

SECTION 04810
CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Concrete unit masonry.
 - 2. Reinforced unit masonry.

1.02 PERFORMANCE REQUIREMENTS

- A. Provide concrete unit masonry with net compressive test strength of 2000 psi.
- B. Provide concrete unit masonry that develops 1350 psi installed compressive strength (f'm) at 28 days, based on net area.
- C. General Conformance Standard: ACI 530.1 "Specification for Masonry Structures."

1.03 SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and other manufactured products specified.
- B. Shop Drawings: For reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.
- C. Mix Designs: Proposed mortar mix designs.
- D. All shop drawings shall be signed and sealed by a Florida licensed engineer.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Concrete Masonry Units:
 - 1. Store units above ground on level platforms which allow air circulation under stacked units.
 - 2. Cover with heavy weatherproof coverings to prevent staining by weather, dirt, mud, oils, and grease.
 - 3. Carefully handle units to prevent chipping, spalling, cracking, and any other condition which could impair strength, durability, or appearance of units.
 - 4. Discard and remove damaged units from Project site.
- B. Mortar and Masonry Grout:
 - 1. Deliver cementitious materials to Project site in manufacturer's original unopened containers.

2. Store lime and cement in waterproof sheds or enclosures. Do not use materials damaged by water, moisture, or extended storage.
3. Protect aggregates from dampness, freezing, and damage by inclusion of foreign substances.

1.05 PROJECT CONDITIONS

- A. Protection: Protect partially completed masonry against weather, when work is not in progress, by covering top of walls with strong, waterproof, nonstaining membrane.
 1. Extend membrane at least 2 feet down both sides of walls and anchor securely in place.
- B. Environmental Requirements:
 1. Do not lay masonry when temperature is below 32 deg F when temperature is rising or below 40 deg F when temperature is falling, unless adequate precautions are taken to prevent work from freezing.
 2. During freezing or near freezing weather, provide adequate equipment or cover to protect completed portions of Work and maintain minimum temperatures above 50 deg F.

1.06 QUALITY ASSURANCE

- A. Masonry inspections shall be provided per ACI 530, "Building Code Requirements & Specifications for Masonry Structures".

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and as follows for each form of concrete masonry unit required.
 1. Provide special shapes for stretchers, lintel and bond beams, and other shapes indicated or required.
 2. Provide square-edged units for outside corners.
- B. Concrete Masonry Units: ASTM C 90, "Concrete Masonry Units Using Lightweight Aardelite Aggregate" and as follows:
 1. Weight Classification: Normal weight.
 2. Provide Type II, nonmoisture-controlled units.
 3. Sizes: Nominal face dimensions of 8 inches by 16 inches; thicknesses as indicated.
 4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated on Drawings.

2.02 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, "Standard Specification for Portland Cement", Type I or II; maximum 0.6 percent alkali. Provide natural color.

- B. Masonry Cement: ASTM C 91, "Standard Specification for Masonry Cement", non-staining. 22 percent maximum air content by volume and properties complying with requirements of ASTM C 270, "Standard Specification for Mortar for Unit Masonry" Table 2, Type S mortar.
- C. Hydrated Lime: ASTM C 207, "Standard Specification for Hydrated Lime for Masonry Purposes", Type S.
- D. Aggregate for Mortar: ASTM C 144, "Standard Specification for Aggregate for Masonry Mortar". Clean, dry, and washed free of salts.
- E. Aggregate for Grout: ASTM C 404, "Standard Specification for Aggregates for Masonry Grout". Size #1 for fine grout; Size #8 for coarse grout when minimum horizontal dimension of grouting space exceeds 4 inches.
- F. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142, "Standard Specification for Extended Life Mortar for Unit Masonry". Permissible for use subject to approval by Engineer for compliance with required compressive strength characteristics.
- G. Water: Clean, fresh, and potable.

2.03 REINFORCING STEEL

- A. Steel Reinforcing Bars: Material and grade as follows:
 - 1. Billet steel complying with ASTM A 615, "Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement".
 - 2. Grade 60.

2.04 JOINT REINFORCEMENT

- A. General: Provide joint reinforcement formed from the following:
 - 1. Galvanized carbon steel wire, coating class as follows:
 - a. ASTM A 82, "Standard Specification for Steel Wire, Plain, for Concrete Reinforcement" with ASTM A 153, "Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware" Class B-2 coating, for exterior walls.
- B. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, integral drips, and complying with requirements indicated below:
 - 1. Wire Diameter for Side Rods: 0.1483 inch.
 - 2. Wire Diameter for Cross Rods: 0.1483 inch.
- C. For single-wythe masonry provide ladder type design with single pair of side rods. Space joint reinforcement at 16 inches o.c. vertically.

- D. Manufacturers: One of the following:
1. AA Wire Products Company.
 2. Dur-O-Wal, Inc.
 3. National Wire Products Corp.

2.05 MISCELLANEOUS MASONRY ACCESSORIES

- A. Premolded Control Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
1. Styrene-butadiene rubber compound complying with ASTM D 2000, "Standard Classification System for Rubber Products in Automotive Applications" Designation M2AA-805.
 2. Products/Manufacturers: One of the following:
 - a. "Titewall AA1000"; AA Wire Products Co.
 - b. "D/A 2005"; Dur-O-Wal, Inc.
 - c. "Regular"; Ty-Wal.

2.06 MORTAR AND GROUT MIXES

- A. General: Do not add admixtures, including pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds, or other admixtures, unless otherwise specified.
1. Do not use calcium chloride in mortar or grout.
 2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, in order to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, "Standard Specification for Mortar for Unit Masonry" Proportion Specification, for types of mortar indicated below:
1. Limit cementitious materials in mortar to portland cement-lime.
 2. Exterior and Loadbearing Masonry: Type M or S.
- C. Grout for Unit Masonry: Comply with ASTM C 476, "Standard Specification for Grout for Masonry". Use grout of consistency indicated or, if not otherwise indicated, of consistency (fine or coarse) at time of placement that will completely fill spaces intended to receive grout.
1. Compressive Strength: 3000 psi at 28 days.
 2. Aggregate Size: 3/8 inch.
 3. Slump: 8 to 10 inches.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

3.02 INSTALLATION, GENERAL

- A. Thickness: Build single-wythe walls to the actual thickness of the masonry units, using units of thickness indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges.

3.03 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/4 inch in 10 feet, nor 3/8 inch in 20 feet, nor 1/2 inch in 40 feet or more.
- B. Variation from Level: Do not exceed 1/4 inch in 20 feet, nor 1/2 inch in 40 feet or more.
- C. Variation of Linear Building Line: Do not exceed 1/2 inch in 20 feet, nor 1/2 inch in 40 feet or more.
- D. Variation in Cross-Sectional Dimensions: Do not exceed minus 1/4 inch nor plus 1/2 inch from wall thickness indicated.

3.04 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locating of openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and where possible at other locations.
- B. Lay walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
- C. 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.
- D. Stopping and Resuming Work: In each course, rake back 1/2-unit length for one-half running bond; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar prior to laying fresh masonry.
- E. Built-in Work: As the construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
 - 1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
 - 2. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, and similar items, unless otherwise indicated.

3.05 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows:
 - 1. With full mortar coverage on horizontal and vertical face shells.
 - 2. Bed webs in mortar in starting course on footings and where adjacent to cells or cavities to be filled with grout.
 - 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
 - 4. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 3/8 inch joints.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.06 HORIZONTAL JOINT REINFORCEMENT

- A. General: Provide continuous horizontal joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcing a minimum of 6 inches.
 - 1. Space reinforcement no more than 16 inches o.c.
 - 2. Provide reinforcement in mortar joint 1 block course above and below wall openings and extending 12 inches beyond opening.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column pipe enclosures, and other special conditions.

3.07 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joints in unit masonry construction where indicated. Build-in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 - 1. Install preformed control joint gaskets designed to fit standard sash block. Provide at 34 feet on center maximum.

3.08 LINTELS

- A. Provide masonry lintels where shown and where openings of more than 24 inches for block size units are shown without structural steel or other supporting lintels.
 - 1. Provide prefabricated or built-in masonry lintels. Use specially formed bond beam units with reinforcement bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installation. Temporarily support formed-in-place lintels until cured.

- B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.09 INSTALLATION OF REINFORCED UNIT MASONRY

- A. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction.
 - 1. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements of ACI 530.1, "Building Code Requirements & Specifications for Masonry Structures".
 - 1. Lap reinforcing bars 48 diameters where spliced.
 - 2. Hold vertical bars in position at top and bottom and with a minimum clearance of 1/4 inch to masonry walls and one diameter between bars.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
 - 1. Grouting Options:
 - a. 4 foot high lifts with no observation holes.
 - b. 8 foot high lifts with observation holes. Observation holes shall be 4 inch by 4 inch sawcuts at the base course of all reinforcing.

3.10 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged, or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, 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 all joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.
- D. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

END OF SECTION 04810