

Section 32 14 13
CONCRETE TILE PAVERS
(1995 MasterFormat Section 02780)

Note: This guide specification for the U.S. is for the installation of concrete tile paving units whose thickness are less than the minimum 2 3/8 in. (60 mm) required to conform to ASTM C 936. These tile units are generally 7/8 in. to 1½ in. (20 to 40 mm) thick. They are placed on a thin layer of bedding sand over an existing concrete base. Installations with a high quality concrete base will require no bedding sand. These installation methods are addressed in this guide specification.

The finished paver surface is intended for pedestrian use only. This method of construction is for rehabilitation of concrete pool decks, other kinds of concrete decks, walks and roofs. The text must be edited to suit specific project requirements. This Section includes the term "Architect." Edit this term as necessary to identify the design professional in the General Conditions of the Contract.

Note: Construction on a concrete base requires securing edge pavers with acrylic fortified mortar bed (thin-set mortar) or a polymer adhesive specifically for concrete pavers. A thin layer of bedding sand is placed within the edge restraints. An alternative paving method is placing interior units directly on concrete, spreading sand, and rinsing the sand into the joints with water to ensure settlement of the sand into them. Installations may be proof rolled with a water-filled roller to further imbed the units into the sand. If bedding sand is used, pavers secured at the edge of the concrete are often thicker to help contain the bedding sand. The surface of the pavers is typically sealed to stabilize the joint sand for pool applications, and other applications may use a joint sand stabilizer applied to the jointing sand. Adjustments in elevations of the concrete base and drains prior to paving may be necessary to facilitate drainage.

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Concrete tile paver units. [Concrete paver edge units.]
 - 2. Bedding and joint sand.
 - 3. [Acrylic fortified mortar] [paver adhesive].
 - 4. Cleaners and Sealers].
- B. Related Sections
 - 1. Section: [] – Concrete base.
 - 2. Section: [] – Roofing Materials.

1.02 REFERENCES

- A. American Society of Testing and Materials (ASTM):
 - 1. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
 - 2. C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - 3. C 936, Specification for Solid Interlocking Concrete Paving Units.
 - 4. C 979, Specification for Pigments for Integrally Colored Concrete.
 - 5. C 1645, Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units.

1.03 SUBMITTALS

- A. In accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Manufacturer's drawings and details: Indicate perimeter conditions, relationship to adjoining materials and assemblies, [expansion and control joints,] concrete paver [layout,] [patterns,] [color arrangement,] installation [and setting] details.
- C. Sieve analysis per ASTM C 136 for grading of bedding and joint sand.
- D. Concrete paving tile units:

1. [Four] representative full-size samples of each paver type, thickness, color, finish that indicate the range of color variation and texture expected in the finished installation. Color(s) selected by [Architect] [Engineer] [Landscape Architect] [Owner] from manufacturer's available colors.
2. Accepted samples become the standard of acceptance for the work.
3. Test results from an independent testing laboratory for compliance with compressive strength, absorption and freeze-thaw resistance per ASTM C 936 using testing methods in ASTM C 140.

Note: Tile pavers will likely require cutting prior to capping and testing in compression in order to conform to the thickness/width or aspect ratio requirements for test specimens in ASTM C140.

4. Manufacturer's certification of concrete pavers by ICPI as having met applicable ASTM standards.
 5. Manufacturer's catalog product data, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.
- E. Paver Installation Subcontractor:
1. A copy of Subcontractor's current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.
 2. Job references from projects of a similar size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.

1.04 QUALITY ASSURANCE

- A. Paving Subcontractor Qualifications:
1. Utilize an installer having successfully completed concrete paver installation similar in design, material, and extent indicated on this project.
 2. Utilize an installer holding a current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.
- B. Regulatory Requirements and Approvals: [Specify applicable licensing, bonding or other requirements of regulatory agencies].
- C. Mock-Ups:
1. Install a 7 ft x 7 ft (2 x 2 m) paver area.
 2. Use this area to determine surcharge of the bedding sand layer, joint sizes, lines, laying pattern(s), color(s), and texture of the job.
 3. This area will be used as the standard by which the work will be judged.
 4. Subject to acceptance by owner, mock-up may be retained as part of finished work.
 6. If mock-up is not retained, remove and properly dispose of mock-up.

1.05 DELIVERY, STORAGE & 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 containers 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 pavers to the site in steel banded, plastic banded or plastic wrapped packaging capable of transfer by fork lift or clamp lift.
 3. Unload pavers at job site 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. [Store concrete paver cleaners and sealers per manufacturer's instructions.]

1. Cover bedding sand and joint sand with waterproof covering if needed to prevent exposure to rainfall or removal by wind. Secure the covering in place.

1.06 PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
 1. Do not install sand or pavers during heavy rain or snowfall.
 3. Do not install frozen sand or saturated sand.
 3. Do not install concrete pavers on frozen or saturated sand.

1.07 MAINTENANCE

- A. Extra Materials: Provide [Specify area] [Specify percentage.] additional material for use by owner for maintenance and repair.
- B. Paving units shall be from the same production run as installed materials.

PART 2 PRODUCTS

2.01 CONCRETE PAVERS

Note: Concrete pavers may have spacer bars on each unit. They are highly recommended for mechanically installed pavers. Manually installed pavers may be installed with or without spacer bars.

- A. Manufacturer: [Specify ICPI member manufacturer name].
 1. Contact: [Specify ICPI member manufacturer contact information].
- B. Concrete Tile Pavers:
 1. Paver Type: [Specify name of product group, family, series, etc.].
 - a. Color [and finish]: [Specify color.] [Specify finish].
 - c. Color Pigment Material Standard: Comply with ASTM C 979.
 - d. Size: [Specify.] inches [(Specify.)mm] x [Specify.] inches [(Specify.)mm] x [Specify.] inches [(Specify.) mm] thick.
 - e. Material Standard: When manufactured as a 2 3/8 in. (60 mm) thick unit, the concrete mix for the thin units shall meet the following requirements:
 - f. Average Compressive Strength: 8000 psi (55 MPa) with no individual unit under 7200 psi (50 MPa) per ASTM C 140.
 - g. Average Water Absorption (ASTM C 140): 5% with no unit greater than 7%.
 - h. Freeze/Thaw Resistance (ASTM C 1645): 28 freeze-thaw cycles with no greater loss than 225 g/m² of paver surface area or no greater loss than 500 g/m² of paver surface area after 49 freeze-thaw cycles. Freeze-thaw testing requirements shall be waived for applications not exposed to freezing conditions.

2.02 PRODUCT 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 or stone dust.
 3. Sieve according to ASTM C 136.
 4. Bedding and joint and material requirements: Conform to the grading as shown in Table 1 below:

Table 1
Grading Requirements for Bedding Sand

Sieve Size	Percent Passing
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No. 8 (2.36 mm)	100
No.16 (1.18mm)	65 to 97
No. 30 (0.600 mm)	25 to 70
No. 50 (0.300 mm)	5 to 35
No. 100 (0.150 mm)	0 to 7
No. 200 (0.075 mm)	Maximum 4

- B. Silica sand may be used in lieu of that specified in Table 1 provided that 100% passes the No. 8 (2.36 mm) sieve and no more than 4% passes the No. 200 (0.075 mm) sieve.

2.04 EDGE RESTRAINTS

Note: Select material for securing edge pavers to concrete base.

- A. Provide paving unit edge restraints installed around the perimeter of all concrete tile paving unit areas with [acrylic fortified (thin-set) mortar] [polymer paver adhesive].
1. Manufacturer: [Specify manufacturer.].
 2. Material Standard: [Specify material standard.].

2.05 ACCESSORIES

- A. Provide accessory materials as follows:
1. Geotextile:
 - a. Material Type and Description: [Specify material type and description.].
 - b. Material Standard: [Specify material standard.].
 - c. Manufacturer: [Acceptable to interlocking concrete paver manufacturer] [Specify manufacturer.].

Note: Delete article below if cleaners, sealers, and/or joint sand stabilizers are not specified.

2. [Cleaners] [Sealers] [Joint sand stabilizers]
 - a. Material Type and Description: [Specify material type and description.].
 - b. Material Standard: [Specify material standard.].
 - c. Manufacturer: [Specify manufacturer.].

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. [Specify acceptable paving subcontractors.].

Note: The elevations and surface tolerance of the concrete base determine the final surface elevations of concrete pavers. The paver installation contractor cannot correct deficiencies in the base surface with additional bedding sand or by other means. Therefore, the surface elevations of the base should be checked and accepted by the General Contractor or designated party, with written certification to the paving subcontractor, prior to placing bedding sand and concrete pavers.

3.02 EXAMINATION

- A. Acceptance of Site Verification of Conditions:
1. General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of concrete tile paving units.
 - a. Verify that geotextiles, if applicable, have been placed according to drawings and specifications.
 - c. Verify that concrete base materials, thickness, surface tolerances and elevations conform to specified requirements.
 - d. Verify location, type, and elevations of edge restraints, [concrete collars around] utility structures, and drainage holes and inlets.

2. Do not proceed with installation of bedding sand and concrete paving units until base conditions are corrected by the General Contractor or designated subcontractor.

3.03 PREPARATION

- A. Verify concrete base is clean and dry, certified by General Contractor as meeting material, installation and grade specifications.
- B. Verify that the concrete base drains water away from buildings, pools or other structures and conforms to elevations on the drawings.
- C. Verify that concrete base [and geotextile] is dry and ready to support sand, pavers, and imposed loads. Verify that concrete base is sound, clean and free from cracks, scaling, spalling or other defects that would be detrimental to the adhesion of the [mortar] [polymer adhesive] materials, or contribute to the loss of bedding sand, cracking or other kinds of degradation of the installed assembly.
- D. Verify location, type, installation and elevations of edge pavers to be installed around the perimeter area to be paved.

3.04 INSTALLATION

- A. Edge Restraints
 1. Follow all manufacturer's instructions on [mixing and] applying [acrylic fortified mortar] [polymer adhesive] to edge pavers.
 2. Locate and secure edge tile pavers on the concrete base according to the drawings. Allow the [mortar] [adhesive] to cure per the manufacturer's instructions.
 3. Provide weep holes through joints in the pavers per the drawings. Cover with geotextile to prevent loss of sand as shown in the drawings.
 4. The surface of the installed edge restraint units shall be even.
- B. Bedding sand
 1. Spread the sand evenly over the base inside the installed edge restraints.
 2. Screed smooth to a nominal 1/4 in. (7 mm) thickness, or to the thickness that results in a finish paver surface that is level with the edge units.
 3. Do not disturb the screeded sand should not be disturbed.
 4. Place sufficient sand to stay ahead of the laid pavers.
 5. Do not use the bedding sand to fill depressions in the base surface.
- C. Concrete tile pavers
 1. Ensure that pavers are free of foreign material prior to installation.
 2. Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight joint lines.
 3. Joints between the pavers on average shall not exceed 1/8 in. (3 mm).
 4. [Joints widths shall be negligible on roof decks and the entire surface tightly fitted.]
 5. Cut pavers to be placed along the edge with a masonry saw.
 6. Fill gaps at the edges of the paved area with cut pavers or edge units.
 7. Spread sand over the surface of the pavers. Wash the area with water, rinsing the sand into the joints. Repeat as necessary until the joints are full.
 8. Proof roll the all the pavers with a water-filled roller not exceeding 300 lbs. (135 kg). Do not use a plate compactor on the pavers.
 9. After surface is dry, remove excess sand.

3.05 FIELD QUALITY CONTROL

Note: Surface tolerances on flat slopes should be measured with a rigid straightedge. Tolerances on complex contoured slopes should be measured with a flexible straightedge capable of conforming to the complex curves on the pavement surface.

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

- C. The surface elevation of pavers shall be 1/8 in. (3 mm) above adjacent drainage inlets, concrete collars or channels.
- D. Lippage: No greater than 1/8 in. (3 mm) difference in height between adjacent pavers.

Note: Cleaning and sealing may be required for some applications. See ICPI Tech Spec 5, Cleaning and Sealing Interlocking Concrete Pavements for guidance on when to clean and seal the paver surface, and when to stabilize joint sand. Delete article below if cleaners, sealers, and or joint sand stabilizers are not applied.

3.06 [CLEANING] [SEALING]

- A. [Clean] [Seal] concrete pavers in accordance with the manufacturer's written recommendations.

3.07 PROTECTION

- A. After work in this section is complete, the General Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.

END OF SECTION