

**SECTION 32 14 13.16
CONCRETE PAVER SLABS IN SAND BED
(1995 MasterFormat Section 02784)**

PART 1 GENERAL

1.01 SUMMARY

- A) Section includes:
 - 1) Paving slabs.
 - 2) Bedding and jointing sand.
 - 3) Edge restraints.
 - 4) Geotextile fabric.
 - 5) Cleaning, sealing and joint stabilization.
- B) Related work:
 - 1) Section [] – Earthwork
 - 2) Section [] – Grading
 - 3) Section [] – Aggregate Base
 - 4) Section [] – Concrete [Walks] [Curbs] [and] [Gutters]

1.02 REFERENCES

- A) American Society for Testing and Materials (ASTM)
 - 1) C 33, Specification for Concrete Aggregates.
 - 2) C 136, Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 3) C 144, Standard Specification for Aggregate for Masonry Mortar.
 - 4) ASTM D 698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft³ (600 kN-m/m³)).
 - 5) ASTM D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 6) ASTM D 2940, Specification for Graded Aggregate Material for Bases or Subbases for Highways or Airports.
- B) Canadian Standards Association (CSA)
 - 1) A231.1, Precast Concrete Paving Slabs.

1.03 SUBMITTALS

- A) In accordance with Conditions of the Contract and Division 1 Submittal procedure section.
- B) Shop drawings: Indicate perimeter conditions, relationship to adjoining materials and assemblies, expansion and control joints, paving slab layout, patterns, color(s), installation and setting details.
- C) Sieve analysis per ASTM C 136 for the bedding and joint sands.
- D) Paving slabs:
 - 1) Four full-sized samples representing expected extremes of color and texture in the finished application. Submit samples for each slab type, thickness, color and finish.
 - 2) Accepted samples become the standard of acceptance for the work of this section.
 - 3) Manufacturer's literature and material safety data sheets (MSDS) for the safe handling of the specified paving slabs and other products used in this section.
- E) A copy of installer's current certificate from the Interlocking Concrete Pavement Institute's (ICPI) Paver Installer Certification program.

1.04 QUALITY ASSURANCE

- A) Regulatory Requirements and Approvals: [Specify applicable licensing, bonding or other requirements of regulatory agencies.]
- B) Paving Subcontractor Qualifications:

- 1) Utilize an installer having successfully completed concrete paving slab installation similar in design, material and extent indicated on this project.
 - 2) Installer shall hold a current membership to the Interlocking Concrete Pavement Institute (ICPI).
 - 3) Installer shall hold a current certificate to the Interlocking Concrete Pavement Institute's (ICPI) Paver Installer Certification program. Installation crew shall have at least one member having completed at least Level One of this Certified Paver Installer program present at jobsite at all times.
- C) Mock-Up(s):
- 1) Install a 7 ft. x 7 ft. mock-up area representing full scope of this specification for all types of slabs used on project.
 - 2) Mock-up area(s) will be used as the standard by which all work will be judged and compared.
 - 3) Subject to acceptance by Owner, mock-up(s) may be retained as part of the finished work.
 - 4) If the mock-up(s) are not retained, remove and properly dispose of mock-up.
- 1.04 DELIVERY, STORAGE AND HANDLING
- A) General: Comply with Division 1 Product requirement Section.
- B) Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C) Delivery: Deliver materials in manufacturer's original, unopened, undamaged container packaging with identification labels intact.
- 1) Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.
 - 2) Deliver concrete paving slabs to the site in steel banded, plastic banded and/or plastic wrapped packaging capable of transfer by forklift or clamp lift.
 - 3) Unload slabs at jobsite in such a manner that no damage occurs to the product.
- D) Storage and Protection: Store materials protected such that they are kept free from mud, dirt and other foreign materials.
- 1) Cover bedding sand and joint sand with waterproofing covering if needed to prevent exposure to rainfall or removal by wind. Secure covering in place.
- 1.06 PROJECT / SITE CONDITIONS
- A) Environmental Requirements:
- 1) Do not install sand or slabs during heavy rainfall or snowfall.
 - 2) Do not install frozen bedding sand.
 - 3) Do not install concrete slabs on frozen aggregate base or bedding sand.
- 1.07 MAINTENANCE
- A) Extra Materials: Provide [specify area or percentage] additional material for use by owner for maintenance and repair.

PART 2 PRODUCTS

- 2.01 CONCRETE PAVING SLABS
- A) Manufacturer: StoneBilt Concepts, Henderson, Colorado
- 1) Contact: Gregory Stavaridis, 303-867-6700
- B) Concrete Paving Slabs:
- 1) Travertine (Light and/or Dark)
 - 2) Sandstone (Light Buff, Dark Buff and/or Rustic Red)
 - 3) Slate (Bluestone and/or Smoke)
 - 4) Old World (Limestone and/or Raven)
 - 5) Classic (Pewter, Brick Red and/or Buff)
- C) Size:
- 1) 1.75 in. thick.

2) Available sizes as follows:

	12" x 12"	12" x 18"	12" x 24"	18" x 18"	18" x 24"	24" x 24"
Travertine						
Light		x	x			
Dark		x	x			
Sandstone						
Light Buff	x	x	x	x	x	x
Dark Buff	x	x	x	x	x	x
Rustic Red	x	x	x	x	x	x
Slate						
Bluestone	x	x	x	x	x	x
Smoke	x	x	x	x	x	x
Old World						
Limestone	x		x	x		x
Raven	x		x	x		x
Classic						
Pewter						x
Buff						x
Brick Red						x

2.02 PROJECT SUBSTITUTIONS

A) Substitutions: No substitutions permitted.

2.03 BEDDING AND JOINT SAND

A) Provide bedding and joint sand as follows:

- 1) Clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
- 2) Do not use limestone screenings, stone dust, or sand for the bedding sand material that does not conform to the grading requirements of ASTM C 33.
- 3) Do not use mason sand or sand conforming to ASTM C 144 for bedding sand.
- 4) Sieve according to ASTM C 136.
- 5) Bedding Sand Material Requirements: Conform to the grading requirements of ASTM C 33 with modifications as shown in Table 1.

Table 1
Grading Requirements for Bedding Sand
ASTM C 33

Sieve Size	Percent Passing
3/8 inch	100
No. 4	95 to 100
No. 8	85 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10
No. 200	0 to 1

- 6) Joint Sand Material Requirements: Conform to the grading requirements of ASTM C 144 as shown with modifications in Table 2 below.

Table 2
Grading Requirements for Joint Sand
ASTM C 144

Sieve Size	Natural Sand Percent Passing	Manufactured Sand Percent Passing
No. 4	100	100
No. 8	95 to 100	95 to 100
No. 16	70 to 100	70 to 100
No. 30	40 to 75	40 to 100
No. 50	10 to 35	20 to 40
No. 100	2 to 15	10 to 25
No. 200	0 to 1	0 to 10

2.04 EDGE RESTRAINTS

- A) Provide paver/hardscape specific edge restraints installed around the perimeter of all concrete paver slabs not restrained by other materials (concrete curb, sidewalk edge, etc.). Aluminum and/or landscape edging shall not be used.
- 1) Manufacturer: []
 - 2) Material: []
 - 3) Material Standard: []

2.05 ACCESSORIES

- A) Provide accessory materials as follows:
- 1) Geotextile:
 - a) Manufacturer: []
 - b) Material: []
 - c) Material Standard: []
 - 2) Cleaner, Sealer, Joint Stabilizer:
 - a) Manufacturer: []
 - b) Material: []
 - c) Material Standard: []

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A) As per above 1.04 B. No exceptions shall be made.

3.02 EXAMINATION

- A) Acceptance of Site / Verification of Conditions:
- 1) Contractor shall inspect, accept and certify in writing that site conditions meet specifications for the following items prior to installation of concrete paving slabs.
 - a) Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
 - b) Verify that geotextiles, if applicable, have been placed according to drawings and specifications.
 - c) Verify that [Aggregate] [Cement-treated] [Asphalt-treated] [Concrete] [Asphalt] base materials, thickness, [compacted density], surface tolerances and elevations conform to specified requirements.
 - d) Provide written density test results for soil subgrade, [aggregate] [cement-treated][asphalt-treated][asphalt] base materials to the Owner, General Contractor and paving slab installation subcontractor.
 - e) Verify location, type, and elevations of edge restraints, [concrete collars around] utility structures, and drainage inlets.

- B) Do not proceed with installation of bedding sand and concrete paving slabs until [subgrade soil and] base conditions are corrected.

3.03 PREPARATION

- A) Verify base is dry, certified by Contractor as meeting material, installation and grade specifications.
- B) Verify that base [and geotextile] is ready to support sand, [edge restraints] and, slabs and imposed loads.
- C) Edge Restraint Preparation:
 - 1) Install edge restraints per the drawings manufacturer's recommendations.

3.04 INSTALLATION

- A) Spread bedding sand evenly over the base course and screed to a nominal 1 in. thickness, not exceeding 1-1/2 in. thickness. Spread bedding sand evenly over the base course and screed rails, using the rails and/or edge restraints to produce a nominal 1 in. thickness, allowing for specified variation in the base surface.
 - 1) Do not disturb screeded sand.
 - 2) Screeded area shall not substantially exceed that which is covered by slabs in one day.
 - 3) Do not use bedding sand to fill depressions in the base surface.
- B) Lay slabs in pattern(s) shown on drawings. Place units hand tight without using hammers. Make horizontal adjustments to placement of laid slabs with rubber hammers as required.
- C) Provide joints between slabs of up to 3/16 in wide. No more than 5% of the joints shall exceed 1/4 in. wide to achieve straight bond lines.
- D) Joint (bond) lines shall not deviate more than $\pm 1/2$ in. over 50 ft. from string lines.
- E) Fill gaps at the edges of the paved area with cut slabs or edge units.
- F) Cut slabs to be placed along the edge with a masonry saw. Cut units shall be no smaller than 1/3 of a whole slab. A paver splitter shall not be used.
- G) Adjust bond pattern at pavement edges such that cutting of edge slabs is minimized.
 - 1) Cut slabs at edges as indicated on the drawings.
- H) Keep all motorized equipment, such as skid steer and forklift, off slabs at all times.
- I) After an area is completely paved, compact the units into the sand with a mechanical plate vibrator with rug attachment.
 - 1) Use a low-amplitude plate compactor capable of at least minimum of 4,000 lbf (18 kN) at a frequency of 75 to 100 Hz. Remove any cracked or damaged slabs and replace with new units.
 - 2) Travertine slabs shall not be plate compacted but set with rubber mallet.
 - a) Exception: Travertine slabs laid with joints equal to or greater than 1/4".
- J) Spread, sweep and compact dry joint sand into joints until full. Do not compact within 6 ft. of unrestrained edges of paving units.
 - 1) Travertine slabs shall not be plate compacted but set with rubber mallet.
 - a) Exception: Travertine slabs laid with joints equal to or greater than 1/4".
- K) All work within 6 ft. of the laying face shall be left fully compacted with sand-filled joints at the end of each day or compacted upon acceptance of the work. Cover the laying face or any incomplete areas with plastic sheets overnight if not closed with cut and compacted slabs with joint sand to prevent exposed bedding sand from becoming saturated from rainfall.
- L) Remove excess sand from surface when installation is complete.
- M) Surface shall be broom clean after removal of excess joint sand.

3.05 FIELD QUALITY CONTROL

- A) The final surface tolerance from grade elevations shall not deviate more than $\pm 3/8$ in. under a 10 ft straightedge.
- B) Check final surface elevations for conformance to drawings.

- C) The surface elevation of slabs shall be 1/8 in. to 1/4 in. above adjacent drainage inlets, concrete collars or channels.
 - D) Lippage: No greater than 1/4 in. difference in height between adjacent slabs.
- 3.06 CLEANING, SEALING, JOINT SAND STABILIZATION
- A) Clean, seal and/or apply joint sand stabilization to concrete slabs in accordance with the manufacturer's written recommendations.
- 3.07 PROTECTION
- A) After work in this section is complete, Contractor shall protect work from damage due to subsequent construction activity on the site. No vehicular traffic shall be allowed on sand set slabs.

END OF SECTION