SECTION 04 73 00 (04730)
MANUFACTURED STONE MASONRY

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Simulated Stone

B. Products installed, but not furnished, under this Section include the following:
   1. **Steel Lintel and Shelf Angles** for unit masonry, furnished under Section 05 50 00, Metal Fabrications.
   2. Hollow-metal frames in unit masonry openings, furnished under Section 08 11 13, Hollow Metal Doors and Frames.

1.2 REFERENCES
A. **ASTM International (ASTM)** Publications: (Former American Society for Testing and Materials)
   2. C67 "Test Methods of Sampling and Testing Brick and Structural Clay Tile"
   6. C192 “Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory”

1.3 SYSTEM DESCRIPTION
A. General: Fabricate and install simulated stone to withstand loads from wind, gravity, movement of building structure, and thermally induced movement, as well as to resist deterioration under conditions of normal use including exposure to weather, without failure.
B. Provide hand-set (field-installed) anchoring system, including connections to building structure, that is capable of sustaining forces generated by gravity loads, wind loads, and stresses induced by thermal movement, acting separately or in combination, within the following parameters:

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:

1. Product Data: Submit manufacturer's product data for each type of simulated stone, accessory, and other manufactured products, including certifications that each type complies with specified requirements.

2. Samples for verification purposes of simulated stone in form of sets for each color, grade, finish, type, and variety of simulated stone required.
   a. Provide colored pointing mortar and grout samples for each color required showing full range of exposed color and texture to be expected in completed work.

3. Shop Drawings detailing fabrication and installation of simulated stone cladding. Include setting Drawings indicating sizes, dimensions, sections, and profiles of stones, arrangement and provisions for jointing, supporting, anchoring, and bonding stonework, and details showing relationship with, attachment to, and reception of related work.
   a. Include building elevations showing layout of units and locations of joints and anchors.

4. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing simulated stone similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to manufacture required units.

B. Single-Source Responsibility for Simulated stone: Obtain each color, grade, finish, type, and variety of stone from a single manufacturer with resources to provide materials of consistent quality in appearance and physical properties, including the capacity to mold and finish material without delaying the progress of the work.

C. Single-Source Responsibility for Mortar and Grout Materials: Obtain mortar ingredients of uniform quality and from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.

D. Single-Source Responsibility for Other Materials: Obtain each type of simulated stone accessory, sealant, and other materials from one manufacturer for each product.

E. Installer Qualifications: Engage an experienced installer who has completed stone cladding similar in material, design, and extent to that indicated for project that has resulted in construction with a record of 5 years of successful in-service performance.

F. Sample Panels: Before installing simulated stone, build sample panels, using materials indicated for the completed Work, to verify selection and to demonstrate aesthetic effects. Build sample panels for each type of exposed simulated stone assembly in sizes approximately 48 inches long by 48 inches high by full thickness.
1. Locate panels in the locations indicated or, if not indicated, as directed by Owner’s Representative.

2. Build mock-ups for the following types of dimension stonework:
   a. Typical exterior simulated stone of each type, full size in conjunction with mock-up for other exterior materials. Illustrate field pattern of stone and color and tooling of joints.
   b. Mockups may be incorporated into the work. If not, retain mock-ups during construction as standard for judging completed dimensions stonework. When directed, demolish mock-ups and remove from site.

3. Clean exposed faces of panels with masonry cleaner indicated.

4. Maintain sample panels during construction in an undisturbed condition as a standard for judging the completed Work.

5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by the Architect in writing.
   a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels, unless such deviations are specifically approved by the Architect in writing.

6. Demolish and remove sample panels when directed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver simulated stone materials to project in undamaged condition in manufacturer’s original, unopened, undamaged containers with identification labels intact.

B. Store simulated stone on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

   1. Do not use pinch or wrecking bars.
   2. Lift with wide-belt-type slings where possible. Do not use wire rope or ropes containing tar or other substances that might cause staining. If required to move stone, use wood rollers with cushions at end of wood slides.
   3. Store simulated stone on wood skids or pallets covered with nonstaining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones.
   4. Protect simulated stone from weather with waterproof, nonstaining covers or enclosures, but allow air to circulate around stones.
   5. Store cementitious materials off the ground, under cover, and in dry location.
   6. Do not use salt or calcium-chloride to remove ice from simulated stone surfaces.

C. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.
D. Store simulated stone accessories, including metal items, to prevent deterioration by corrosion and accumulation of dirt.

1.7 PROJECT/SITE CONDITIONS

A. Protection of Work: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed simulated stone when construction is not in progress.

B. Staining: Prevent grout, mortar, and soil from staining the face of simulated stone to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such simulated stone.
   a. Protect base of walls from rain-splashed mud and from mortar splatter by means of coverings spread on ground and over wall surface.

C. Environmental Requirements:
   1. Ambient air temperature shall be in accordance with manufacturer's requirements.
   2. Maintain materials and surrounding air temperature to minimum 40 degrees prior to, during, and for 48 hours after completion of work.
   3. Protect materials from rain, moisture, and freezing temperatures prior to, during, and after 48 hours after completion of work.
   4. Allow no construction activity on opposite side of wall during installation, and for 48 hours after completion of work.

PART 2 PRODUCTS

2.1 MATERIALS, GENERAL

A. Comply with referenced standards and other requirements indicated applicable to each type of material required.

2.2 MANUFACTURERS

A. Accepted Manufacturers:
   1. “Cultured Stone”; Cultured Stone, Division of Owens Corning (800-2551727)
      a. Size: As indicated in Exterior Finish Schedule on Drawings.
      b. Color: As indicated in Exterior Finish Schedule on Drawings.

2.3 ACCESSORIES

A. Membrane Flashing: As specified in Section 07 60 00 – Flashing and Sheet Metal.
B. Metal Lath: 18 gauge galvanized woven wire mesh, or galvanized 2.5 lb. Flat diamond mesh
D. Water Repellant Coating: As specified in Section 07 19 00 – Water Repellents.
E. Fasteners:
   1. Into Wood Studs: Minimum 0.120 inch shank diameter galvanized nails or staples of sufficient length to penetrate 1-3/8 inches minimum into the stud.
2.4  MORTAR AND GROUT MATERIALS
A.  Portland Cement:  ASTM C150, Type I, of natural color or white, as needed to produce color indicated.
B.  Hydrated Lime:  ASTM C207, Type S
C.  Aggregate:  ASTM C144, and as indicated below:
   1.  For joints narrower than 1/4 inch, use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent the No. 16 sieve.
   2.  For pointing mortar, use aggregate graded with 100 percent passing the No. 16 sieve.
   3.  White Mortar Aggregates:  Natural white sand or ground white stone.

2.5  SIMULATED STONE FABRICATION
A.  General:  Fabricate simulated stone in sizes and shapes required to comply with requirements indicated, including details on Drawings and final Shop Drawings.
B.  Carefully inspect finished stones at fabrication plant for compliance with requirements relative to qualities of appearance, material, and fabrication. Replace defective stones with ones that do comply.

2.6  MORTAR AND GROUT MIXES
A.  General:  Comply with referenced standards and with manufacturers' instructions relative to mix proportions, mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality and with optimum performance characteristics.
   1.  Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or calcium chloride, unless otherwise indicated.
   2.  Mixing:  Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer, unless otherwise indicated. Discard mortars and grout when they have reached their initial set.
B.  Portland Cement/Lime Setting Mortar for Nonpaving Installations:  Comply with ASTM C270, Proportion Specification, for types of mortars and stone indicated below:
   1.  Set stone with Type N mortar.
      a.  Color:  As indicated in Exterior Finish Schedule on Drawings.

PART 3  EXECUTION
3.1  EXAMINATION
A.  Examine surfaces to receive simulated stone work, and conditions under which materials will be installed, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of dimension stonework. Do not proceed with installation until unsatisfactory conditions have been corrected.
3.2 PREPARATION
A. Advise installers of other work about specific requirements relating to placement of inserts, flashing reglets, metal anchors, and similar items to be used by stonework installer for anchoring, supporting, and flashing of dimension stonework. Furnish installers of other work with Drawings or templates showing locations of these items.
B. Verify items provided by other sections of work are properly sized and located.
C. Sheathed Surfaces: Install one layer of weather-resistant barrier with lap joints of 4-inches shingle fashion. Apply code approved metal lath, attach using galvanized nails a minimum of 6-inches on center vertically and 16 inches on center horizontally, which penetrate a minimum of 1-inch into studs. Wrap weather resistant barrier and metal lath a minimum of 16 inches around all outside and inside corners.

3.3 INSTALLATION
A. Comply with manufacturer's product data, including product technical bulletins and installation instructions.
B. General: Install/set all units and accessories accurately, using skilled, experienced personnel, according to approved shop and setting drawings.
   1. Use stone-fitters to perform field-cutting with power saws, when required.
      a. Cut masonry units with wet-saw.
C. Clean stone surfaces before setting, using only water or mild cleaning compounds containing no caustic or abrasives. Clean cut units using a stiff fiber brush and clean water. Allow units to surface dry prior to placement.
D. Provide chases, reveals, openings, and other spaces required to accommodate other work. Close up after other work is complete with simulated stone which matches stone already set.
E. Mortar: Apply 3/4 inch of mortar to lath, covering a maximum of 10 square feet at one time. Press the units firmly into position in soft mortar bed, wiggle and apply slight pressure to unit to ensure firm bonding causing mortar to extrude slightly around edges of units.
   1. For stones applied in hot or dry weather, the back of each piece shall be moistened with a fine spray of water or a wet brush to adequately prevent excessive absorption of moisture from the mortar. If being installed over concrete, masonry or scratch coat substrate, the substrate surface area should also be dampened before applying mortar.
   2. Applications should be protected from freezing, as mortar will not set up properly under such conditions. Do NOT use antifreeze compounds to lower the freezing point of mortar.
F. Masonry Flashing: Extend flashing through veneer, turn up and bed into mortar joint of masonry, seal to concrete or seal into sheathing over steel stud framed back-up.
   a. Lap end joints and seal watertight.
G. Lintels: Install lintels as scheduled.
H. Joints:
   1. Mortar joints should not be over 1/2-inch to 3/4-inch in width. Set simulated stone accurately, in patterns and locations indicated, with uniform joints of dimensions
indicated, and with edges and faces aligned according to established relationships and indicated tolerances.

2. When installing "pre-fitted" stone textures, units should be fitted tight against each other with no allowance for mortar joints.

3. Remove excess mortar; do not allow mortar to set up on face of units.  Point, rake and tool joints before mortar have set.

I. Movement Control Joints
   1. Construct movement joints in locations noted on Drawings.
   2. Do not continue horizontal joint reinforcing across movement control joints.
   3. Form movement control joints by leaving head joints between stacked units void of mortar, ready for application of bond breaker and joint sealant.
   4. Size joint in accordance with Section07 92 00 – Joint Sealants for sealant performance.

J. Setting Units:  Press each stone into the mortar setting bed firmly enough to squeeze some mortar out around the stone's edges.  Apply pressure to the stone to ensure a good bond. Ensure complete coverage between the mortar bed and the surface of the stone. Mortar may also be applied to the entire back of the stone.

K. Shim and adjust anchors, supports, and accessories.

L. Mortar Color:  As indicated in Exterior Finish Schedule on Drawings.

3.4 PROTECTION

A. Protect work during erection as follows:
   1. Cover top of walls with nonstaining waterproof sheeting at end of each day's work.  Cover partially completed structures when work is not in progress.  Extend cover a minimum of 24 inches down both sides and hold securely in place.
   2. Prevent staining of stone from mortar, grout, sealants, and other sources.  Immediately remove such materials from stone without damage to latter.
   3. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
   4. Protect sills, ledges, and projections from droppings of mortar and sealants.

B. Provide final protection and maintain conditions in a manner acceptable to fabricator and installer ensuring dimension stonework being without damage or deterioration at time of Substantial Completion.

3.5 ADJUSTING AND CLEANING

A. General:  Perform final cleaning as soon as possible after mortar has set and been tooled.  Clean faces of stone at pointed joints immediately.  Remove soiled areas, streaks and stains from prefinished panels using clean water and soft bristle brush, followed by clear water rinse.

B. Use no wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods which could damage, discoloration, etching of surfaces or joints, without written approval from simulated stone manufacturer.
C. Clean stone surfaces that have become dirty or stained prior to setting to remove soil, stains, and foreign materials. Clean stones by thoroughly scrubbing stones with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.

D. Remove and replace or repair simulated stone work of the following description:
   1. Broken, chipped, stained, or otherwise damaged stones. Broken, chipped, stained, or otherwise damaged stone may be repaired, providing the methods and results are acceptable to the Architect.
   2. Defective joints.
   3. Stones and joints not matching approved samples and field-constructed mock-up.
   4. Simulated stone work not complying with other requirements indicated.

E. Acceptable Appearance: Simulated stone shall show no obvious repairs or imperfections, other than minimal color variations, when viewed with the unaided eye at a 20 foot distance in normal daylight conditions.

F. Replace in manner that results in dimension stonework matching approved samples and field-constructed mock-ups, complying with other requirements, and showing no evidence of replacement.

G. Remove protection materials upon substantial performance of the work or when risk of damage is no longer present.

END OF SECTION 04 73 00 (04730)