

Provided By:



THIN TILE PAVERS

SECTION 32 14 13

Note: This guide specification for the U.S. is for the installation of concrete tile paving units generally 3/4 to 2 in. (20 to 50 mm) thick. These thicknesses are less than the minimum 2 3/8 in. (60 mm) required for conformance to ASTM C936. Regardless of thickness differences, the manufacturing process is very similar to that used to make 2 3/8 in. (60 mm) thick pavers meeting ASTM C936.

There are two installation methods, one with bedding sand and another with none. Both methods are applied over a concrete or cement-stabilized aggregate base. This method of construction is for new or rehabilitative overlay on concrete pool decks, other decks, patios, walks, balconies and roofs. These two installation methods are described in this guide specification and are intended for pedestrian use only.

Construction on a concrete base requires securing edge pavers with an acrylic-fortified mortar bed (thin-set mortar) or a polymer adhesive. A smooth concrete base can allow pavers placed directly on concrete. Fine sand is spread and washed into the joints until full. This method typically moves some sand under the pavers to reduce or eliminate rocking. Most applications are sealed as a means to secure sand in the joints.

Other installations use a thin layer of screeded bedding sand typically 1/2 to 3/4 in. thick. This is screeded within the fastened edge pavers. After placing pavers on the sand, they may be proof rolled with a water-filled roller to imbed them into the bedding sand. The joints are filled with sand. Both installation methods may use polymeric joint sand stabilizer. Adjustments in elevations any surface drain inlets are necessary to facilitate drainage of water from the new, elevated paver surface.

*This Section includes the term "Architect." Edit this term as necessary to identify the design professional in the General Conditions of the Contract. **The text must be edited by a qualified, licensed design professional to suit specific project requirements. ICPI makes no representations or warranties of any kind, expressed or implied, and disclaims any liability for damages resulting in the use of this guide construction specification.***

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.

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2. Section: [] – Roofing Materials.

1.02 REFERENCES

- A. **American Society of Testing and Materials (ASTM):**
 1. C136 Method for Sieve Analysis for Fine and Coarse Aggregate.
 2. C140 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 3. C936 Specification for Solid Interlocking Concrete Paving Units.
 4. C979 Specification for Pigments for Integrally Colored Concrete.
 5. C1645 Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units.
- B. **Interlocking Concrete Pavement Institute (ICPI) Technical Bulletins**
 1. Tech Spec 5 Cleaning, Sealing and Joint Sand Stabilization of Interlocking Concrete Pavement.

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 C136 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 compressive strength, absorption, dimensional tolerances, and freeze-thaw durability.

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 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. Current certificates from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program for job foremen on the project.
 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.
5. 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 forklift 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.
 2. 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 typically not included in dimensional measurements.

- 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].
 - b. Color Pigment Material Standard: Comply with ASTM C979.

- c. Size: [Specify] inches [mm] x [Specify] inches [mm] x [Specify] inches [mm] thick.
- d. Material Standard: comply with ASTM C936.
- e. Average Compressive Strength: 8000 psi (55 MPa) with no individual unit under 7200 psi (50 MPa) per ASTM C140.
- f. Average Water Absorption (ASTM C140): 5% with no unit greater than 7%.
- g. Freeze-thaw Resistance (ASTM C1645): 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 C136.
- 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 |
|--------------------|-----------------|
| No. 8 (2.36 mm) | 100 |
| No. 16 (1.18 mm) | 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) | 0 to 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.
 - b. Verify that concrete base materials, thickness, surface tolerances and elevations conform to specified requirements.
 - c. 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 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.**
- E. **Verify that any area drains are raised to the final elevation of the installed pavers.**

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 drain water from under pavers and prevent loss of sand as shown in the drawings.
4. The surface of the installed edge restraint units shall be even.

Note: Use the following if bedding sand is used under the pavers. Delete B if pavers are applied directly to a concrete base.

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 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.

Note: Use the next article when pavers are applied directly to a concrete base. Delete article C8.

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.]

Note: Use articles C8 and C9 if pavers are placed on bedding sand. Delete C7 above.

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. Fill the joints with sand.]
10. After surface is dry, remove excess sand.
11. All work more than 6 ft (2 m) 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 pavers with joint sand to prevent exposed bedding sand from becoming saturated from rainfall.

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, Sealing and Joint Sand Stabilization of Interlocking Concrete Pavement 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] [JOINT SAND STABILIZERS]

- A. [Clean with] [Seal with] [Apply polymeric joint sand to] 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

ABOUT CMHA

The Concrete Masonry & Hardscapes Association (CMHA) represents a unification of the Interlocking Concrete Pavement Institute (ICPI) and National Concrete Masonry Association (NCMA). CMHA is a trade association representing US and Canadian producers and suppliers in the concrete masonry and hardscape industry, as well as contractors of interlocking concrete pavement and segmental retaining walls. CMHA is the authority for segmental concrete products and systems, which are the best value and preferred choice for resilient pavement, structures, and living spaces. CMHA is dedicated to the advancement of these building systems through research, promotion, education, and the development of manufacturing guides, design codes and resources, testing standards, and construction practices.

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