ½" joint between hollow metal frame and adjacent block to receive sealant.
- C. Mortar beds:
1. Lay block with full mortar coverage on horizontal and vertical joints in courses.
  2. Install sufficient mortar on ends of block to fill head joints.
  3. Rock closures into place with head joints thrown against two adjacent blocks already in place.
  4. Do not pound corners or jambs to fit stretcher units after setting into place.
  5. Remove mortar and replace with fresh mortar where adjustment to corners or jambs must be made after mortar has started to set.
- D. Mortar joints:
1. Nominal thickness: 3/8".
  2. Tool joints exposed in finished work when "thumb print" hard; use round jointer slightly larger than joint width.
  3. Tool joints: Concave.
  4. Trowel point or concave-tool joints below grade.
  5. Flush cut joints not to be exposed in finished work or otherwise tooled.
- E. Bonding pattern: Lay block in common running bond.
- F. Control joints: Provide through wall joints as recommended by the Masonry Institute
1. Keep clean of mortar and debris.
  2. Install control joint material specified in Masonry Accessories Section continuous.

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3. Make joints  $\frac{3}{4}$ " wide unless otherwise indicated.
  4. Space control joints as required but in no case more than 25'-0" O.C..
  5. Coordinate location of control joints in block masonry.
- G. Expansion joints:
1. Keep clean of mortar and debris.
  2. Make joints 1" wide unless otherwise indicated. Stop horizontal joint reinforcement 1" each side of joint.
- H. Wall ties: Install in accord with requirements of Masonry Anchorage and Reinforcement Section.
1. Install Breakaway Fire Anchors at each side of firewall at horizontal joints closest to structural deck of both existing and new floor slabs at each floor line. Space anchors a maximum of 32" o.c. along floor edge.
- I. Cavity wall flashing & Weep holes:
1. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated. Weep holes should have a maximum spacing of 24" (600 mm) o.c.
  2. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing before covering with mortar
  3. Provide thru wall flashing as indicated on the drawings as well as at all head, lintels, and sills as detailed. Extend flashing 8 inches horizontally into masonry at each end and turn up minimum 2 inches to form a weep pan
  4. Provide honeycomb weep materials at the bottom and the top of the cavity below thru-wall flashing, window sills, etc. Exercise caution to assure that where sidewalls abut the masonry, the weep will be above the walkway.
  5. Trim honeycomb weep material used in weep holes flush with outside face of wall after mortar has set
- J. Sealant joints: Retain  $\frac{1}{2}$ " deep by  $\frac{1}{4}$ " wide sealant joint around outside perimeter of exterior doors, window frames, and other wall openings.
- K. Pointing: Cut out defective mortar joints and holes in exposed work. Repoint with new mortar.
- L. Dry cleaning: Brush block masonry surfaces with stiff bristle brush. Do not allow mortar droppings to harden on exposed surfaces.
- M. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated. Fill cores of reinforced masonry walls
- 3.5. **LINTELS**

Install galvanized steel lintels where indicated.

Provide masonry lintels where shown. Use pre-cast lintels made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcement bars indicated or required to support loads indicated.

Minimum bearing of 8 inches at each jamb, unless otherwise indicated.



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3.6 TOLERANCES:

- A. Maximum variation from plumb:
  - a. In lines and surfaces of walls and arrises:
    - 1) 1/4" in 10'-0".
    - 2) 3/8" in any story or 20'-0" maximum.
    - 3) 1/2" in 40'-0" or more.
  - b. For external corners, expansion joints, and other conspicuous lines:
    - 1) 1/4" in any story or 20'-0", maximum.
    - 2) 3/8" in 40'-0" or more.
- B. Maximum variation from level or grades for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:
  - a. 1/4" in any bay or 20'-0".
  - b. 1/2" in 40'-0" or more.
- C. Maximum variation of linear building line from established position in plan and related portions of columns, walls, and partitions:
  - a. 1/2" in any bay or 20'-0".
  - b. 3/4" in 40'-0" or more.
- D. Maximum variation in cross-sectional dimensions of columns and thickness of walls: Not less than 1/4" smaller nor more than 1/2" larger than indicated.

3.7 CLEANING

- A. General:
  - 1. Remove stains in accord with recommendations of Block Institute of America, Technical Notes #20 REV, Reissued June 1987. Use cleaning agents only after pre-testing on sample panel.
  - 2. Test panel:
    - a. Apply solution on half of surface of mock-up panel at least 21 days prior to application of cleaning solution to block.
    - b. Should discoloration of block or mortar joints, staining, or efflorescence appear on sample panel, notify Architect in writing; await further instructions.
  - 3. Wet cleaning within seven days of placing masonry is prohibited.
- B. Preparatory work:
  - 1. Protect materials adjacent block masonry subject to corrosion from contact with cleaning solution.
  - 2. Saturate mortar joints with clean water; flush off loose debris at least two hours prior to cleaning solution application to block.
- C. Manufactured cleaning compound:
  - 1. Apply on block masonry as tested on mock-up panel in accord with manufacturer's product data; flush with clean water.
  - 2. Begin cleaning process at highest point of wall, working downward. Work in areas of 20 SF, maximum. Flush wall with clean water as cleaning progresses to prevent accumulation of scum.
  - 3. Scrubbing mortar joints with cleaning solution is prohibited.
- D. Safely discard solutions containing debris and residue.

**END OF SECTION**