

## SECTION 09 30 00

### TILE

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and installing the following:

1. Wall tile.
2. Floor tile.
3. Stone thresholds.
4. Stone base.

B. Related Sections:

1. Elastomeric liquid waterproofing is specified in Section 07 14 16.
2. Joint sealants are specified in Section 07 92 00.
3. Cementitious backing board is specified in Section 09 28 13.

##### 1.02 SUBMITTALS

A. Product Data: Furnish manufacturer's product data for each specified product.

B. Shop Drawings: Show tile patterns and locations and widths of expansion, contraction, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Initial Selection: If colors have not been preselected, furnish manufacturer's color charts consisting of actual tiles or sections of tile showing full range of colors, textures, and patterns available for each type of tile. Include samples of grout and accessories involving a color selection.

D. Samples for Verification: Furnish samples of the following items. Where products involve color and texture variations, furnish sets showing full range of variations expected.

1. Each type and composition of tile for each color and texture required, at least 12-inches square, mounted on plywood or hardboard backing and grouted.
2. Full-size units of each type of trim and accessory for each color required.
3. Stone thresholds in 6-inch lengths.
4. Metal edge or divider strips in 6-inch lengths.

F. LEED Submittals:

1. Credit MR 4: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
  - a. Furnish the LEED Online Credit Template declaring that the credit requirements have been met and list the recycled content products used.
  - b. List total cost of all materials for the Project.

- c. Required Audit Documentation:
  - 1) Manufacturer product data sheets, literature or letters highlighting the overall post-consumer and/or post-industrial recycled content percentages (by weight) of each product listed on the template.
  - 2) Materials invoices showing costs for each product listed on the template.
- 2. Credit IEQ 4.1: Product data for adhesives and sealants used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D.
  - a. Furnish LEED Online Credit Template listing the adhesives and sealants used in the building and declaring that they meet the specified LEED requirements.
  - b. Required Audit Documentation:
    - 1) Product data sheets and MSDS for each adhesive/sealant used on the interior, with the VOC content in g/L circled and indicating VOC content of each product used.
    - 2) Summary table comparing credit VOC requirements and actual VOC levels for each product.

### 1.03 QUALITY ASSURANCE

- A. Single-Source Responsibility for Tile: Obtain each color, grade, finish, type, and variety of tile from a single source with resources to provide products of consistent quality in appearance without delaying progress of the work.
- B. Single-Source Responsibility for Setting and Grouting Materials: Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.
- C. Installer's Qualifications: A minimum of 3-years experience installing ceramic tile of the types specified, and a minimum of 5 installations of a magnitude similar to or larger than the work of this Section.
- D. Field-Constructed Mock-Up: Before installing tile, erect mock-ups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and installation. Build mock-ups using materials to be used in the final work.
  - 1. Locate on site in a location and size as directed by the County's Representative.
  - 2. Obtain County's Representative's acceptance before start of final work.
  - 3. Retain and maintain during construction in undisturbed condition as a standard for judging completed work.
- E. Floor tile shall have a minimum coefficient of friction of 0.6 determined in accordance with ASTM C1028.

### 1.04 ENVIRONMENTAL QUALITY ASSURANCE

- A. Credit MR 4: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 10-percent of cost of materials used for the Project.
  - 1. The cost of post-consumer content of an item shall be determined by dividing the weight of post-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.
  - 2. The cost of post consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing the weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.

3. Mechanical, electrical and plumbing components and specialty items such as elevators shall not be included in this calculation. Only include materials permanently installed in the Project.
- B. Credit IEQ 4.1: Adhesives and sealants used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with the requirements of the following reference standards:

1. Adhesives, Sealants and Sealant Primers: Comply with South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC limits as follows:

Architectural Applications	VOC Limit g/L less water	Specialty Applications	VOC Limit g/L less water
Indoor Carpet Adhesives	50	PVC welding	510
Carpet pad adhesives	50	CPVC welding	490
Wood flooring adhesives	100	ABS welding	325
Rubber floor adhesives	60	Plastic cement welding	250
Subfloor adhesives	50	Adhesive primer for plastic	550
Ceramic tile adhesives	65	Contact adhesive	80
VCT and asphalt adhesives	50	Special purpose contact adhesive	250
Drywall and panel adhesives	50	Structural wood member adhesive	140
Cove base adhesives	50	Sheet applied rubber lining operations	850
Multipurpose construction adhesives	70	Top and trim adhesive	250
Structural glazing adhesives	100		
Substrate Specific Applications	VOC Limit g/L less water	Sealants	VOC Limit g/L less water
Metal to Metal	30	Architectural	250
Plastic foams	50	Nonmembrane roof	300
Porous material (except wood)	50	Roadway	250
Wood	30	Single-ply roof membrane	450
Fiberglass	80	Other	420
Sealant Primers	VOC Limit (g/L less water)		
Architectural, nonporous	250		
Architectural, porous	775		
Other	750		

2. Aerosol Adhesives: Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.

Aerosol Adhesives	VOC Limit
General purpose mist spray	65% VOCs by weight
General purpose web spray	55% VOCs by weight
Special purpose aerosol adhesives (all types)	70% VOCs by weight

- C. Applicable LEED Credits:

1. Credit MR 4 – Recycled Materials.
2. Credit IEQ 4.1 – Low-Emitting Materials - Adhesives and Sealants.

#### 1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, foreign matter, and other causes.

#### 1.06 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Maintain temperatures at 50-deg. F. or more in tiled areas during installation and for 7-days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

## 1.07 EXTRA MATERIALS

- A. Furnish additional tile for replacement and maintenance, at the rate of approximately 3-percent, to the nearest full carton, for each size, color, pattern, and type installed. Identify each carton as to contents.

## PART 2 - PRODUCTS

### 2.01 TILE MATERIALS

- A. Wall Tile: To be selected by the County's Representative.
- B. Floor Tile: To be selected by the County's Representative.
- C. Trim Units: Provide trim units to match adjoining flat tile.
  - 1. Size: Coordinate with sizes and coursing of adjoining flat tile.
  - 2. Shapes:
    - a. Base for Mortar-Set Tile: Coved.
    - b. Base for Thin-Set Tile: Straight.
    - c. Wainscot Cap for Thin-Set Tile: Surface bullnose. Provide regular flat tile for conditions where tile wainscot is flush with wall surface above.
    - d. External Corners for Thin-Set Tile: Surface bullnose.
    - e. Internal Corners: Field-buttet square corners.

### 2.02 STONE THRESHOLDS AND BASE

- A. General: Provide stone that is uniform in color and finish, fabricated to sizes and profiles required to provide transition between tile surfaces and adjoining finished floor surfaces.
- B. Marble: ASTM C503, white honed marble.
- C. Granite: Polished granite to be selected by the County's Representative.

### 2.03 SETTING MATERIALS

- A. Portland Cement: ASTM C150, Type I.
- B. Sand: ASTM C144.
- C. Hydrated Lime: ASTM C206 or C207, Type S.
- D. Water: Clean, clear, potable.
- E. Mortar:
  - 1. Cement Mortar: Job mixed, portland cement, sand, water, and hydrated lime at Developer Design/Builder's option, proportions specified in ANSI A108.1.
  - 2. Dry-Set Mortar: ANSI A118.1.
  - 3. Conductive Dry-Set Mortar: ANSI A118.2.
  - 4. Latex Portland-Cement Mortar: ANSI A118.4.
    - a. Mortar shall be approved for use in thin-setting ceramic tile over elastomeric liquid waterproofing specified in Section 07 14 16.

## 2.04 GROUTING MATERIALS

- A. Commercial Portland Cement Grout: ANSI A118.6, color as selected by the County's Representative.
- B. Dry-Set Grout: ANSI A118.6, color as selected by the County's Representative.
- C. Latex-Portland Cement Grout: ANSI A118.6, color as selected by the County's Representative.
- D. Chemical-Resistant Epoxy Grout: ANSI A118.3, color as selected by the County's Representative.
- E. Grout Schedule:
  - 1. Wall Tile: Commercial portland cement, dry-set, or latex-portland cement.
  - 2. Floor Tile: Commercial portland cement, sand-portland cement, dry-set, latex-portland cement or epoxy.
  - 3. Toilet Room and Quarry Tile Floors: Epoxy.

## 2.05 MISCELLANEOUS MATERIALS

- A. Metal Edge Strips: Zinc alloy or stainless steel terrazzo strips, 1/8-inch wide at top edge with integral provision for anchorage to mortar bed or substrate.
- B. Sealer: As recommended by tile and grout manufacturers.
- C. Curing Cover: 40-pound kraft membrane.
- D. Elastomeric Sealant: As specified in Section 07 92 00.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Examine substrates and areas where tile will be installed, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.
  - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

### 3.02 PREPARATION

- A. Blending: For tile exhibiting color variations within the range selected, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.03 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standard: Comply with referenced parts of ANSI 108 series of tile installation standards.
- B. TCA Installation Guidelines: Comply with TCA "Handbook for Ceramic Tile Installation" installation methods referenced.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars or covers overlap tile.

- E. Jointing Pattern: Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.
  - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- F. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints during installation of setting materials, mortar beds, and tile. Do not saw cut joints after installation of tiles.
  - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
  - 2. Prepare joints and apply sealants as specified in Section 07 92 00.

### 3.04 TILE INSTALLATION METHODS

- A. Interior Floors:
  - 1. Thin-set over Concrete Slab: Install over concrete slab in accordance with ANSI A108.5 using TCA Method F113.
  - 2. Thin-set over Waterproofing: Install over waterproof membrane in accordance with ANSI A108.5 using TCA Method F122. Waterproofing is specified in Section 07 14 16.
  - 3. Thin-set over Concrete Slab with Epoxy Grout: Install over concrete slab in accordance with ANSI A108.5 using TCA Method F115.
- B. Interior Walls:
  - 1. Thin-set over Cementitious Backing Board: Install over cementitious backing board in accordance with ANSI A108.5 using TCA Method W244.
- C. Expansion Joints: Comply with TCA Method EJ171. Proposed joint locations shall be approved by the County's Representative.
  - 1. Interior: Provide expansion joints at 24- to 36-feet on center in both directions, over cold joints and saw-cut control joints, and where tile abuts restraining surfaces. Joint spacing for tile exposed to direct sunlight or moisture shall be 12-to 16-feet on center. Joint width for paver tile shall be minimum 1/4-inch wide; ceramic mosaic tile and glazed wall tile shall be minimum 1/8-inch.
  - 2. Sealant Materials: As specified in Section 07 92 00.

### 3.05 CLEANING

- A. Upon completion of placement and grouting, clean tile surfaces so they are free of foreign matter.
  - 1. Remove latex-portland cement grout residue from tile as soon as possible.
  - 2. Do not use acid or acid cleaners to clean tile.
- B. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

### 3.06 CURING

- A. Damp cure tile installations, including portland cement grouts, for a minimum of 72-hours.
  - 1. Cover with clean non-staining kraft paper.
  - 2. Do not use polyethylene sheets directly over tile on horizontal surfaces.

### 3.07 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures tile is without damage or deterioration at time of Substantial Completion.
  - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
  - 2. Prohibit foot and wheel traffic from tiled floors for at least 7-days after grouting is completed.
- B. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.
- C. Apply sealer to portland cement grout installations in accordance with sealer manufacturer's recommendations. Apply to small test area and obtain County's Representative's approval before proceeding with application over large areas.

### 3.08 WASTE MANAGEMENT

- A. General: Comply with Section 01 74 19.
- B. Separate waste in accordance with the Waste Management Plan and place in designated areas in the following categories for recycling:
  - 1.  $\frac{1}{2}$  tiles and larger, set aside for reuse by County, non-profit organizations such as Habitat for Humanity, etc.
  - 2. Broken tile and cut offs smaller than  $\frac{1}{2}$  tile, excess mortar and grout, crush for use as mosaic, sub-base or fill.
  - 3. Separate metal waste and place in designated areas for recycling or reuse.
  - 4. Separate cardboard waste and place in designated areas for recycling.

END OF SECTION