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SECTION 093033

STONE TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Dimension stone tile
2. Stone thresholds.
3. Metal edge strips.

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for finishes specified for tile substrates.

2. Division 07 Section "Joint Sealants" for sealing joints in stone tile.
3. Division 09 Section "Stone Flooring" for dimension stone flooring.

1.2 REFERENCES

- A. ASTM C 97-02: Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
- B. ASTM C 119-04: Terminology Relating to Dimension Stone
- C. ASTM C 170-90 (1999): Test Method for Compressive Strength of Dimension Stone
- D. ASTM C 615-03: Specification for Granite Dimension Stone
- E. ASTM C 880-98: Test Method for Flexural Strength of Dimensional Stone
- F. National Building Granite Quarries Association (NBGQA) Specifications for Architectural Granite.

1.3 DEFINITIONS

- A. Definitions contained in ASTM C 119 apply to this Section.
- B. Dimension Stone Tile: Modular stone units less than 3/4 inch thick.

1.4 SUBMITTALS

- A. Product Data: For each stone type and each manufactured product shown on Drawings or specified.
 1. For each stone variety used on Project, include physical property data.
- B. Shop Drawings: Show fabrication and installation details for stone.
- C. Stone Samples: Two sets for each stone type required, exhibiting the full range of color characteristics expected; not less than 12 inches square.
 1. Mortar Samples: Full range of exposed color and texture.
 2. Sealant Samples: For each type and color of joint sealant required.
- D. Qualification Data: For the following:
 1. **[Installer]**
 2. **[Fabricator]**

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage experienced installer that has completed stone installation similar in material, design, and extent to that indicated for the project.
- B. Fabricator Qualifications: Engage experienced fabricator that has completed stone fabrication similar in material, design, and extent to that indicated for the project.
- C. Visual Mockup: **[At the Owner's Expense]** Provide full sized mock-up of the approved stone or stones in the approved finishes, erected at a site agreed to by the Architect,

Contractor, and the Fabricator. The approved mock-up shall become the standard for the project.

1. Build mockup of [areas as shown on Drawings].
2. Size: [insert size of visual mockup]
3. Color consistency: demonstrate color consistency with mockup; color range shall not exceed range of color established by samples.
4. Included typical components and anchors.
5. Include sealant joints installed as required by Division 07 Section "Joint Sealants."
6. Mockup may become part of the completed Work if approved at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in factory wrappings, clearly labeled with identification of manufacturer and lot number.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store [liquid latexes] in unopened containers and protected from freezing.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install stone tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 STONE SOURCE

- A. Varieties and Source: Subject to compliance with requirements, provide stone from the following source:
 1. Granite Source: Cold Spring Granite Company.
- B. Each color of stone shall come from a single quarry, with sufficient reserves to satisfy the requirements of the project. The granite supplier shall have the capabilities to cut and finish the stone without delaying the project.

2.2 STONE MATERIAL

- A. Granite: ASTM C 615.
- B. Granite Type [insert type]:
 1. Stone Variety: [Insert stone variety] by Cold Spring Granite Company.
 2. Location:
 - a. [Stone tile floors].

- b. [Stone tile walls].
 - 3. Finish:
 - a. [Polished]
 - b. [Velvet]
 - c. [Diamond 8 honed]
 - d. [Rub & Sand]
 - e. [Textured]
 - f. [Thermal]
 - g. [Diamond 10]
 - 4. Thickness:
 - a. [3/8 inch (10 mm)]
 - b. [1/2 inch (12 mm)]
 - c. [5/8 inch (15 mm)]
 - d. [13/16 inch (20 mm)]
- C. Stone Threshold Type:
 - 1. Stone Type: Granite, complying with ASTM C 615.
 - 2. Finish: [**Honed**].
 - 3. Edges: Beveled.
 - 4. Nominal Threshold Thickness: 1/2 inch.

2.3 SETTING AND GROUTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:
 - 1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils thick.
 - 2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
 - 1. Prepackaged dry-mortar mix combined with acrylic-resin liquid-latex additive.
 - a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to other requirements in ANSI A118.4.
- C. Water-Cleanable Epoxy Adhesive: ANSI A118.3, water-cleanable, tile-setting epoxy adhesive.
- D. Organic Adhesive: ANSI A136.1, Type I.
- E. Polymer-Modified Tile Grout: ANSI A118.7.
 - 1. Polymer Type: Acrylic resin in liquid-latex form for addition to prepackaged dry-grout mix.
- F. Water-Cleanable Epoxy Grout: ANSI A118.3, chemical-resistant, water-cleanable, tile-setting and -grouting epoxy.

2.4 ELASTOMERIC SEALANT

- A. Provide elastomeric sealant of single-component, mildew-resistant, neutral-curing silicone sealant that complies with applicable requirements in Division 07 Section "Joint Sealants."
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints.

2.5 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Primer-Sealer for Wood Subfloors: Product recommended by tile-setting material manufacturer.
- C. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness; metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, and white zinc alloy exposed-edge material with dull finish.
- D. Cleaner: A neutral cleaner capable of removing soil and residue without harming stone tile and grout surfaces, specifically approved for materials and installations indicated by stone tile producers and grout manufacturers.
- E. Floor Sealer: Colorless, slip- and stain-resistant sealer, not affecting color or physical properties of stone surfaces as recommended by stone tile producers for application indicated.

2.6 FABRICATION

- A. Facial Dimensions of Stone Tiles: Do not vary facial dimensions from specified dimensions by more than plus or minus 1/64 inch.
- B. Joint Surfaces: Except for specified beveled or eased edges, if any, dress joint surfaces square for full depth of tile.
- C. Backs of Pieces: Gage units by dressing backs of pieces smooth and flat. When tested with a 24-inch straightedge, gap shall not exceed 1/32 inch.
- D. Thresholds: Fabricate to size and profile as indicated or required to provide transition between adjacent floor finishes.
 - 1. Bevel edges of thresholds at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.

2.7 MIXING MORTARS AND GROUTS

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where stone 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, and clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
 - 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. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, consult Architect to adjust joint locations.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove surface-applied finishes and adhesives from substrates.
- B. Remove coatings that are incompatible with tile-setting materials from substrates, including curing compounds and other substances that contain soap, wax, oil, or silicone.
- C. For concrete substrates for tile floors installed with adhesives or thin-set mortar, correct conditions that do not comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
 - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- D. Apply primer-sealer to wood and plywood subfloors when recommended by tile-setting material manufacturer.
- E. Lay out tile patterns by marking joint lines on substrates to verify joint placement at edges, corners, doors, and other critical elements.
 - 1. Notify Architect seven days in advance of dates and times when layout will be done.
 - 2. Obtain Architect's approval of layout before starting tile installation.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with ANSI A108 setting and grouting materials and methods.
 - 1. Floor Tile: Provide minimum 95 percent mortar coverage.
- B. TCA Installation Guidelines: Comply with TCA's "Handbook for Ceramic Tile Installation" and TCA installation methods.
- C. Wipe backs of tiles with a damp cloth to remove dirt and dust before units are installed.
- D. At showers, tubs, and where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.
- E. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- G. Finish cut tile edges that will not be concealed by other construction by grinding and honing cut surfaces and easing edges to match factory-fabricated edges.
- H. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. 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.
- I. Match tiles within each space by selecting tiles to achieve uniformity of color and pattern. Reject or relocate tiles that do not match color and pattern of adjacent tiles.
- J. Mix tiles to achieve a uniformly random distribution of color shadings and patterns.
- K. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
 - 2. Prepare joints and apply elastomeric sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.4 INSTALLATION TOLERANCES

- A. Variation from Plumb: For vertical joints, external corners, and other conspicuous lines, do not exceed 1/8 inch in 8 feet.
- B. Variation in Level: For horizontal joints and other conspicuous lines, do not exceed 1/4 inch in 20 feet, or 1/2 inch maximum.

- C. Variation in Surface Plane of Flooring: Do not exceed 1/8 inch in 10 feet from level or slope indicated when tested with a 10-foot straightedge.
- D. Variation in Plane between Adjacent Units (Lipping): Do not exceed 1/64 inch between faces of adjacent units as measured from a straightedge parallel to tiled surface.
- E. Variation in Joint Width: Do not vary joint thickness more than 1/16 inch or one-fourth of nominal joint width, whichever is less.

3.5 ADJUSTING

- A. Remove and replace material that is stained or otherwise damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

3.6 CLEANING

- A. Clean stone tiles after setting and grouting is complete; use procedures recommended by stone producer and manufacturer for types of application indicated.
- B. Apply sealer to cleaned stone tile flooring, according to sealer manufacturer's written instructions.

3.7 PROTECTION

- A. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- B. Protect stone tile flooring during construction period with kraft paper or other heavy covering of type that will not stain or discolor stone.
- C. Before inspection for Substantial Completion, remove protective covering and clean surfaces using procedures and materials recommended by grout and stone manufacturers.

3.8 STONE FLOOR TILE INSTALLATION

- A. Stone Floor Tile Installation: TCNA F111.
 - 1. Stone Tile: **[Granite]**
 - 2. Location: Interior concrete cement mortar bed (thickset)
 - 3. Installation: ANSI A108.1C.
 - 4. Thickset Mortar: Portland cement mortar.
 - 5. Grout: Polymer-modified sanded grout.
 - 6. Grout Color: **[To Be Selected]**.
- B. Stone Floor Tile Installation: TCNA F113
 - 1. Stone Tile: **[Granite]**
 - 2. Location: Interior concrete
 - 3. Installation: ANSI A108.5.
 - 4. Thin-Set Mortar: Latex-portland cement mortar.
 - 5. Grout: Polymer-modified sanded grout.

6. Grout Color: **[To Be Selected]**.
- C. Stone Floor Tile Installation: TCNA F122
1. Stone Tile: **[Granite]**
 2. Location: Interior concrete with waterproof membrane
 3. Installation: ANSI A108.5.
 4. Thin-Set Mortar: Latex-portland cement mortar.
 5. Grout: Polymer-modified sanded grout.
 6. Grout Color: **[To Be Selected]**.
- D. Stone Floor Tile Installation: TCNA F125A
1. Stone Tile: **[Granite]**
 2. Location: Interior concrete with full crack isolation membrane
 3. Installation: ANSI A108.5.
 4. Thin-Set Mortar: Latex-portland cement mortar.
 5. Grout: Polymer-modified sanded grout.
 6. Grout Color: **[To Be Selected]**.
- E. Stone Floor Tile Installation: TCNA F135
1. Stone Tile: **[Granite]**
 2. Location: Interior concrete with acoustical underlayment
 3. Installation: ANSI A108.5.
 4. Thin-Set Mortar: Latex-portland cement mortar.
 5. Grout: Polymer-modified sanded grout.
 6. Grout Color: **[To Be Selected]**.
- 3.9 STONE WALL TILE INSTALLATION
- A. Stone Wall Tile Installation: TCNA W202
1. Stone Tile: **[Granite]**
 2. Location: Interior wall; dimensionally stable masonry or concrete
 3. Installation: ANSI A108.5.
 4. Thin-Set Mortar: Latex-portland cement mortar.
 5. Grout: Polymer-modified sanded grout.
 6. Grout Color: **[To Be Selected]**.
- B. Stone Wall Tile Installation: TCNA W243
1. Stone Tile: **[Granite]**
 2. Location: Interior wall; gypsum board
 3. Installation: ANSI A108.5.
 4. Thin-Set Mortar: Latex-portland cement mortar.
 5. Grout: Polymer-modified sanded grout.
 6. Grout Color: **[To Be Selected]**.
- C. Stone Wall Tile Installation: TCNA W244.
1. Stone Tile: **[Granite]**
 2. Location: Interior wall; cementitious backer board
 3. Installation: ANSI A108.5.
 4. Thin-Set Mortar: Latex-portland cement mortar.
 5. Grout: Polymer-modified sanded grout.
 6. Grout Color: **[To Be Selected]**.

D. Stone Wall Tile Installation: TCNA W245.

1. Stone Tile: [**Granite**]
2. Location: Interior wall; glass-mat, water-resistant backer board
3. Installation: ANSI A108.5.
4. Thin-Set Mortar: Latex-portland cement mortar.
5. Grout: Polymer-modified sanded grout.
6. Grout Color: [**To Be Selected**].

E. Stone Wall Tile Installation: TCNA B419 and TCA W245.

1. Stone Tile: [**Granite**]
2. Location: Interior bathtub wall installation over water-resistant gypsum board
3. Installation: ANSI A108.5.
4. Thin-Set Mortar: Latex-portland cement mortar.
5. Grout: Polymer-modified sanded grout.
6. Grout Color: [**To Be Selected**].

3.10 STONE THRESHOLD INSTALLATION

A. Stone Threshold Installation: TCNA F113

1. Stone Tile: [**Granite**]
2. Location: Interior concrete
3. Installation: ANSI A108.5.
4. Thin-Set Mortar: Latex-portland cement mortar.
5. Grout: Polymer-modified sanded grout.
6. Grout Color: [**To Be Selected**].

END OF SECTION