

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 Summary

- A. Furnish materials, labor, transportation, services, and equipment necessary to furnish and install Architectural Concrete Pavers as indicated on drawings and as specified herein.
- B. Related Sections include the following:
 - 1. Division 02 - Section 02210 Grading
 - 2. Division 02 - Section 02220 Excavation, Backfilling and Compaction.
 - 3. Division 02 - Section 02770 Concrete Paving, Walks, Curbs and Gutters.
 - 4. Division 03 - Section 03300 Cast-In-Place Concrete.
 - 5. Division 07 - Section 07120 Modified Bituminous Sheet Membrane Waterproofing.
 - 6. Division 07 - Section 07920 Sealants.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C-150 -Specification for Portland Cement.
 - 2. ASTM C-33 -Specification for Concrete Aggregates.
 - 3. ASTM C-140 - Specification for Concrete.
 - 4. ASTM C-293
 - 5. ASTM C-1028
 - 6. ASTM C501, 50
 - 7. ASTM C241
- B. Tile Council of America (TCA)
 - 1. TCA F102 - Installation Method Cement Mortar Bonded.
 - 2. TCA F101 - Installation Method Cement Mortar Bonded.
- C. American National Standards Institute (ANSI)
 - 1. ANSI A-118.4 - Latex Portland Cement Mortar.
 - 2. ANSI A-118.6 - Grout - Latex.
- D. Performance Requirements
 - 1. *Compressive Strength:* At the time of delivery, the average compressive strength shall not be less than 8,000psi with no individual unit less than 7,000psi (48,000kPa) per ASTM C-140.
 - 2. *Water Absorption:* Shall not be greater than 6% per ASTM C-936.
 - 3. *Flexural Strength:* Shall not be less than 800psi (5,500kPa) per ASTM C-293.
 - 4. *Freeze/Thaw:* Durability of the paver shall meet the freeze/thaw tests per Section 8 of ASTM C-67 and shall have no breakage and not greater than 1 % loss in dry weight of any individual unit when subject to 50 cycles of freeze/ thaw.

5. *Static Coefficient of Friction:* ASTM C-1028 conditionally slip resistant:
 - a. Wet: 0.50 - 0.60 and Dry: 0.60 - 0.70

6. *Sizing Dimensions:* Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.

- B. Product Data:
 1. Manufacturer's data sheets on each product to be used, including preparation instructions, Installation methods, Storage and handling requirements and recommendations.
 2. Submit test results from an independent testing laboratory for compliance with performance requirements specified herein.
 3. Submit two copies of written instructions for recommended maintenance.

- B. Shop Drawings:
 1. Layout drawings of each paved area showing the pattern of pavers, indicate pavers requiring cutting, indicate setting bed methods in each area, drainage patterns and drains and indicate and relationship of paving joints. Include details of setting beds, noting all materials and their thickness, show details at curbs and vertical surfaces.
 2. Details of custom (nonstandard) curbs and stair tread/risers, include methods of installation.

- C. Samples:
 1. Submit two complete sets of color chips representing manufacturer's full range of available colors and texture. Color will be selected by Architect / Engineer / Landscape Architect / Owner from manufacturer's available standard and custom colors.

1.5 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** All products covered under this Section shall be produced by a single manufacturer unless otherwise specified with a minimum of ten (10) years proven production experience.

- B. **Installer Qualifications:** Installer shall have a minimum of three (3) years proven specialized construction experience with this product and be capable of estimating & building from blueprint plans and details, in addition to proper material handling. All Work must comply with local, state/provincial licensing and bonding requirements.

- C. **Special Consideration:** The paver manufacturer shall demonstrate, either by proven field performance or a laboratory freeze-thaw test, that the paving units have adequate durability if they are to be subjected to a freeze-thaw environment.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with provisions of Section 01300.

- B. Precast Concrete Pavers to be stretch wrapped in rows and banded on pallets, delivered in original unopened packaging with legible manufacturer identification, including size, quantity, manufacture date and inspector initials.
- C. Protect Concrete Pavers during shipment, storage and construction against damage. Store a minimum of 4 inches off the ground on pallets in a dry location and cover with polyethylene to protect from contact with materials which would cause staining or discoloration.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
 - 1. Do not work during freezing weather or on wet or frozen sub-base.

1.8 WARRANTIES / GUARANTEES

- A. Tile Tech Detectable Warning Pavers shall remain free from defects for a period of ten (5) years. The contractor shall warrant that his work will remain free from defects of labor and materials used in conjunction with his work in accordance with the general conditions for this project or a maximum of three (3) years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
Tile Tech Pavers Inc, 888-380-5575 Phone: (213) 380-5560 Fax: (213) 380-5561
 E-mail: sales@tiletechpavers.com Website: www.tiletechpavers.com
- B. Substitutions: Not permitted.
- B. Precast Concrete Pavers equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals are approved in writing by the Architect prior to bid.

2.2 MATERIALS

- A. **Concrete Pavers: Granite-Tech™ Series** pavers as manufactured by Tile Tech Pavers Inc.
 - 1. Color: Standard and custom range as manufactured by Tile Tech Pavers Inc.
 - 2. Size: Nominal 20"x20", 16"x16", 12"x12", 12"x24", 16"x24" or Custom Sizes.
 - 3. Thickness: 1" to 2" thick.
 - 4. Surface Finish: Shot-blasted or Honed.
 - 5. Edge Finish: 3/16" bevel on all four (4) sides or straight edge.
 - 6. Weight: 11 to 22 lbs per square foot depending on paver size & thickness.
- B. **Concrete Pavers: Stamp-Tech™ Series** pavers as manufactured by Tile Tech Pavers Inc.
 - 1. Color: Standard and custom range as manufactured by Tile Tech Pavers Inc.
 - 2. Size: Nominal 20"x20", 16"x16", 12"x12", 12"x24", 16"x24" or Custom Sizes
 - 3. Thickness: 1" to 2" thick
 - 4. Surface Finish: Flat, Slate, Rock, Wave or Custom Designs.

5. Edge Finish: 3/16" bevel on all four (4) sides.
6. Weight: 11 to 22 lbs per square foot depending on paver size & thickness.

C. **Concrete Pavers: Cool-Roof™ Series** pavers as manufactured by Tile Tech Pavers Inc.

1. Color: Standard and custom range as manufactured by Tile Tech Pavers Inc.
2. Size: Nominal 20"x20", 16"x16", 12"x12", 12"x24", 16"x24" or Custom Sizes.
3. Thickness: 1" to 2" thick.
4. Surface Finish: Flat, Slate, Rock, Wave or Custom Designs.
5. Edge Finish: 3/16" bevel on all four (4) sides or straight edge.
6. Weight: 11 to 22 lbs per square foot depending on paver size & thickness.

D. **Concrete Pavers: Recycled-Glass Series** pavers as manufactured by Tile Tech Pavers Inc.

1. Color: Standard and custom range as manufactured by Tile Tech Pavers Inc.
2. Size: Nominal 20"x20", 16"x16", 12"x12", 12"x24", 16"x24" or Custom Sizes
3. Thickness: 1" to 2" thick.
4. Surface Finish: Shot-blasted or Honed.
5. Edge Finish: 3/16" bevel on all four (4) sides or straight edge.
6. Weight: 11 to 22 lbs per square foot depending on paver size & thickness.

E. **Concrete Pavers: Detectable Warning or ADA Truncated Dome Pavers** as manufactured by Tile Tech

1. Color: Standard and custom range as manufactured by Tile Tech Pavers Inc.
2. Size: Nominal 12"x12"
3. Thickness: 2"
4. Surface Finish: Shot-blasted and Sealed.
5. Edge Finish: 3/16" bevel on all four (4) sides.
6. Weight: 22 lbs per square foot.

F. **Precast Steps:** as manufactured by Tile Tech Pavers Inc.

1. Color: Standard and custom range to match field/border colored pavers as manufactured by Tile Tech Pavers Inc.
2. Size: 48"x14", 48"x12"
3. Thickness: 2"
4. Refer to drawings for type, dimensions of treads and risers and locations and layouts of steps.

2.3 PRECAST MATERIAL REQUIREMENTS

- A. *Portland Cement:* ASTM C-150 specifications for Portland Cement.
- B. *Aggregates:* All aggregates to meet ASTM C-33 specifications, cleaned and properly graded to size. Aggregate shall be blended to meet individual project requirements. And to meet ASTM C241 & HA 10 minimum.
- C. *Coloring:* Pigments used shall be inorganic, alkali resistant and used per manufacturer's recommendations.
- D. *Color Blending:* Factory-blend pre-cast paver that has a natural color range so products taken from one batch will have the same range as products from a separate batch.
- E. *Cleaner:* Liquid neutral chemical cleaner with pH factor between 7 and 8, of formulation recommended by sealer manufacturer for type of precast paver used.

- F. *Sealer*: Colorless, slip and stain resistant penetrating or acrylic sealer with pH factor between 7 and 10 that does not affect color or physical properties of precast paver surface.

2.4 INSTALLATION MATERIALS

A. Sand-Set Method

1. *Sand Setting Bed Material*: Sand shall be common sand generally referred to as concrete sand and shall be free of organic materials and any other contaminants that could potentially stain or otherwise damage the unit pavers.
2. *Joint Filler Materials*: Sand conforming with ASTM C-144 with 100% passing a No.16 sieve.
3. *Landscape Filter Fabric*: Woven or non-woven non-biodegradable filter between the compacted base and the sand leveling bed.
4. *Preformed Asphalt Joint Filler*: As indicated on drawings: ASTM D-994, 1/2inch (13 mm) thick, for expansion joints which are not sealed, one of the following:
 - a. *Code 1301* by W.R. Grace and Co.
 - b. *Asphalt Expansion Joint* by W. R. Meadows, Inc.
 - c. *Elastite Asphalt Expansion Joint* by The Celotex Corporation.

B. Mortar Setting Bed (Thin-Set) Method - PEDESTRIAN

1. *Latex Mortar Mix*: ANSI A-118.4.
2. *Water*: Clean and free of deleterious acids, alkalis or organic materials.
3. *Grout*: ANSI A-118.6, Grout - Latex.
4. *Sealant, Back-up & Bond Breaker*: As specified in Section 07920 - Sealants and Caulking.

C. Portland Cement Setting Bed (Thick-Set) Method

1. *Portland Cement Mortar Mix*: ASTM C-150 Custom Bldg Products thick Bed Mortar Mix with Admix, or approved equal.
2. *Reinforcement*: 2inches by 2inches (51mm by 51mm) - 16/16 welded galvanized wire mesh used in thick mortar bed.
3. *Water*: Clean and free of deleterious acids, alkalis or organic materials.
4. *Grout*: Custom Bldg Products Grout with Admix, color as selected or approved equal.
5. *Bond Slurry*: Custom Bldg Products bond coat or approved equal.
6. *Sealant, Back-up & Bond Breaker*: As specified in Section 07920 - Sealants and Caulking.

D. Bituminous Setting Bed Method

1. *Asphalt Setting Bed Materials*:
 - a. *Asphalt Cement*: ASTM D-3381, viscosity grade AC-10 or AC-20.
 - b. *Fine Aggregate*: Clean, hard sand, free of organic matter, uniformly graded from coarse to fine, all passing the No.4 sieve meeting the gradation requirements when testing in accordance with ASTM-C136.
 - c. *Mixing*: Provide plant mixed asphalt setting bed by combining approximately 93% dry fine aggregate and approximately 7% hot asphalt cement and heat to approximately 300 degrees F (149 degree C). Provide each ton of setting bed material apportioned by weight with the approximate ratio of 145lb (66kg) of asphalt to 1,855lb (841kg) of sand.
2. *Setting Bed Primer*: Cut back asphalt, ASTM D-2028, grade as recommended by manufacturer.

3. *Asphalt Adhesive:* Standard neoprene modified asphalt adhesive containing oxidized asphalt combined with 2% neoprene and 10% long fibered mineral fibers with a softening point of 155 degrees F.
4. *Joint Filler Materials:* Sand conforming to ASTM C-144 with 100% passing a No.16 sieve.
5. *Pre-formed Asphalt Joint Filler:* ASTM D-994, 1/2inch (13mm) thick, for expansion joints which are not sealed, one of the following:
 - a. *Code 1301* by W.R. Grace and Co.
 - b. *Asphalt Expansion Joint* by W. R. Meadows, Inc.
 - c. *Elastite Asphalt Expansion Joint* by The Celotex Corporation.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Prior to starting work inspect the sub-grade to ensure that it has been properly prepared. Commencement of work shall imply acceptance of sub-grade conditions.
 1. Verify that sub-grade preparation, compacted density and elevations conform to the specifications. Compaction of the soil sub-grade to at least 95% Standard Proctor Density per ASTM D-698 is recommended. Higher density or compaction to ASTM D-1557 may be necessary for areas subject to vehicular traffic.
 2. Stabilization of the sub-grade and/or base material may be necessary with weak or saturated sub-grade soils. The Architect/Engineer should inspect sub-grade preparation, elevations, and conduct density tests for conformance to specifications.
 3. Verify that Geotextiles, if applicable, have been placed according to specifications.
 4. Verify that aggregate base materials, thickness, compaction, surface tolerances, and elevations conform to the specifications.
 5. Verify that base is dry, uniform, even, and ready to support sand, pavers, and imposed or anticipated vehicular loads.
 6. Verify location, type, installation and elevations of edge restraints around the perimeter area to be paved.
- B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with Tile Tech Pavers Inc. and other contributing manufacturer's instructions. Installation requirements vary for each individual project site. Precast Pavers used, pattern, grid layout, starting point, and finished elevation should be shown on plan view shop drawings, which have been prepared and approved by the designer, installing contractor and/or owner.

B. Placement Tolerance:

1. Maximum of 1/16 inch (1.6 mm) height variation between adjacent pavers.
2. Individual pavers shall not vary more than 1/16 inch (1.6mm) from level across width of the paver.
3. Paved areas shall not vary more than 1/4 inch (6 mm) from level in a distance of 10 feet (3m) measured at any location and in any direction.
4. The surface elevation of pavers shall be 1/8 in. to 1/4 in. (3mm to 6mm) above adjacent drainage inlets, concrete collars or channels.
5. Joints between pavers to be 3/16 inch (4.8mm) or 1/8 inch (3mm).
6. Concrete shall not exceed 1/8 inch in 10 feet (3 mm in 3 m) from required plane. Concrete to be steel troweled with fine broom finish. No curing or sealing compound used.

C. Sand-Set Method Installation:

1. Spread a sand/cement mix evenly over the base course and screed to a nominal 1 in. (25 mm.) thickness, not exceeding 1-1/2 in. (40mm) thickness. The screened sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers. Do not use the bedding sand to fill depressions in the base surface.
2. Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines.
3. Field cut pavers with wet masonry saw in accordance with manufacturer's recommendations for methods, equipment and precautions.
4. Tamp into bedding or use a low amplitude, high frequency plate vibrator to vibrate the pavers into the sand. Cover vibrator plate with carpet or card board to prevent surface damage to pavers.
5. Sweep dry joint sand into the joints & sweep off excess sand when the job is complete.

D. Mortar Setting Bed (Thin-Set) Method Installation - PEDESTRIAN

1. Installation of Mortar bed as per TCA F102. All Materials used shall follow instructions of manufacturer for use in mortar method.
2. Install precast concrete pavers.
3. Grouting of pavers in strict accordance with grout manufacturer's directions and instructions. Use latex or acrylic additives from the same manufacturer as the grout.
4. All expansion and Control joints shall be installed per TCA EJ171. Joint materials used shall follow manufacturer's directions and instructions.
5. Rework mixes from time to time to maintain proper consistency, as recommended by manufacturer but do not add ingredients. Discard mortar that has reached its initial set.
6. Field cut pavers with wet masonry saw in accordance with manufacturer's recommendations for methods, equipment and precautions.
7. Remove, scrub & wash clean mortar stains and all other types of soiling from exposed paver surfaces.

E. Portland Cement Setting Bed (Thick-Set) Method Installation

1. Installation of Mortar bed as per TCA F101. All materials used follow instructions of manufacturer for use in mortar method.
2. Install precast concrete pavers and firmly set, tamp into bedding to ensure minimum 95% surface contact with mortar bed. Coat underside of each precast pavers unit with latex cement mortar.
3. Grouting of pavers in strict accordance with grout manufacturer's directions and instructions. Use latex or acrylic additives from the same manufacturer as the grout.

4. All expansion and Control joints shall be installed per TCA EJ171. Joint materials used shall follow manufacturer's directions and instructions.
5. Field cut pavers with wet masonry saw in accordance with manufacturer's recommendations for methods, equipment and precautions.
6. Remove, scrub & wash clean mortar stains and all other types of soiling from exposed paver surfaces.

F. Bituminous Setting Bed Method Installation

1. Place solid steel 3/4 inch (19 mm) thick control bars directly on the base or slab. Install shims under bars for minor adjustment of depth and finish paver elevations. Space bars approximately 11 feet (3.4m) apart and parallel to each other to serve as guides for strike-off boards.
2. Place asphalt setting bed at not less than 200 degrees F (93 degree C) in panels between control bars on the primed concrete slab or binder course to no less than 3/4 inch (19mm) compacted thickness. Spread material and strike off by pulling the material with a 12 feet long by 2 inches by 6 inches (3.7m by 51mm by 152mm) wood board several times to produce a smooth firm and even setting bed. Add fresh material in low, porous spots after each pass of the strike-off board. After each panel is complete remove and advance the first control bar to the next panel position in readiness for placing and striking adjacent panels. Fill in depressions left by the control bar.
3. Roll setting bed with a roller (not over one ton in weight) to a nominal depth of 3/4 inch (19 mm) thick while it is still hot. Add additional material to adjust thickness required and to allow for setting of pavers to finish elevations and slopes.
 - a. If setting bed is installed greater than 1-1/2 inches (38mm) thick, place in two equal lifts. Place the second lift immediately after the first to assure bond between lifts.
 - b. If pavers are not installed immediately after setting bed, provide protection of setting bed with minimum 1/2 inch plywood sheet laid on the setting bed with butted joints. Repair all damage to the setting bed prior to installing pavers.

F. Concrete Slab Installation – VEHICULAR

1. Install precast concrete pavers, slabs and curbs in locations, patterns and at elevations and with slopes for surface drainage as shown on the Drawings and in accordance with the manufacturer's printed installation instructions and the final reviewed shop drawings.
2. Apply neoprene modified asphalt adhesive on the cured setting bed by squeegeeing or troweling. If troweled on, use a trowel with serrations not exceeding 1/16 inch (1.5 mm) depth. Place adhesive to not more than 1/16 inch (1.6mm) thickness over the total surface of the setting bed. Do not begin installation of pavers, slabs and curbs until adhesive is dry to the touch.
3. Lay out pavement in 30 feet (9m) working area modules. Set precast concrete pavers, slabs and curbs by hand on dry adhesive in patterns shown on the Drawings with hand tight joints 1/16 inch to 1/8 inch (1.6 mm to 3 mm) wide joints and uniform top surfaces.
4. Field cut pavers with wet masonry saw in accordance with manufacturer's recommendations for methods, equipment and precautions.
5. Maintain accurate alignment and check for creep and shrinkage. Make adjustments to creep and shrinkage within the 30 feet (9 m) module area.
6. Sweep fine dry sand over pavement surface to fill joints immediately after installing pavers, slabs and curbs on setting bed. Brush in sand until joints are completely filled, remove surplus sand. Do not allow traffic on installed pavers, slabs or curbing until the joints have been filled.
7. Protect newly laid pavers, slabs and curbs with plywood panels on which workers stand. Advance protective panels as work progresses but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of installed pavers, slabs and curbs.

8. Install the specified joint filler where precast concrete pavers, slabs and curbs abut curbs, other vertical surfaces and other construction.
9. After the precast concrete paving is completed, backfill the spaces along the edges of the walks, metal edging and pavements to the required elevations with material reviewed by the Testing Laboratory. The Material shall then be compacted until firm and the surface neatly graded, with allowance made for top soil.

3.4 PROTECTION

- A. Protect installed pavers until completion of project.
- B. Remove and replace pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement before Substantial Completion.

3.5 CLEANING AND SEALING

- A. Wash entire surface with phosphate free neutral cleaner with pH factor between 7 to 10 and rinse with clean water and allow to dry thoroughly.
- C. Apply sealer in accordance with manufacturer's directions.
 1. pH factor between 7 and 10
 2. Non-discoloring and UV resistant.
 3. Penetrating type designed especially for precast concrete pavers.

3.6 MAINTENANCE

- A. Extra Materials: Deliver supply of maintenance materials to the owner. Furnish not less than 1 percent maintenance materials from same lot as materials installed, and enclosed in protective packaging with appropriate identifying labels.

**END OF SECTION 02780
CONCRETE PAVERS**