

SECTION 096340 STONE FLOORING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the stone flooring as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Stone flooring and base as scheduled.
 - 2. Furnishing, cutting, fabricating, delivery, and setting of all stone flooring.
 - 3. Mortar setting bed and grouting of stone joints.
 - 4. Sealant for expansion and control joints.
 - 5. Protection of stone during transit, storage, erection, and after installation. Cleaning of stone prior to acceptance.
 - 6. Shop drawings, setting drawings, and samples for work of this Section.

1.3 RELATED SECTIONS

- A. Cast-in-Place Concrete - Section 033000.

1.4 QUALITY ASSURANCE

- A. Statement of Application: The Contractor, by commencing the work of this Section, assumes overall responsibility, as part of his warranty of the work, to assure that all assemblies, components, and parts shown or required within the work of this Section, comply with the Contract Documents. The Contractor shall further warrant:
 - 1. That all components, specified or required to satisfactorily complete the installation, are compatible with each other and with the conditions of installation and expected use.
 - 2. The overall effective integration and correctness of individual parts and the whole of the system.
 - 3. Compatibility with adjoining substrates, materials and work by other trades.
 - 4. There shall be no material failure due to improper design and fabrication of the stone. All materials are to fully perform to their normal life expectancy.
- B. Each piece of stone shall be subject to the Architect's acceptance, and any piece or pieces which may be rejected after having been set shall be carefully cut out and replaced with new suitable stone without delay, and without cost to the Owner. Any piece or pieces damaged in the removal and resetting of defective profiles shall also be removed and suitable, approved pieces provided and set. Patching or filling of stone not permitted. Stone having chipped arrises or broken corners shall be rejected and replaced.

1. Architect's inspection of the stone does not relieve the Contractor for this work from his responsibility to provide all stonework in accordance with the approved samples and shop drawings.
 - C. Subcontract fabrication and installation of stone flooring to a firm or firms which have successfully fabricated and/or installed stone similar to the quality specified, and in the quantity shown, for a period of not less than five (5) years.
 - D. Examination Criteria: All examinations, selections, and acceptances shall be for the purpose of achieving a final appearance of stone with the greatest possible uniformity, and will be based upon the following criteria:
 1. Color within accepted, pre-selected color charts and finish.
 2. Sequence matching of adjacent stone units, as accepted by the Architect.
 3. Only one source of each type of stone shall be used throughout the work. Stone shall match the type, pattern, color, texture, and finish of samples available for inspection in the office of the Architect.
 4. Conformance to approved shop drawings and details within specified dimensions and tolerances.
 5. Other criteria as specified in Part 2, Products, herein.
 - E. Conform to the standards of Marble Institute of America "Dimension Stone Design Manual," latest edition; unless more stringent requirements are specified herein.
 - F. All surfaces shall not have a lower wet value of 0.42 per DCOF AcuTest criterion for slip resistance.
- 1.5 TOLERANCE
- A. Joints: -0", +1/16".
 - B. Stone: Stone dimension tolerance shall be +0", -1/16" in both directions, with ninety (90) degree angle for all corners.
 - C. Stone face dimension tolerance (flatness) shall be + 1/32" in all directions.
 - D. Offset at joints: Do not exceed plus or minus 1/32"; including stone joints on the wall and on the floor which are in alignment.
 - E. Stone thickness tolerance shall be + 1/8".
- 1.6 SUBMITTALS
- A. Shop Drawings: Submit complete cutting and setting drawings showing shop sizes, shapes, thicknesses, jointing, connection with other work, typical and special details, dimensions and setting numbers. Do not fabricate any stone (except for samples) until shop drawings have been reviewed by the Architect.
 - B. Fabricator's Data

1. Submit copies of fabricator's specifications and installation instructions for mortar and grout required. Include data substantiating that materials comply with specified requirements. Indicate that Installer has received a copy of the fabricator's instructions.
2. Fabricator's instructions for handling and storage at job site; installation and protection of each type of stone. Indicate that the Installer of stone work has received a copy of each instruction.

C. Samples

1. Stone: Submit three (3) sets of 1' x 1' samples of each type of stone. Indicate in each set the full range of exposed color and texture to be expected in the completed work. Architect's review will be for color, veining, markings and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
2. Mortar Materials: Submit certification that mortar materials comply with specification requirements.
3. Grouting materials - Submit color samples.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect stone during transit, storage and handling to prevent moisture, soiling, staining and physical damage.
- B. Handle stone to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of stone with wood or other rigid materials. Lift with wide belt type slings wherever possible; do not use wire rope or ropes containing tar or other substances which might cause staining. If required, use wood rollers and provide cushion at end of wood slide.
- C. Store stone on wood pallets, covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones. Protect stored stone from weather with waterproof, non-staining covers or enclosures, but allow air to circulate around stones.
- D. Protect mortar materials and stonework accessories from weather, moisture and contamination with earth and other foreign materials.

1.8 JOB CONDITIONS

- A. Installer must review installation procedures and coordination with other work, with Contractor and other subcontractors whose work will be affected by stonework.

1.9 PROTECTION

- A. Protect adjacent surfaces from damage. Protect exposed surfaces of stone units from damage or defacement. Prevent materials used for installing work of this Section from staining or damaging the exposed surfaces of stone units or the exposed surfaces of the adjoining construction. Immediately remove mortar, grout or other detrimental materials from exposed surfaces of stone or adjoining construction.
- B. After installation, protect stone flooring from damage during subsequent construction activities.

- C. Protect all stone flooring from other materials that will cause staining or defacement. Stone subject to damage after setting shall be properly covered or protected.
- D. No lumber or other material liable to stain or deface the stone shall be used.

1.10 CERTIFICATION

- A. Manufacturer of mortar additive shall certify in writing that material shall not stain stone; submit test data from independent testing laboratory using stone specified herein showing no stain.

1.11 WARRANTY

- A. Unless stated otherwise in these Specifications, warranty shall state that all work is in accord with drawings and Specifications, as amended by any changes thereto authorized by the Architect, free from defects in materials and workmanship for a period of five (5) years from date of acceptance of the work by the Owner or failure of system to meet performance requirements. Contractor shall agree to repair or replace defective materials and workmanship during the guarantee period at no additional cost to the Owner.
- B. Defective materials and workmanship are hereby defined to include evidence of abnormal deterioration, aging, structural failure of components resulting from exposure to normal load and forces, failure of operating parts to function normally, sealant failures, deterioration or discoloration of finishes in excess of normal aging, and failure to fulfill other specified performance.
- C. Contractor and respective subcontractors shall be responsible for damage to the building and furnishings occasioned by defective materials or workmanship or damage as part of repairs to the stone work.
- D. The warranty, the enforcement or lack of enforcement thereof, shall not deprive the Owner of other actions, rights or remedies available to him. Warranty shall be in form approved by the Architect.

PART 2 - PRODUCTS

2.1 STONE

- A. Stone shall be nominal 3/4" thick, unless otherwise noted; of variety selected by the Architect.
- B. Stone shall have a polished finish, mirror glass with sharp reflections, on all exposed surfaces; concealed surfaces may be sawn.
- C. Examinations
 - 1. Examination of the Fabrication Plant: Production units shall be made available for inspection by the Architect at his request. To this end, the fabricator shall, after review of final shop drawings, advise the Architect when production has begun and of the earliest possible opportunity to inspect a representative sampling of production work.
 - 2. Contractor shall provide lighting that is sufficient in intensity and color range to permit an adequate examination to the satisfaction of the Architect.

- D. Visual Criteria for Stone Flooring: All examinations, selections, and approvals shall be for the purpose of achieving a final appearance of stone flooring with greatest possible uniformity, and will be based upon the following criteria:
1. All stone shall be of sound stock, and uniform texture, and shall be free of defects which would impair the strength, durability, and appearance of the work, as determined by the Architect.
 2. Inherent variations characteristic of the stone and the quarries from which it is to be obtained shall be brought to the attention of the Architect at the time samples are submitted, and shall be subject to acceptance of the Architect.
 3. All stone shall be selected for background color, veining, marking and matching, shall run in even shades, and shall be set accordingly.

2.2 ACCESSORY MATERIAL FOR STONEWORK

- A. Mortar Materials
1. White Portland Cement: ASTM C 150, Type 1, non-staining. Cement shall in no case contain more than 0.03% by weight of soluble alkali (calculated as Na₂O).
 2. Sand: ASTM C 144, except graded with 100% passing No. 16 sieve, non-staining; white.
 3. Latex Additives: Made by Laticrete, Mapei or approved equal as follows:
 - a. Thin Set: "Platinum 254."
 - b. Slurry Bond Coat: Laticrete "211 Crete Filler Powder" gauged with Laticrete 4237 additive or Mapei "Kerabond Powder" gauged with Mapei "Keralastic."
 - c. Thick Bed Mortar: Laticrete 226 Thick Bond Mortar mix gauged with Laticrete 3701 admix or Mapei 4-to-1 Mud Bed Mix gauged with Mapei Planicrete AC Admix.
 4. Water: Potable, clear and free of deleterious materials which would impair the quality of the mortar.
 5. Grout: Laticrete floor grout and joint filler gauged with Laticrete 1776 grout admix or Mapei "Ultracolor Plus" (no admix required) or approved equal; color as selected by the Architect.
- B. Anti-Fracture Membrane: "ECB 75 Anti-Fracture Membrane" by NAC, or approved equal.
- C. Cleavage Membrane: 6 mil polyethylene sheet.
- D. Reinforced mesh shall be 2" x 2" x 16 ga. welded galvanized reinforcing mesh.
- E. Sealant for Control and Expansion Joints: Provide a two-part polyurethane sealant complying with Fed. Spec. TT-S-00227, Class B, Type 2, equal to "THC-900/901" made by Tremco, or equal made by Mameco, Pecora, color as selected by the Architect. Back-up rod shall be "Ethafom" made by Dow Chemical Co. or approved equal.
- F. Stone Sealer: "Stand-Off Stain Barrier" made by ProSoCo, "UltraCare Penetrating Plus SB Stone & Porcelain Tile Sealer" made by Mapei, or approved equal made by HMK or approved equal.

2.3 FABRICATION

- A. All stone flooring shall be executed by mechanics skilled in the trade. All stone shall be well-cured and seasoned before cutting. Cut stone units with bed, unless otherwise accepted by Architect.
- B. Stone shall be accurately cut to sizes, shapes, profiles and dimensions. There shall be no deviation from jointing.
- C. Exposed surfaces and edges of stone units shall be free from cracks, broken corners, chipped edges, scratches, or other defects affecting appearance. Patching or filling not permitted.
- D. The use of stone with chipped edges or faces shall not be permitted.
- E. Cut stone units full and true on faces, reveals, beds, joint and top, to the full dimensions required by drawings. All edges shall be straight and true with sharp and true arrises. All stone shall fit together accurately.
- F. Make faces of stone units in same plane flush at joints. All finished surfaces shall be true in line and face.
- G. Sawn surfaces and edges shall be cleaned of all rust stains and iron particles.
- H. Cut stone to allow for uniform 1/8" wide joints.

2.4 CUTTING, DRILLING AND FITTING

- A. Provide holes and sinkages required to accommodate other items which connect to or penetrate the stone.
- B. Include all cutting, drilling and fitting of stone work required to accommodate the work of other trades. In cutting and fitting, carefully cut and grind edges to a neat tight fit. Do cutting in such manner so as not to impair strength or appearance of stone. Use physical templates for all cutting and drilling; obtain required templates from proper trades.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where stone flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 TOLERANCES

- A. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.
 - 1. Floors: 1/16" in 10'-0" run, any direction; + 1/16" at any location; 1/32" off-set at any location.

3.3 CONTROL SECTION

- A. Prior to general installation of stone flooring, install a section of the stone flooring (used as "control section") in accordance with final reviewed shop drawings. Architect shall be informed of time and place of such installation of control section.
- B. Obtain Architect's acceptance of visual qualities of control section before start of general installation. Replace unsatisfactory work, as directed, until acceptable to the Architect. Retain control section during construction as a standard for judging completed work. Do not alter, move or destroy control section unless directed by the Architect.
- C. An as-built drawing locating control section shall be submitted to the Architect.

3.4 SETTING STONE FLOORING

- A. Mortar: Mix latex Portland cement mortar and bond coat following ANSI A108.1 and recommendations of latex additive manufacturer.
- B. Apply cleavage membrane on concrete sub-floor prior to application of setting bed following manufacturer's instructions.
- C. Setting
 1. The prepared mortar shall be spread to the desired thickness. The mortar shall be rodded and compacted with a steel trowel.
 2. Install antifracture membrane over full cured mortar.
 3. Before placing the stone, a slurry coat shall be applied to the mortar bed antifracture membrane following manufacturers guidelines. Thickness of the bond coat shall be approximately 1/16". In addition, a skim coat shall be applied to the back of each stone just prior to placing on the bed.
 4. Stone shall be placed in the wet slurry coat before the surface dries. Uniform joints shall be maintained with a nominal width of 1/8".
 5. After each piece is laid, it shall be beat in with a wooden block or rubber mallet to level the surface and embed the stone. Bearing shall be done before mortar takes initial set.
 6. Setting bed shall provide for an average contact area of not less than 100%.
- D. Joint Treatment
 1. After all stone units have been set and setting bed is thoroughly cured, brush all 1/8" wide joints clean. Thoroughly wet raked out portion of joints and then fill solid with colored joint grout. Strike joint neatly and tool to a dense, slightly recessed surface. Grouting of joints as done in tile work is not permitted. Every effort must be made to keep grout and mortar off exposed surfaces of stone. Apply masking tape to prevent staining of adjacent stone surfaces, in continuous strips in alignment with joint edge. Remove tape immediately upon grout having achieved initial set.
 2. At obstructions, fill stone joints with sealant and rod specified herein following requirements of Section 079200.

E. Cleaning

1. Excess material shall be cleaned from the stone surface immediately as the work progresses. Cleaning shall be done while mortar is fresh and before it hardens on the surface.
2. Difficult to clean cement film or mortar shall be immediately removed from the finished work.

3.5 REPAIR, CLEANING AND SEALING (AFTER INSTALLATION)

- A. Remove and replace stone units which are broken, chipped, stained or otherwise damaged. Where directed, remove and replace units which do not match adjoining stonework. Patching or hiding defects in stone will not be permitted. Provide new matching units, install as specified and reseal joints to eliminate evidence of replacement. Reseal defective and unsatisfactory joints to provide a neat, uniform appearance.
- B. Thoroughly clean stone prior to using clear sealer using cleaner recommended by sealer manufacturer. After cleaning agent has thoroughly dried apply clear sealer at the rate of 100 sq. ft./gallon using a wet-on-wet application. Use enough sealer to keep the surface wet for a minimum of 5 minutes. Sweep out puddles with a stiff bristle broom, or pick up with a dry towel or mop.

3.6 PROTECTION

- A. After installation and cleaning, protect stone flooring from damage during subsequent construction activities.
- B. Protect all stone flooring from other materials that will cause stain. Stone subject to damage after setting shall be properly covered or protected.
- C. At completion of construction work, remove all temporary protection from the work of this Section.
- D. Examine all work and repair all damage. Clean soiled or stained surfaces. In the event damage is irreparable, or soiled or stained surface cannot be cleaned, then remove and replace such items at no additional cost to Owner.

END OF SECTION 096340