

SECTION 04820 - REINFORCED UNIT MASONRY ASSEMBLIES

PART I - GENERAL

1.01 SECTION INCLUDES

- A. Concrete Block.
- B. Clay Facing Brick.
- C. Mortar and Grout.
- D. Reinforcement and Anchorage.
- E. Flashings.
- F. Accessories.

1.02 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement: Reinforcing steel for grouted masonry.
- B. Section 04065 - Mortar and Masonry Grout.
- C. Section 05120 - Structural Steel.

1.03 REFERENCES

- A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute; 1992.
- B. ACI 530.1/ASCE 6/TMS 602 - Specifications For Masonry Structures; American Concrete Institute; 1992.
- C. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 1995a.
- D. ASTM A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 1995.
- E. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 1996a.
- F. ASTM A 616 - Standard Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement; 1996a.
- G. ASTM A 617 - Standard Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement; 1996a.
- H. ASTM A 641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 1992.
- I. ASTM A 706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement; 1996b.
- J. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction; 1992.
- K. ASTM C 67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 1996.

- L. ASTM C 90 - Standard Specification for Load-Bearing Concrete Masonry Units; 1996a.
- M. ASTM C 140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units; 1996b.
- N. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 1993.
- O. ASTM C 150 - Standard Specification for Portland Cement; 1996.
- P. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 1991 (reapproved 1992).
- Q. ASTM C 216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 1995a.
- R. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 1996a.
- S. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout; 1995.
- T. ASTM C 476 - Standard Specification for Grout for Masonry; 1995.
- U. ASTM C 652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale); 1997.
- V. ASTM C 744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units; 1996a.
- W. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 1996.
- X. ASTM C 1019 - Standard Method of Sampling and Testing Grout; 1989a (reapproved 1993).
- Y. ASTM C 1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 1994.
- Z. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1995.
- AA. ASTM E 447 - Standard Test Methods for Compressive Strength of Masonry Prisms; 1992b.
- AB. ASTM E 518 - Standard Test Methods for Flexural Bond Strength of Masonry; 1980 (Reapproved 1993).

1.04 SUBMITTALS

- A. See Project Manual - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate bar sizes, spacings, reinforcement quantities, bending and cutting schedules, reinforcement supporting and spacing devices, and accessories.
- C. Design Data: Indicate unit assembly strength in each plane, and supporting test data.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

1.06 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

## PART II - PRODUCTS

### 2.01 CONCRETE MASONRY UNITS

- A. Concrete Block and Bond Beam Block: Comply with referenced standards and as follows:
1. Load-Bearing Units: ASTM C 90.
  2. Size: 7 5/8" x 7 5/8" x 15 5/8" for 8" CMU's
  3. Size: 7 5/8" x 11 5/8" x 15 5/8" for 12" CMU's
  4. Hollow block, Grade N
  5. Type II: Normal weight.
  6. Minimum Compression strength: Strength shall be as required for specified masonry strength (f'm) but not less 2500 psi on net area of block.
- B. Channel Block are not to be used.

### 2.02 BRICK UNITS

- A. Face Brick: Provide "Heritage Wite Cut" as manufactured by Carolina Ceramics. Conform to ASTM C216.
1. Size: Standard utility 3 5/8" x 3 5/8" 11 5/8".
  2. Grade: SW
  3. Type: FBS
  4. Minimum Compression Strength: 6000 psi on net section
  5. Provide special shapes at all non 90 degree corners
  6. Provide solidier units with adjacent side finish at end units.

### 2.03 MORTAR AND GROUT MATERIALS

- A. Mortar and grout: As specified in Section 04200.
- B. Water: Clean and potable.

### 2.04 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: ASTM A 615 Grade 60.
- B. Reinforcing Steel To Be Welded: ASTM A 706, deformed low-alloy steel bars.
- C. Multiple Wythe Joint Reinforcement: Ladur type; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153, Class B; side rods with 9 ga. cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure. See structural plans.
- D. Mechanically fastened anchors and hooks for cast stone products, submit to Architect for approval.

## 2.05 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; 4 inch wide x by maximum lengths available.
- C. Building Paper: ASTM D 226, Type I ("No. 15") asphalt felt.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
- E. Weep products: Rectangular plastic tubes with insect screen and cotton wick, cotton wick cords, Mortar Net weep vent.

## 2.06 PRECONSTRUCTION TESTING

- A. Testing will be conducted by an independent test agency.
- B. Clay Masonry: Test each type of clay masonry in accordance with ASTM C 67.
- C. Concrete Masonry: Test each type, class, and grade of concrete masonry unit in accordance with ASTM C 140.
- D. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C 780 recommendations for preconstruction testing.
- E. Grout Mixes: Test grout batches in accordance with ASTM C 1019 procedures.
- F. Prism Testing: Test masonry prisms in accordance with provisions of ASTM E 447, Method B, for wall types scheduled.
  - 1. Prepare two sets of prisms for clay masonry prisms and concrete masonry prisms; test one set at 7 days and the other at 28 days.
  - 2. Clay masonry prisms: Height-to thickness ration of 5.0.
  - 3. Concrete masonry prisms: Height-to-thickness ratio of not less than 1.33 and not more than 5.0; apply correction factor per ACI 530.1/ASCE 6/TMS 602 for ratio other than 2.0.
- G. Flexural Bond Strength: Where scheduled, test masonry prisms per ASTM E 518, with tooled joints downward.

## PART III - EXECUTION

### 3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### 3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Clean reinforcement of loose rust.

- C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- D. Keep all concrete units protected from the weather.

### 3.03 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches.
  - 3. Mortar Joints: Concave.
- D. Brick Units:
  - 1. Bond: 1/3 Running.
  - 2. Coursing: Two units and two mortar joints to equal 8 inches.
  - 3. Mortar Joints: Concave.

### 3.04 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar as work progresses.
- E. Interlock intersections and external corners, except for units laid in stack bond.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. The maximum height of grouting the cavity space must not exceed 1 foot.

### 3.05 REINFORCEMENT AND ANCHORAGE

- A. Reinforcement Bars: Secure all reinforcement with vertical bar positioners and to avoid displacement during grouting. Minimum spacing between bars or to masonry surfaces shall be one bar diameter.
  - 1. Welding of splices is not permitted.
- B. Joint Reinforcement: Install horizontal joint reinforcement 16 inches on center.
  - 1. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
  - 4. Place continuous joint reinforcement in first and second joint below top of walls.

3. Lap joint reinforcement ends minimum 6 inches.

C. Strap Anchors: Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

### 3.06 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.

B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

D. Form expansion joint as detailed.

### 3.07 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

### 3.08 TOLERANCES

A. Variation from Plumb: Vertical lines, surfaces or columns, walls do not exceed  $\frac{1}{4}$ " in 10' or  $\frac{1}{2}$ " up to 40'. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed  $\frac{1}{4}$ " in any story of 20' maximum. Vertical alignment of head joints not to exceed  $\frac{1}{4}$ " in 10'.

B. Variation from Level: For bed joints, parapets, horizontal grooves and other conspicuous lines, do not exceed  $\frac{1}{4}$ " in any bay or 20' maximum.

C. Variation of Linear Building Line: Do not exceed  $\frac{1}{2}$ " in any bay or 20' maximum, nor  $\frac{3}{4}$ " in 40' or more.

D. Variation in Mortar Joint Thickness: Do not exceed joint thickness indicated by more than plus or minus  $\frac{1}{8}$ ".

### 3.09 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### 3.10 LAYING MASONRY WALLS:

A. Pattern Bond: Lay masonry in 1/3 running bond for utility size brick. Do not use units with less than nominal 4: horizontal face dimensions at corners or jambs.

- B. Tool exposed joints slightly concave.

### 3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C 67 requirements, sampling 5 randomly chosen units for each 5,000 square feet of wall installed.
- C. Concrete Masonry Unit Tests: Test concrete unit masonry in accordance with ASTM C 140, sampling 2 randomly chosen units for each 5,000 square feet of wall installed.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C 780 procedures.
  - 1. Test frequency: 2 samples for each 5,000 square feet of wall installed.
- E. Test and evaluate grout in accordance with ASTM C 1019 procedures.
  - 1. Test frequency: 2 samples for each 5,000 square feet of wall installed.
- F. Prism Tests: Test masonry and clay masonry in accordance with ASTM C 1072, E 447, and E 518 provisions; perform tests and evaluate results as specified in individual masonry sections.
  - 1. Test frequency: 2 samples for each 5,000 square feet of wall installed.

### 3.12 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Clean soiled surfaces with cleaning solution.
- C. Use non-metallic tools in cleaning operations.

END OF SECTION

