SECTION 04 21 13 – Unit Masonry/Clay Unit Masonry/Brick Masonry

PART 1: GENERAL

1.1 SUMMARY

A. Section Includes:

1. Clay Masonry Units
2. Steel Reinforcement
3. Brick Anchors and Ties
4. Expansion Joints
5. Flashing/Weep Materials
6. Mortar

1.2 REFERENCES

A. ASTM International List of Applicable Standards:

2. ASTM A62 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
4. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
5. ASTM A775 Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
6. ASTM A996 Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
7. ASTM A1008 Standard Specification for Steel Sheet, Cold-Rolled Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

B. The Brick Industry Association (BIA):

1. Technical Note 20, Cleaning Brickwork.

1.3 SUBMITTALS
A. General: Submit listed submittals in accordance with Conditions of the Contract and Section [01 33 00 - Submittal Procedures] [______].

B. Product Data: Submit product data for specified products.

C. Samples: Submit brick samples showing range of color and texture to be expected.

D. Test Reports: Submit reports of brick tests specified in Part 2.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: In accordance with Section [01 41 00 - Regulatory Requirements] [______].

B. Mock-Ups:

1. Provide a mock-up panel for each type of brick specified and as indicated on the drawings.
2. Build the mock-up(s) according to the Architect’s direction; do not move, alter or destroy the mock-up(s) until directed to do so by the Architect.
3. For each mock-up, provide brick of color and texture that represents the brick to be used on the project.
4. Do not begin installation of brickwork until the Architect accepts the mock-up(s). Build as many mock-ups as required to obtain the Architect's acceptance. Remove unacceptable mock-ups from the site.

1.5 DELIVERY, STORAGE & HANDLING

A. General: Comply with Section [01 61 00 - Common Product Requirements] [______].

B. Storage and Protection:

1. Store materials to prevent damage due to moisture, contamination, breakage, chipping or other causes.
2. Store materials on pallets or stable aggregate bed to reduce contamination and soiling. Cover with a non-staining waterproof membrane allowing for airflow around brick while protecting it from airborne contaminants and wind-borne dirt.

PART 2 - PRODUCTS

2.1 CLAY MASONRY UNITS

A. Face brick shall be A Grade units manufactured by the following member of the Brick Industry Association (BIA):

Name: BORAL BRICKS INC.
Address: 200 Mansell Ct East, Suite 305, Roswell, GA 30076
Phone: (800) 526-7255 centralized customer service
B. Brick Specification
   1. Size: <List of available sizes, by product, found on Boral website>
   2. Color/Product Name: <As indicated on drawings or a description of target sample for matching purposes>
   3. Compressive Strength: <?> lbs per square inch, minimum.
   4. Initial Rate of Absorption (IRA): <?> grams per minute per 30 square inches, maximum.
   5. ASTM Designation:
      Face Brick: ASTM C216, Grade SW, Type <FBS or FBA>
      Hollow Brick: ASTM C652, Grade SW, Type <HBS or HBA>

2.2 OTHER MATERIALS

A. Steel Reinforcement:
   <Select the appropriate type below or add a type to reflect the accurate requirements for steel reinforcement on the project>
   1. Billet Steel Deformed Bars: ASTM A615.
   2. Rail Steel Deformed Bars: ASTM A996.
   3. Axle Steel Deformed Bars: ASTM A996.
   4. Epoxy Coated Steel Bars: ASTM A775.
   Note: Fabricated steel lintels or shelf angles are a normal support requirement over most masonry openings, for vertical expansion joint installation in multi-story structures and for special design cases where the masonry wall cannot be supported from below. Steel designations for lintel and shelf angle use are covered in Division 05: Metal.

B. Brick Anchors and Ties:
   <Select the appropriate anchor(s) and/or wall tie(s) below (items 1-4) for the project and enter their individual specifications, or add details if a required anchor or wall tie is not listed>
   2. Joint Reinforcement: ASTM A82, <As required per drawings>, galvanized in accordance with ASTM A153, Class B-2.
   3. Wire Wall Ties, ASTM A82:
      a. Wire Size: <As required per drawings>
      b. Shape: <As required per drawings>
      c. Length: <As required per drawings>
      d. Galvanized in accordance with ASTM A153, Class B-2.
   4. Dovetail Anchors, ASTM A1008:
      a. Gauge: <As required per drawings>
      b. Length: <As required per drawings>
      c. Galvanized in accordance with ASTM A153, Class B-2.
      d. Galvanized in accordance with ASTM A153, Class B-2.

C. Expansion Joints:
<Select the appropriate expansion joint material for the project from the list below or add details for specific joint material required but not listed>

a. Premolded Foam: ASTM D1056, Type 2, Class A, Grade 1  
b. Neoprene: ASTM D1056, Type 2, Class A, Grade 1.

Note: A flexible sealant is normally installed in the expansion joint after the expansion material has been inserted. Since the sealant is part of the flashing or moisture management strategy for the project, it is covered in detail under Division 07: Thermal and Moisture Protection.

D. Mortar:

<Edit the basic mortar constituents below based on project requirements. The need for (or acceptance of) pre-blended masonry mortars or special mortar additives should be expressed in detail>

1. Portland Cement: ASTM C150, Type I.  
2. Hydrated Lime: ASTM C207, Type S.  

Mortar should be mixed by proportion according to ASTM C270 for Type N mortar.

2.3 FLASHING/WEEP MATERIALS

A. Flashing for all masonry openings and drainage planes should be installed according to prevailing building codes and industry best-practice and are covered separately under Division 07: Thermal and Moisture Protection.

B. Weeps are to be used in conjunction with flashing materials for proper functioning of the masonry wall drainage system. The specified weep material is:

1. Cotton sash cord, 12 inches long with end laid in air cavity  
2. Plastic tube, 1/4 inch minimum diameter  
3. Plastic vents or cells  
4. Aluminum vents or cells

2.4 PRODUCT SUBSTITUTIONS

A. Substitutions are permitted in accordance with Division 01 25 13: Product Substitution Procedures. > <not permitted>.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate conditions are acceptable for product installation in accordance with manufacturer's instructions and industry best practice.
3.2 PREPARATION

A. Prepare all surfaces using the methods recommended by the manufacturer and industry best practice for achieving the best result for the substrate under the project conditions.

B. Remove mud, loose rust, ice and contaminants that may interfere with mortar-to-unit bonding or mortar-to-footing/brick ledge bonding.

3.3 INSTALLATION

A. Bond Pattern: Units will be installed in a $<1/2 \text{ bond}> <1/3 \text{ bond}> <\text{Flemish Bond}>$ pattern.

B. Laying Clay Masonry Units:
   1. Lay brick making sure head joints and bed joints are full of mortar.
   2. Lay brick units plumb and true to line.
   3. Where fresh mortar joins partially set mortar, remove loose brick and mortar and lightly wet the exposed surface of set masonry.
   4. When adjustment must be made after mortar begins to harden, remove hardened mortar and replace it with fresh mortar.

C. Tooling and Pointing:
   1. Tool mortar joints to a $<\text{Concave}> <\text{V-shaped}> <\text{Grapevine}>$ appearance. Other joint profiles are less durable and allow water to more easily penetrate the wall.
   2. Tool exposed joints when they are thumbprint hard.
   3. Flush-cut all joints when they are not tooled.
   4. When re-pointing a section in a wall, rake the mortar joints to a depth of not less than 1/2 inch. Fill the joint completely with pointing mortar and tool to match the surrounding masonry.

D. Flashing:
   1. Remove any projections on the brick surface or mortar bed that might puncture the flashing material.
   2. Place through-wall flashing on a bed of mortar so that the flashing projects 1/4 inch from wall face and forms a drip edge. Overlap flashing a minimum of 6 inches.
   3. Cover flashing with mortar.

E. Weeps:
   1. Install weeps in the head joints of the first brick course immediately above the through-wall flashing. Place weeps at not more than 24 inches on center horizontally.
   2. Keep the air cavity free of mortar as much as possible.

F. Expansion Joints:
   1. Install expansion joints as indicated on drawings.
   2. Keep joints free of mortar and any debris that may hinder movement.
   3. Install expansion joint material and finish the joint with a sealer.

G. Cold Weather Procedures:
1. Preparation:
   a. If ice or snow has formed on the masonry bed, remove it by carefully applying heat not to exceed 120 degrees F until the surface is dry to the touch.
   b. Remove any brick units or mortar that is frozen or damaged.
   c. When the clay masonry unit suction exceeds 30 grams per minute per 30 square inches, sprinkle with heated water as follows:
      1) When units are 32 degrees F or above, heat water to 70 degrees F or above.
      2) When units are below 32 degrees F, heat water to 130 degrees F or above.

2. Work in Progress:
   a. Air temperature 40 degrees F to 32 degrees F:
      1) Heat sand or mixing water to produce mortar temperatures that match air temperature.
   b. Air temperature 32 degrees F to 25 degrees F:
      1) Heat sand and mixing water to produce mortar temperatures between 40 degrees F and 120 degrees F.
      2) Maintain temperature of mortar on boards above freezing.

Installation in colder air temperatures will require heat sources on the wall and the use of windbreaks or tents to create a controlled environment suitable for proper bonding and curing.

3. Completed Work and Work Not in Progress:
   a. Mean daily air temperature of 40 degrees F to 32 degrees F: Protect masonry from rain and snow for 24 hours by covering with a weather-resistive membrane.
   b. Mean daily air temperature of 32 degrees F to 25 degrees F: Cover masonry with a weather-resistive membrane for 24 hours.
   c. Mean daily air temperature of 25 degrees F to 20 degrees F: Cover masonry with insulating blankets for 24 hours.

H. Hot Weather Procedures:
   1. When ambient temperature exceeds 90 degrees F and wind exceeds 8 miles per hour:
      a. Maintain temperature of mortar and grout between 70 degrees F and 120 degrees F.
      b. Limit the spread of the mortar bed to 4 feet and place units within 1 minute of spreading mortar.
      c. Control moisture evaporation in partially or newly completed walls by fog spraying with potable water, covering with opaque plastic or canvas or both.

I. Protection of Work in Progress:
   1. Covering:
      a. Cover tops of walls with a strong waterproof membrane at the end of each day or work shutdown.
b. Extend the waterproof membrane cover a minimum of 24 inches down the side of each wall.

c. Hold cover securely in place.

2. Load Application:

a. Do not apply uniform floor or roof loading for at least 12 hours after completing columns and walls.

b. Do not apply concentrated loads for at least 3 days after completing columns and walls.

3. Staining:

a. Prevent grout and mortar from staining the face of masonry.

b. Remove grout and mortar that comes in contact with masonry units immediately.

c. Protect sills, ledges and projections from mortar droppings.

d. Protect base of wall from rain-splashed mud and mortar splatter.

e. Turn scaffold boards on edge when work is not in progress to lessen splattering.

3.4 CLEANING

A. Cut out defective mortar joints and holes in exposed masonry and re-point with mortar.

B. Clean a sample wall area. Do not proceed with cleaning without Architect's approval.

C. Clean brick in accordance with BIA Technical Note Number 20 and the proprietary cleaning product manufacturer's recommendations.

End of Section