

**SECTION 32 14 41
GRANITE PAVING**

This guide specification utilizes recommendations and formats contained in references of the Construction Specifications Institute (CSI), including the CSI Practice Guides (formerly the Project Resource Manual), incorporating SectionFormat, PageFormat and MasterFormat, latest Editions, insofar as practicable.

This Section must be carefully reviewed and edited by the user to meet the Project requirements and should be coordinated with related Specification Sections and the Drawings.

Where Specification indicates information as "shown on Drawings" or similar phrases, the Drawings are required to show this information or the text needs to be modified appropriately.

Where Specification indicates bracketed text, e.g. [text], make appropriate selection and delete the remainder of text within additional brackets, highlighting, and bold face type.

Consult Dakota Granite Company for assistance in editing this Specification guide for the specific applications.

This Specification was current at the time of publication but is subject to change. Please confirm the accuracy of these specifications with the manufacturer prior to use.

For more information contact:

Dakota Granite Company
48391 150th Street
Milbank, SD 57252
Toll Free: 1(800) 843-3333
Phone: (605) 432-5580
Fax: (605) 432-6155
www.dakotagranite.com
Email: dakota@dakgran.com

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 01. Exterior paving.
 - 02. Installation materials.
 - 03. Joint sealant and filler.
 - 04. Miscellaneous materials.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections:

SPECIFIER: Select applicable Divisions or Sections in subparagraphs below related to the Work of this Section; adjust actual Section numbers and names as necessary.

- 01. [Division 07 Section "Joint Sealants"] [Section 07 92 00 - Joint Sealants];** for joint sealant filler and material requirements, and for installation requirements.
- 02. [Division 09 Section "Stone Stairs"] [Section 09 63 41.13 - Granite Stairs];** for granite stair construction.
- 03. [Division 32 Section "Stone Curbs"] [Section 32 17 15 - Granite Curbs, Bollards, and Barricades];** for granite curb construction.

1.03 DEFINITIONS

- A. Definitions contained in ASTM C119 apply to this Section.
- B. Metric conversions are shown in a table at the end of this Section.

1.04 REFERENCE STANDARDS

SPECIFIER: Use care when indicating the edition date of the referenced standards; these standards are subject to regular review, and updated accordingly. Edit list below to eliminate references not contained in the final text.

- A. ACI International/American Society of Civil Engineers/The Masonry Society (ACI/ASCE/TMS)
 - 01. ACI 530.1/ASCE 6/TMS 602-02, Specification for Masonry Structures
- B. American National Standards Institute Specifications (ANSI)
 - 01. ANSI Installation Specifications Series, including:
 - a. ANSI A108.5-2005, Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar
 - b. ANSI A108.10-2005, Installation of Grout in Tilework
 - 02. ANSI Material Specifications Series, including:
 - a. ANSI A118.1-2005, Dry-Set Portland Cement Mortar
 - b. ANSI A118.4-2005, Latex-Portland Cement Mortar
 - c. ANSI A118.7-2005, Polymer Modified Tile Grouts for Tile Installation
- C. ASTM International (ASTM)
 - 01. ASTM A82-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
 - 02. ASTM A185-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
 - 03. ASTM C33-11a, Standard Specification for Concrete Aggregates
 - 04. ASTM C114-11b, Standard Test Methods for Chemical Analysis of Hydraulic Cement
 - 05. ASTM C11911, Standard Terminology Relating to Dimension Stone
 - 06. ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar
 - 07. ASTM C150-11, Standard Specification for Portland Cement
 - 08. ASTM C17009, Standard Test Method for Compressive Strength of Dimension Stone
 - 09. ASTM C20706(2011), Standard Specification for Hydrated Lime for Masonry Purposes
 - 10. ASTM C270-10, Standard Specification for Mortar for Unit Masonry
 - 11. ASTM C61511, Standard Specification for Granite Dimension Stone
 - 12. ASTM C88009, Standard Test Method for Flexural Strength of Dimension Stone
 - 13. ASTM D226-09, Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

14. ASTM D1752-04a(2008), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
 15. ASTM D4397-10, Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
- D. National Building Granite Quarries Association, Inc. (NBGQA)

NOTE: For the Specifier's convenience, a copy of the NBGQA document referenced below is published in the Dakota Granite "Architectural" Catalog, available upon request.

01. Specifications for Architectural Granite, 2010

1.05 ACTION AND INFORMATIONAL SUBMITTALS

SPECIFIER: Revise Section number in the paragraph below to match that used in the Project Manual.

- A. Submit in accordance with Section [01 33 00] [Other]:
01. Product Data:
 - a. For each granite type and each manufactured product shown on Drawings or specified.
 - b. For each granite variety used on Project, include physical property data.
 02. Shop Drawings:
 - a. Show fabrication and installation details for granite paving.
 - b. Show locations of each type of granite paving and paving pattern.
 - c. Include dimensions and profiles of granite units.
 - d. Show widths, details, and locations of expansion, contraction, control, and isolation joints in substrates and finished granite paving surfaces.
 03. Granite Samples: Submit samples of each granite type required, exhibiting the full range of color characteristics expected in the completed Work.
 - a. Submit a minimum of 2 each, 12 inches by 12 inches (305 mm by 305 mm) in size, and in each color and finish specified.
 - b. In the case of more variegated granite, submit color photos in addition to the number of samples to show the full range of color and markings.
 04. Other Samples:
 - a. Mortar: Full range of exposed color and texture; furnish 2 mortar keys in each color selected.
 - b. Grout: Full range of exposed color and texture; furnish 2 grout keys in each color selected.
 - c. Sealant: For each type and color of joint sealant required; actual sealant installed within (between) 2 small representative samples of granite selections, not less than 3 inches square.
 05. Certificates: Submit a letter of certification from the granite fabricator, stating the material being furnished is the specified material and there are sufficient reserves available to supply the Project and furnish replacement units if needed.
- B. Quality Assurance/Control Submittals:

SPECIFIER: Select Division 07 or Section 07 92 00 in subparagraph below; adjust actual Section number and name as necessary.

01. Sealant Compatibility Test Report: Submit test report from sealant manufacturer, in accordance with **[Division 07 Section "Joint Sealants"] [Section 07 92 00 - Joint Sealants]** stating that sealants will not stain granite.
 02. Stone Test Reports:
 - a. Preliminary Test Reports: Submit test reports for proposed stones prior to final stone selection. Preliminary test reports shall be indicative of the granite to be proposed for the Project.
 - b. Material Test Reports: From a qualified independent testing agency.
 - 1) Provide reports for each granite type.
 03. Qualification Data: Submit qualification data specified under Article 1.06 QUALITY ASSURANCE.
- C. Cold-Weather Procedures: Detailed description of methods, materials, and equipment.
- D. Hot-Weather Procedures: Detailed description of methods, materials, and equipment.

1.06 QUALITY ASSURANCE

- A. Compliance:
01. Comply with the provisions of the Building Code, these specifications, and standards referenced in Article 1.04 REFERENCE STANDARDS, except where more stringent requirements are shown on the Drawings or specified herein.

- B. Granite Supply: Each type of granite 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.
- C. Fabricator Qualifications: Shop that employs skilled workers who have completed granite fabrication similar in material, design, and extent to that indicated for this Project, and whose work has resulted in installations with a record of successful in-service performance.
- D. Installer Qualifications: Experienced stone setters skilled in installing granite paving similar in material, design, and extent to that indicated for this Project, and whose work has resulted in installations with a record of successful in-service performance.

SPECIFIER: Delete Paragraph below if a mock-up is not required.

- E. Mock-up: Provide a mock-up of the granite installation in the approved colors and finishes, installed at the site in a location determined by the Architect, and agreed upon by the Contractor, and the fabricator.

SPECIFIER: Indicate size of mock-up or reference Drawings for location of mock-up in subparagraph below; approved mock-ups which are subsequently removed on or before Substantial Completion, and not incorporated in the Work, shall be provided at the Owner's expense.

- 01. Size: **[Insert dimensions] [Refer to Drawings for size and location]** .
- 02. Color Consistency: Color range shall not exceed range of color established by samples.
- 03. Joints: Include grouted joints, control and expansion joints, and sealant, in types, colors, and profiles specified or shown.
- 04. When approved, the mock-up will become the standard for the Project.

SPECIFIER: Select removal or incorporation of mock-up in subparagraph below.

- 05. [Remove mock-up(s) at Substantial Completion or when requested by the Architect.] [Approved mock-up(s) may become part of completed Work if undisturbed at time of Substantial Completion.]**

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials to prevent deterioration or damage.
 - 01. Carefully pack and load granite for shipment using reasonable care and customary precautions against damage in transit. Do not use material for blocking or packing, which may cause staining or discoloration.
 - 02. Stack granite on timber or platforms at least 4 inches above the ground. Use care to prevent staining or discoloration during storage.
 - 03. If storage is to be for a prolonged period, use polyethylene or other suitable plastic film placed between wood blocking and finished surfaces of completely dry stone. Ventilate under covers to prevent condensation.
 - 04. Lift granite with wide-belt slings; do not use wire rope or ropes that might cause damage. Move granite, if required, using dollies with cushioned wood supports.
 - 05. Properly store cementitious materials on elevated platforms, under cover, and in dry location.
 - 06. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
 - 07. Store polymer additives in unopened containers and protected from freezing.
 - 08. Store installation accessories, including metal items, to prevent corrosion and contamination.

1.08 FIELD CONDITIONS

- A. Cold-Weather Requirements: Comply with ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: Comply with ACI 530.1 ASCE 6/TMS 602.

PART 2 - MATERIALS

2.01 GRANITE SOURCE

- A. Varieties and Source: Subject to compliance with requirements, provide granite from the following source:
 - 01. Granite Source: Dakota Granite Company; 1(605) 432-5580.
- B. Substitutions: Suppliers seeking approval of their products are required to comply with the Owner's Instructions to Bidders.
- C. Granite Source Examination: Make quarried blocks available for examination by Architect.

2.02 GRANITE MATERIAL

- A. Granite: ASTM C615; match Architects's samples.

SPECIFIER: Indicate individual Types in paragraph below, including applicable characteristics; add paragraphs as necessary to meet Project requirements.

- B. Granite Type **[Insert Drawing Designation Type]:**
 - 01. Granite Variety: **[Insert granite variety]**.
 - 02. Finish: **[Antique] [Brushed] [Honed] [Polished] [Sandblasted] [Sawn] [Split-Face] [Thermal] [Other]**.
 - 03. Thicknesses:
 - a. Unless otherwise indicated, provide units with not less than the following thicknesses: **[7/8 inch (22 mm)], [1-1/4 inches (32 mm)], [1-1/2 inches (38 mm)], [2 inches (51 mm)] [3 inches (76 mm)] [4 inches (102 mm)]**.

2.03 MORTAR MATERIALS

- A. Portland Cement: ASTM C150, Type I or Type II, except Type III may be used for cold-weather construction.
 - 01. Provide natural color or white cement as required to produce mortar color indicated.

SPECIFIER: Retain subparagraph below if recommended by stone source to limit staining.

- 02. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C207.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C150, Type I or III, and hydrated lime complying with ASTM C207; provide products by one of the following:
 - 01. Essroc, Italcementi Group
 - 02. Holcim (US), Inc.
 - 03. Lafarge North America
 - 04. Lehigh Cement Company
- D. Mortar Pigments: Natural and synthetic iron oxides with a record of satisfactory performance in mortar, and containing no carbon black; provide products by one of the following:
 - 01. Davis Colors
 - 02. Solomon Colors
- E. Colored Cement Product: Packaged blend made from portland cement and lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 01. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - 02. Do not exceed 10 percent of Portland cement by weight.
 - 03. Do not exceed 5 percent of masonry cement or mortar cement by weight.
 - 04. Mix mortar to match Architect's sample.
 - 05. Provide products by one of the following:
 - a. Holcim (US), Inc.
 - b. Lafarge North America
 - c. Lehigh Cement Company
- F. Aggregate: ASTM C144.
- G. Latex Additive: Acrylic-resin water emulsion recommended by additive manufacturer for use with field-mixed Portland cement mortar bed; provide products by one of the following:
 - 01. Bonsal
 - 02. Bostik Findley, Inc.
 - 03. C-Cure
 - 04. Custom Building Products
 - 05. DAP, Inc.
 - 06. Laticrete International, Inc.
 - 07. MAPEI Corp.
 - 08. TEC Specialty Construction Brands; H. B. Fuller Company.
- H. Thin-Set Mortar: Latex-Portland Cement Mortar, ANSI A118.4. Provide products by one of the following:
 - 01. Bonsal
 - 02. Bostik Findley, Inc.
 - 03. C-Cure

04. Custom Building Products
 05. DAP, Inc.
 06. Laticrete International, Inc.
 07. MAPEI Corp.
 08. TEC Specialty Construction Brands; H. B. Fuller Company.
- I. Water: Potable.

2.04 GROUT

- A. Polymer Modified Cement Grout: ANSI A118.7.
01. Polymer Type: Acrylic resin in liquid-latex form for addition to prepackaged dry grout mix.
 02. Provide products by one of the following:
 - a. Bonsal
 - b. Bostik Findley, Inc.
 - c. C-Cure
 - d. Custom Building Products
 - e. DAP, Inc.
 - f. Laticrete International, Inc.
 - g. MAPEI Corp.
 - h. TEC Specialty Construction Brands; H. B. Fuller Company.

SPECIFIER: Select one of 2 subparagraphs below; indicate actual color(s) if known.

03. Color: Selected by the Architect from manufacturer's **[standard colors] [full range of colors]**.
03. Color: **[Match granite] [Match Architect's samples]**.

2.05 MISCELLANEOUS MATERIALS

- A. Cleavage Membrane: Asphalt-saturated organic felt, ASTM D226, Type I (No. 15); or polyethylene sheeting, ASTM D4397, 4.0 mils thick.
- B. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches (51 by 51 mm) by 0.062 inch diameter; complying with ASTM A185 and ASTM A82 except for minimum wire size.
- C. Cork Joint Filler: Preformed strips, ASTM D1752, Type II.

SPECIFIER: Delete the following 4 paragraphs if sand-set paving is not specified.

- D. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate.
- E. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 (1.18 mm) sieve and no more than 10 percent passing No. 200 (0.075 mm) sieve.

SPECIFIER: Retain subparagraph below if a particular color is required.

01. Provide sand of color needed to produce required joint color.

SPECIFIER: Select either weed barrier or herbicide for sand-set paving in paragraphs below.

- F. Weed Barrier: Nonwoven polypropylene or polyester geotextile filter fabric, weighing approximately 3 oz./sq. yd. (101g/sq. m) minimum, which is inert to biological degradation and resists naturally-encountered chemicals, alkalis, and acids.
- G. Herbicide: Commercial chemical for weed control, registered with the EPA. Provide in granular, liquid, or wettable powder form.

SPECIFIER: Select edge restraints and specify type, name, and manufacturer; delete paragraph if sand-set paving is not specified, or if paving abuts other permanent construction materials such as concrete or masonry.

H. [Edge Restraints:]

- I. Cleaner: A neutral cleaner capable of removing soil and residue without harming granite and grout surfaces, specifically approved for materials and installations indicated by granite producer and grout manufacturer.

2.06 GRANITE FABRICATION

- A. Fabricate granite to comply with requirements indicated and with NBGQA's "Specifications for Architectural Granite".
- B. Select granite for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.

- C. Cut granite from one block or contiguous, matched blocks in which natural markings occur.
- D. Fabricate granite paving in sizes and shapes required to comply with requirements indicated, including details on Drawings and final shop drawings.
 - 01. Pattern: As indicated on Drawings.

SPECIFIER: Insert desired joint width in subparagraph below.

- 02. Joint Width: **[Insert dimension]**.
- E. Cut granite to produce pieces of thickness, size, and shape indicated and to comply with fabrication and construction tolerances recommended by applicable granite association.
 - 01. Clean sawed backs of granite to remove rust stains and iron particles.
 - 02. Dress joints straight and at a right angle to face.
- F. Finish exposed faces and edges of granite to match selected granite finish.
- G. Carefully inspect finished granite units at fabrication plant for compliance with requirements. Replace defective units.
- H. Refer to Article 3.03 GRANITE PAVING INSTALLATION - GENERAL, for final field cutting prior to setting.

2.07 MIXING MORTARS AND GROUTS

- A. General: Mix mortars and grouts to comply with referenced Standards and mortar and grout manufacturers' written instructions.
 - 01. 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.
 - 02. Do not use admixtures.
 - 03. Calcium chloride is NOT allowed.
 - 04. Combine mortar materials and mix thoroughly. Discard mortar when it has reached initial set.

SPECIFIER: If paving is set with colored mortar products, adjust setting mortar in subparagraph below to reflect the use of color.

- B. Portland Cement-Lime Setting Mortar: Comply with ASTM C270 Type M, Proportion Specification.
- C. Latex-Modified Portland Cement Setting Mortar: Proportion and mix Portland cement, aggregate, and latex additive to comply with manufacturer's written instructions.
- D. Mortar-Bed Bond Coat: Mix neat cement and latex additive to creamy consistency.
- E. Latex-Modified Portland Cement Bond Coat: Proportion and mix Portland cement, aggregate, and latex additive to comply with manufacturer's written instructions.
- F. Cement-Paste Bond Coat: Mix either neat cement or cement and sand, with water to a consistency similar to that of thick cream.
- G. Packaged Grout Mix: Proportion and mix grout ingredients according to grout manufacturer's written instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and areas indicated to receive granite paving and conditions under which paving will be installed, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed granite paving.
 - 01. Verify that substrates for setting paving are firm, dry, and clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of installation standards for installations indicated.
 - 02. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind paving has been completed before installing paving.
 - 03. Verify that joints and cracks in paving substrates are coordinated with paving joint locations; if not coordinated, consult Architect to adjust joint locations.
 - 04. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION PREPARATION

- A. Sweep concrete substrate to remove dirt, dust, debris, and loose particles.
- B. Remove other foreign substances from concrete substrates that could impair mortar bond.
- C. Remove coatings that are incompatible with paving-setting materials from substrates, including curing compounds and other substances that contain soap, wax, oil or silicone.
- D. Clean dirty and stained granite surfaces by removing soil, stains, and foreign materials before setting. Clean granite

by thoroughly scrubbing with nonmetallic fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

3.03 CONSTRUCTION TOLERANCES

- A. Variation in Line: Do not exceed 1/8 inch in 8 feet (3 mm in 2.5 m), 1/4 inch in 20 feet (6 mm in 6 m) or 3/8 inch (10 mm) maximum from level or slope indicated.
- B. Variation in Joint Width: Do not vary joint thickness more than 1/16 inch (1.5 mm) or 1/4 of nominal joint width, whichever is less.
- C. Variation in Surface Plane: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (10 mm) maximum from level to slope indicated.
- D. Variation in Plane between Adjacent Units (Lipping): Do not exceed 1/32 inch (0.8 mm) difference between planes of adjacent units.

3.04 GRANITE PAVING INSTALLATION - GENERAL

- A. Field cut granite as units are set. Cut lines straight and true and finish field-cut edges to match shop-cut edges.
 - 01. Use power saws with diamond blades to cut granite.
 - 02. Scribe and field-cut granite as necessary to fit at obstructions. Produce neat joints of size specified or indicated.
 - 03. Set granite to comply with Drawings and final shop drawings.
 - 04. Expansion- and Control-Joint Installation: Locate and install joints in accordance with Drawings and final shop drawings.
 - 05. Clean granite as work progresses. Remove mortar and miscellaneous stains before grouting joints.

3.05 GRANITE INSTALLATION OVER CONCRETE

- A. Saturate concrete with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.
- B. Expansion and Control Joints: 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.
- C. Apply mortar-bed bond coat to damp concrete, and broom to provide an even coating that completely covers the concrete. Do not exceed 1/16 in (1.5 mm) thickness. Limit area of mortar-bed bond coat to avoid its drying out before placing setting bed.
 - 01. Place reinforcing wire mesh over concrete, lapped at joints by at least one full mesh and supported so mesh becomes embedded in middle of setting bed. Hold edges back from vertical surfaces about 1/2 inch (13 mm).
- D. Apply mortar bed to finished elevations indicated immediately after applying mortar-bed bond coat.
- E. Mix and place only that amount of mortar bed that can be covered with stone before initial set. Cut back, bevel edge, and discard material that has reached initial set before stone can be placed.
- F. Place granite before initial set of mortar occurs. Immediately before placing granite on setting bed, apply uniform 1/16 inch (1.5 mm) thick bond coat to bed or to back of each granite unit.
- G. Tamp and beat granite with a wooden block or rubber mallet.
 - 01. Set each unit in a single operation before initial set of mortar; do not return to areas already set.
- H. Rake out joints to depth required to receive grout or pointing mortar as units are set.
- I. Point joints after setting.
- J. Expansion and Control Joints: 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.

3.06 GRANITE INSTALLATION OVER CLEAVAGE MEMBRANE

- A. Place cleavage membrane over substrates, lapped at least 4 inches (100 mm) at joints.
- B. Place reinforcing wire fabric over cleavage membrane, lapped at least one full mesh at joints and supported so mesh becomes embedded in middle of setting bed. Hold edges back from vertical surfaces about 1/2 inch (13 mm).
- C. Place mortar bed over cleavage membrane to uniform thickness at elevations required with reinforcing wire fabric fully embedded in middle of mortar bed.
- D. Mix and place only that amount of mortar bed that can be covered with granite before initial set. Cut back, bevel edge, and discard material that has reached initial set before stone can be placed.
- E. Apply uniform 1/16 inch (1.5 mm) thick bond coat to bed or back of each granite unit then place granite before initial set of mortar occurs.
- F. Tamp and beat granite with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances.
 - 01. Set each unit in a single operation before initial set of mortar; do not return to areas already set.
- G. Rake out joints to depth required to receive grout or pointing mortar as units are set.

SPECIFIER: Delete paragraph below if joints are to be grouted.

- H. Point joints after setting. Fill full with mortar type and color indicated. Tool joints flat, uniform, and smooth, without visible voids.

3.07 GRANITE INSTALLATION OVER WATERPROOFING

SPECIFIER: Select applicable Division or Section in paragraph below related to the Work of this Section; adjust actual Section number and name as necessary.

- A. Refer to [Division 07 Section "Sheet Waterproofing"] [Section 07 13 00 - Sheet Waterproofing] for installation of waterproofing and protection board under granite flooring.
 - 01. Carefully place granite and setting materials over waterproofing. Replace protection materials that become displaced and arrange for repair of damaged waterproofing, if any, before covering with granite.
- B. Provide cork joint filler, where indicated, at waterproofing that is turned up on vertical surfaces or, if not indicated, provide temporary filler or protection until stone paving installation is complete.
- C. Place reinforcing wire fabric over membrane protection board, lapped at least one full mesh at joints and supported so mesh becomes embedded in middle of setting bed. Hold edges back from vertical surfaces about 1/2 inch (13 mm).
- D. Place mortar bed over membrane protection board to uniform thickness at elevations required with reinforcing wire fabric fully embedded in middle of mortar bed.
- E. Mix and place only that amount of mortar bed that can be covered with granite before initial set. Cut back, bevel edge, and discard material that has reached initial set before stone can be placed.
- F. Apply uniform 1/16 inch (1.5 mm) thick bond coat to bed or back of each granite unit then place granite before initial set of mortar occurs.
- G. Tamp and beat stone with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances.
 - 01. Set each unit in a single operation before initial set of mortar; do not return to areas already set.
- H. Rake out joints to depth required to receive grout or pointing mortar as units are set.

SPECIFIER: Delete paragraph below if joints are to be grouted.

- I. Point joints after setting. Fill full with mortar type and color indicated. Tool joints flat, uniform, and smooth, without visible voids.

3.08 GRANITE INSTALLATION OVER SAND

SPECIFIER: Add drainage geotextile over subgrade to prevent migration of leveling course sand into subgrade if necessary, prior to placing leveling course.

- A. Place leveling course sand over subgrade in area to be covered by granite pavers, as shown on Drawings. Place in uniform thickness, but not less than that shown; slope leveling course sand to promote proper drainage. Place in thicknesses to result in compacted thickness indicated.
- B. Wet the sand and compact with a vibrating type compactor.

SPECIFIER: Select either weed barrier or herbicide in paragraph below.

- C. [Place weed barrier over compacted leveling course with edges overlapped at least 4 inches (102 mm).] [Treat leveling course with herbicide to inhibit growth of grass and weeds. Apply in accordance with barrier manufacturer's recommendations.]

SPECIFIER: Delete paragraph below if paving abuts other permanent construction materials such as concrete or masonry at all terminations.

- D. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

SPECIFIER: Joint sizes may vary depending on the type of edge and finish; indicate joint size on Drawings..

- E. Install specified granite pavers in patterns and with uniform joint spacing indicated.
- F. Sweep fine sand into joints, sweeping at a 45-degree angle to the joints, allowing sand to fill the spaces.
 - 01. When joints are filled, wash excess sand off pavers, let dry and repeat.

SPECIFIER: Delete Article below for pavers installed over leveling course with sand-filled joints.

3.09 GROUTING JOINTS

- A. General:

- 01. Grout joints in mortar-set granite paving to comply with ANSI A108.10, and manufacturer’s written instructions.
- B. Polymer-Modified Cement Grout for Granite Joints:
 - 01. Grout joints as soon as possible after initial set of setting bed. Finish joints by tooling to produce a slightly concave polished joint, free of drying cracks.
 - 02. Maintain grout in damp condition for 7 days.

3.10 ADJUSTING

- A. Remove granite paving and related work with the following defects, and replace with new units to match adjacent units, unless otherwise specified herein:
 - 01. Broken, chipped, stained, and otherwise damaged granite paving units.
 - 02. Defective joints, including misaligned joints.
 - 03. Granite paving and joints not matching approved samples and mock-ups.
 - 04. Granite paving and joints not complying with other requirements indicated.
- B. Replace in a manner that results in granite paving and joints which match approved samples and mock-ups, complies with other requirements, and shows no evidence of replacement.
- C. Patching: Minor patching in small areas may be acceptable if the repair does not distract from the overall appearance of the finished Project.
 - 01. Repair granite using methods recommended by granite producer.
 - 02. The Architect will make final decision on acceptance of patched paving, at their discretion.

3.11 CLEANING

- A. Cleaning: Clean granite paving after setting and grouting is complete, so that surfaces are free of foreign matter.
 - 01. Remove grout residue from paving as soon as possible. Clean grout smears and haze from granite using granite producer’s and grout manufacturer’s written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by granite producer and grout manufacturer and only after determining that cleaners are safe to use by testing on samples of granite paving and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.12 PROTECTION

- A. Prohibit foot traffic for 72 hours and wheel traffic for at least 7 days after paving (including grouting) is completed.
- B. Protect granite paving during construction period with kraft paper or other heavy covering of type that will not stain or discolor granite, and cover with a layer of untreated plywood where adjoining areas require construction work access.
- C. Before inspection for Substantial Completion, remove protective covering and clean surfaces using procedures and materials recommended by grout and granite flooring manufacturers.

END OF SECTION

NOTE: The following metric conversions shall apply where English measurements are indicated in the text:

1/64 inch	(0.40 mm)	2 inches	(51 mm)
1/32 inch	(0.80 mm)	3 inches	(76 mm)
1/16 inch	(1.5 mm)	4 inches	(102 mm)
1/8 inch	(3 mm)	6 inches	(152 mm)
3/16 inch	(5 mm)	7 inches	(178 mm)
1/4 inch	(6 mm)	8 inches	(203 mm)
5/16 inch	(8 mm)	10 inches	(254 mm)
3/8 inch	(10 mm)	12 inches	(305 mm)
1/2 inch	(13 mm)	16 inches	(406 mm)
5/8 inch	(16 mm)	18 inches	(457 mm)
3/4 inch	(19 mm)	24 inches	(610 mm)(0.6 m)
13/16 inch	(20 mm)	48 inches	(1220 mm)(1.2 m)
1 inch	(25 mm)	8 feet	(2440 mm)(2.4 m)
13/16 inches	(30 mm)	10 feet	(3 m)
11/4 inches	(32 mm)	20 feet	(6 m)
11/2 inches	(38 mm)	40 feet	(12 m)
15/8 inches	(41 mm)		