*(**Specifier Note**: The purpose of this guide specification is to assist the specifier in correctly specifying Porphyry Stone Pavers. The specifier needs to edit these guide specifications to fit the needs of each specific project. Contact Milestone Imports to assist in appropriate product selections. Throughout the guide specification, there are Specifier Notes to assist in the editing of the file. The term Architect is used throughout these guide specifications and may be revised to read "Design Professional"," Engineer", "Owner" or other appropriate designation as required for specific projects.*

References have been made within the text of the specification to MasterFormat 2004 Section numbers and titles, the specifier needs to coordinate these numbers and titles with sections included for the specific project. Brackets [ ]; "AND/OR"; and "OR" have been used to indicate when a selection is required.

This guide is for Porphyry Stone Pavers installed on a mortar setting bed with portland cement grout joints. This method of installation can be used for applications either inside or outside. When used for outside applications it is generally used for driveways or public walkways, that get heavier than normal use.

Polymer Modified Grout and Mortar Setting bed materials that are specified in this guide spec are products recommended for use by Milestone Imports for Porphyry Paver installation. If other grout and mortar products are used verify the use of those products with Milestone Imports.

SECTION 09 32 33
MORTAR-BED STONE TILING [Interior Applications]

[SECTION 32 14 40]

[STONE PAVING [Exterior Applications]]
Milestone Imports – Porphyry Pavers

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Stone pavers set in mortar setting bed.

B. Setting Bed and Mortar.

(Specifier Note: Polymer Modified Grouts are used when improved color stability, bond strength, flexural strength and lower water absorption is desired. Epoxy grout is generally used in interior applications where good stain resistance and resistance to erosion caused by occasional contact with mild chemicals commonly found in commercial dining areas, photographic dark rooms, public toilets or public foyers.)

C. [Polymer Modified] [Epoxy] Grout.

1.2 REFERENCES

A. ASTM International (ASTM):
1. ASTM A 82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A 185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
3. ASTM C 97 – Standard Test Method for Absorption and Bulk Specific Gravity of Dimension Stone.
4. ASTM C 99 – Standard Test Method for Modulus of Rupture of Dimension Stone.
5. ASTM C 170 – Standard Test Method for Compressive Strength of Dimension Stone.
6. ASTM C 241 – Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic.
7. ASTM C 615 – Standard Specification for Granite Dimension Stone.
8. ASTM C 880 – Standard Test Method for Flexural Strength of Dimension Stone.
9. ASTM C 1028 – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
10. ASTM D 1056 – Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber.
11. ASTM D 1752 – Standard Specification for preformed Sponge Rubber Cord and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

B. American National Standards Institute (ANSI):

1. ANSI A118.3 – Chemical Resistant Water Cleanable Tile-Setting and –Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
2. ANSI A118.7 – Polymer Modified Cement Grouts for Tile Installation.
3. ANSI A118.10 – Installation of Grout in Tilework.

C. Masonry Standards Joint Committee (MSJC):

1. ACI 530.1/ASCE 6/TMS 602 – Specification for Masonry Structures; Cold and hot weather requirements for mortar and grout.

1.3 SUBMITTALS

A. Refer to Section [01 33 00 Submittal Procedures] [insert section number and title].

B. Product Data: For materials other than water and aggregates.

C. Samples for [stone pavers] [joint materials] [and] [edge restraints].

D. Closeout Submittals:

1. Refer to Section [01 78 00 Closeout Submittals] [insert Section number and title].

1.4 QUALITY ASSURANCE

A. Installer shall have a minimum 5 years experience with similar materials and shall have a record of successful projects of comparable size.

B. Mock-up:

1. Install mock-up using approved stone pavers including related accessories.

a. Mock-up size: [10 feet by 10 feet] [insert size].
b. Mock-up may [not] remain as part of the work.

C. Pre-installation Meeting:

1. Refer to Section [01 31 19 Project Meetings] [insert section number and title].
2. Hold a pre-installation conference, prior to start of stone paving installation. Attendees shall include Contractor, Architect, installer, Owner's Representative, and manufacturer's designated representative.
3. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of stone pavers and components, installer's qualifications, equipment, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.5 PROJECT CONDITIONS

(Specifier Note: Paragraphs A and B are for exterior applications. Delete paragraphs if application is for interior installations.)

A. Cold-Weather Protection: Do not use frozen materials or build on frozen subgrade or setting beds.

B. Weather Limitations for Mortar and Grout:

1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
2. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Do not apply mortar when substrate temperatures exceed 100 deg F.

C. Maintain ambient temperatures not less than 50 F or more than 100 F during installation and for a minimum of seven (7) days after completion.

D. For epoxy grouts maintain ambient temperatures not less than 60 F or more than 90 F during installation and for a minimum of seven (7) days after completion.

1.6 WARRANTY

A. Provide grout and mortar manufacturer's standard warranty of installation systems, including adhesives, grouts and mortars, for a period of 10 years. Warranty shall cover materials and labor.

PART 2 - PRODUCTS

(Specifier Note: Use "Paver" terminology in exterior applications.)

2.1 STONE TILING

A. Rough-Stone Tile [Paver]: Square or Rectangular paving stones, made from stone complying with ASTM C 615.

B. Performance Requirements

1.	Modulus of Rupture:	1,900 psi	per ASTM C 99.
2.	Compressive Strength:	17,622 psi	per ASTM C 170.
3.	Flexural Strength:	3,141 in.lb.	per ASTM C 880.
4.	Absorption:	0.647%	per ASTM C 97.
5.	Density:	160 lbs/cu.ft.	per ASTM C 97.
6.	Static Coefficient of Friction:	0.62 in.lb.	per ASTM C 1028.
7.	Abrasion Resistance:	70.92 in.lb.	per ASTM C 241.

C. Products: Subject to compliance with requirements, provide the following:

1. Porphyry Stone Pavers as distributed by Milestone Imports; www.milestoneimports.com. 866-641-1999.
2. Color: [Storm Grey] [Copper Mountain] [Sierra] [insert color].

3. Thickness: [1/2 to 1¼ inch] [1¼ to 2¼ inch] [2¼ to 3¼ inch] [3¼ to 4¼ inch] [As indicated].
4. Cubes: [1¼ to 2¼ inch cubes] [2¼ to 3¼ inch cubes] [3¼ to 4¼ inch cubes] [As indicated].

(Specifier Note: Random lengths vary from 6 to 15 ¾ inches.)

5. Face Size: [4 by 4 inches] [6 by 6 inches] [8 by 8 inches] [12 x 12 inches] [4 by random length] [6 by random length] [8 by random length] [10 by random length] [12 by random length]
6. Edges: [Snap Cut] [Sawn].

2.2 ACCESSORIES

(Specifier Note: Two paragraphs below are for exterior applications. Paragraph A is generally used against building face where pavers are placed against building foundation wall. Paragraph B is generally used in the field of the paver installation where control or expansion joints are required. Paragraph B holds the tiles in place while the mortar and grout cure. After the mortar and grout have cured the foam filler is removed and Joint sealant is installed.)

A. Cork Joint Filler: Preformed strips complying with ASTM D 1752, Type II.

B. Compressible Foam Filler: Preformed strips complying with ASTM D 1056, Grade 2A1.

(Specifier Note: Sealant maybe specified here or in Division 07 as noted below.)

C. Sealant: [Refer to Section 07 92 00 – Joint Sealants] [insert Section number and title] [A single component urethane joint sealant; Grade – Pourable; traffic exposure; Class 25. BASF, "Sonolastic SL 1"]

(Specifier Note: Reinforcing Mesh is used only when required under the TCNA Installation Method indicated in Part 3. Installations requiring Reinforcing mesh include F111, F114 and F121.)

D. Reinforcing Mesh: 2 by 2 inch by 0.0625 inch diameter galvanized steel welded wire mesh complying with ASTM A 185 and ASTM A 82 except for minimum wire size.

2.3 MORTAR SETTING-BED MATERIALS

A. Mortar Bed: Laticrete 226 Thick Bed Mortar gauged with Laticrete 3701 Mortar Admixture as manufactured by Laticrete International, Inc.

B. Bond Coat: Laticrete 254 Platinum as manufactured by Laticrete International, Inc.

C. Water: Potable.

2.4 GROUT MATERIALS

A. Polymer-Modified Tile Grout: ANSI A118.7, sanded.

1. Product: Subject to compliance with requirements, provide Polymer Modified Tile Grouts for Tile/Stone Installation: Laticrete Tri-Poly Fortified Sanded Grout (1500 Series) gauged with Laticrete 1776 Admix Plus, as manufactured by Laticrete International, Inc.
2. Polymer Type: Ethylene-vinyl acetate or acrylic additive in dry, redispersible form; prepackaged with other dry ingredients.

B. Epoxy Tile Grout: ANSI A118.3, sanded.

1. Product: Subject to compliance with requirements, provide Epoxy Tile Grouts for Tile/Stone Installation. Laticrete SpectraLOCK PRO Grout Sanded Grout, as manufactured by Laticrete International, Inc.

C. Grout Colors: [As indicated by manufacturer's designations] [Match Architect's samples] [As selected by Architect from manufacturer's full range] [Insert color].

D. Water: Potable.

2.5 MORTAR AND GROUT MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions Discard mortars and grout if they have reached their initial set before being used.

B. Mortar-Bed Bond Coat: Mix polymer modified thin-set mortar and water to a creamy consistency, per manufacturer’s recommendations.

C. Polymer-Modified, Portland Cement Setting-Bed Mortar: Comply with written instructions of polymer-additive manufacturer and as necessary to produce stiff mixture with a moist surface when bed is ready to receive pavers.

D. Packaged Grout Mix: Proportion and mix grout ingredients according to grout manufacturer's written instructions.

(Specifier Note: Interior applications generally include the Waterproofing Membrane within this Section. Waterproofing membranes for exterior applications generally are located in Division 07 in a separate Section 07 10 00 – Dampproofing and Waterproofing. Verify if waterproofing membrane is a project requirement and location of Section)

2.6 MEMBRANES

A. Refer to Division 07 Section "[insert name of Section]".

(Specifier Note: Edit per project requirements. Select one of three paragraphs below, dependant on Tile Installation Method using. Waterproof membrane is used in TCNA Installations F101 (optional), and F121.)

B. Waterproof Membrane: Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.

1. Product: Laticrete International, Inc.; Laticrete 9235 Waterproof Membrane.

(Specifier Note: Edit per project requirements. Generally crack suppression membranes are used where tile is being installed on suspended slabs or post-tension slabs. TCNA Installation Methods using crack suppression membrane include F125 or F125A. Installation Method F125 is used where Crack suppression membrane is placed over existing in-plane cracks, not the entire floor area. Installation Method F125A is used where crack suppression membrane is installed under the entire tiled floor area.)

C. Crack Suppression Membrane: Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

1. Product: Laticrete International, Inc.; Laticrete Blue 92 Anti-Fracture Membrane.

(Specifier Note: Cleavage membrane is used to isolate mortar bed from concrete slab. TCNA Installations requiring cleavage membrane include F111, and F114)

D. Cleavage membrane: 15 pound asphalt saturated, non-perforated roofing felt ASTM D226, or 4.0 mils /0.1 mm thick polyethylene plastic film ASTM D4397.

2.7 SOURCE QUALITY CONTROL

A. Fabrication Tolerances:

1. Maximum variations in stated thickness: plus or minus 1/2 inch.
2. Split edge pavers width tolerance: plus or minus 1/8 inch.
3. Sawn edge pavers width tolerance: plus or minus 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

(Specifier Note: Generally "concrete raft slab foundation" is a term used in exterior paving applications.)

A. Verify that [concrete raft slab foundation] [concrete slab on grade] [suspended concrete slab] work is complete and adequately cured per the requirements of Section [03 30 00 Cast-in-Place Concrete] [32 13 13 Concrete Paving] [insert Section number and title] .

(Specifier Note: Verify that waterproofing membrane is specified in Division 07; Section 07 10 00 – Dampproofing and Waterproofing Thermal and Moisture Protection.)

B. Verify that waterproofing membrane work is complete and ready for the work of this Section.

3.2 MEMBRANE INSTALLATION

(Specifier Note: Edit per project requirements.)

A. Waterproof Membrane:

1. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
2. Allow membrane to cure a minimum of 7 days at 70 degrees F and 50% relative humidity.

B. Crack Isolation Membrane:

1. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
2. Allow membrane to cure a minimum of 7 days at 70 degrees F and 50% relative humidity.

C. Cleavage Membrane: Install cleavage membrane over concrete substrate, lap edges of membrane minimum 4 inches. Comply with requirements of ANSI A108.1A.

3.3 MORTAR SETTING-BED APPLICATIONS

(Specifier Note: Typically Mortar Setting-Bed Applications are used over a concrete raft slabs for exterior applications, suspended concrete slabs for plaza decks over occupied spaces or Interior applications such as slabs on grade and suspended slabs. If in doubt which application to use contact Milestone Imports for assistance.)

A. Comply with TCNA's "Handbook for Ceramic Tile Installation" for TCNA installation methods specified at tile end of this section. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods indicated, and apply to types of setting and grouting materials used.

B. Mix and place ½ the overall thickness of the finished mortar bed and embed reinforcing mesh into mortar bed, lap reinforcing at least on full mesh.

C. Mix and place the remaining thickness of the mortar bed over reinforcing mesh. Place only that amount of mortar bed that can be covered with pavers before initial set. Before placing pavers, cut back, bevel edge, and remove and discard setting-bed material that has reached initial set.

D. Place pavers before initial set of mortar bed occurs. Immediately before placing pavers on mortar bed, apply uniform 1/16-inch- thick bond coat to mortar bed or to back of each paver with a flat trowel.

E. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.

F. Spaced Joint Widths: Provide [3/8-inch] [1/2-inch] [3/4-inch] nominal joint width with variations not exceeding plus or minus [1/16 inch] [1/8 inch] [3/16 inch].

3.4 TILE [PAVER] INSTALLATION

A. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

(Specifier Note: Tile Installation. When installing for tile installation tiles shall be cut with motor driven masonry saw.)

B. Stone Cutting:

1. Cut stone tiles with motor-driven masonry saw equipment to provide pattern indicated and to fit adjoining work neatly. Use full stones without cutting where possible.

(Specifier Note: Paver Insallation. When installing for a paver installation pavers shall be cut with a stone guillotine or snap cut machine.)

2. Cut stone pavers with stone guillotine or snap cut machine to provide pattern indicated and to fit adjoining work neatly. Use full stones without cutting where possible.

C. Joint Pattern: [Wave Pattern] [Fan Pattern] [Overlapping Arcs] [Running bond] [Grid] [As indicated] [Match and continue existing stone paver joint pattern].

D. Pavers over Waterproofing: Exercise care in placing pavers and setting materials over waterproofing so protection materials are not displaced and waterproofing is not punctured or otherwise damaged.

E. Joints at building perimeter: Provide cork joint filler at locations and of widths indicated. Install joint filler before setting pavers. Make top of joint filler flush with top of pavers.

F. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide compressible foam filler as backing for sealant-filled joints [unless otherwise indicated; where unfilled joints are indicated, provide temporary filler until paver installation is complete]. Install joint filler before setting pavers.

3.5 GROUTING

A. Grouted Joints: Grout paver joints complying with ANSI A108.10.

B. Grout joints as soon as possible after initial set of setting bed.

1. Force grout into joints, taking care not to smear grout on adjoining surfaces.
2. Tool exposed joints slightly concave when thumbprint hard.

C. Cure grout by maintaining in a damp condition for seven days unless otherwise recommended by grout manufacturer.

D. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.

1. Remove temporary protective coating as recommended by coating manufacturer and as acceptable to paver and grout manufacturers.

3.6 PROTECTION

A. Protect completed work minimum 72 hours or until mortar bed and grout have fully cured.

B. Protect Portland cement based mortars and grouts from direct sunlight, radiant heat, forced ventilation (heat & cold), and drafts until cured to prevent premature evaporation of moisture.

3.7 EXTERIOR TILE INSTALLATION SCHEDULE

(Specifier Note: Edit per project requirements.)

A. Exterior Floor Installations:

(Specifier Note: Under installation method F101, waterproof membrane and crack suppression membrane is optional. If neither waterproof or cracksuppression membranes are to be used then the thickset mortar bed is bonded to concrete using mortar bed bond coat.)

1. Tile Installation F101: Cement mortar bed (thickset) [bonded to concrete] [over waterproof membrane on concrete] [over crack suppression membrane on concrete] [over cleavage membrane on concrete]; TCNA F101.

    a. Tile Type: Rough Stone Paver.
    b. Thin-Set Mortar for Cured-Bed Method: [Dry-set] [Latex-] portland cement mortar.
    c. Grout: [Polymer-modified sanded] [Polymer-modified unsanded] grout.

3.8 INTERIOR TILE INSTALLATION SCHEDULE

(Specifier Note: Edit per project requirements.)

A. Interior Floor Installations, Concrete Subfloor:

1. Tile Installation F111: Cement mortar bed (thickset) with cleavage membrane; TCNA F111.

    a. Tile Type: Rough Stone Tile.
    b. Thin-Set Mortar for Cured-Bed Method: [Dry-set] [Latex-] portland cement mortar.
    c. Grout: [Polymer-modified sanded] [Polymer-modified unsanded] grout.

2. Tile Installation F112: Cement mortar bed (thickset) bonded to concrete; TCNA F112.

a. Tile Type: Rough Stone Tile.
b. Thin-Set Mortar for Cured-Bed Method: [Dry-set] [Latex-] portland cement mortar.
c. Grout: [Polymer-modified sanded] [Polymer-modified unsanded] grout.

3. Tile Installation F114: Cement mortar bed (thickset) with cleavage membrane; epoxy grout; TCNA F114.

a. Tile Type: Rough Stone Tile.
b. Grout: Water-cleanable epoxy grout.

4. Tile Installation F121: Cement mortar bed (thickset) on waterproof membrane; TCNA F121.

a. Tile Type: Rough Stone Tile.
b. Thin-Set Mortar for Cured-Bed Method: [Dry-set] [Latex-] portland cement mortar.
c. Grout: [Polymer-modified sanded] [Polymer-modified unsanded] grout.

5. Tile Installation F125 or F125A: Cement mortar bed (thickset) on crack suppression membrane; TCNA F125 or F125A.

a. Tile Type: Rough Stone Tile.
b. Thin-Set Mortar for Cured-Bed Method: [Dry-set] [Latex-] portland cement mortar.
c. Grout: [Polymer-modified sanded] [Polymer-modified unsanded] grout.

END OF SECTION