

SECTION 32 14 13
INTERLOCKING CONCRETE PAVERS ADHERED TO A CONCRETE BASE
(1995 MasterFormat Section 02780)

Note: This guide specification is for applications of concrete pavers in the U.S. adhered with polymer adhesive onto a rigid base, typically cast-in-place concrete. This specification is not recommended for pavements subject to vehicular traffic. 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.

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 1. Concrete paver units.
 2. Polymer adhesive.
 3. [Joint sand].
 4. [Cleaners, Sealers, and Joint sand stabilizers].
- B. Related Sections
 1. Section: []- Curbs and Drains.
 2. Section: []- Concrete Base.

Note: Pavements vehicles should be designed in consultation with a qualified civil engineer, in accordance with established pavement design procedures, ICPI Lockpave software, and in accordance with the ICPI Tech Spec technical bulletins. Use the current year reference.

1.02 REFERENCES

- A. American Society of Testing and Materials (ASTM):
 1. C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 2. C 936, Specification for Solid Concrete Interlocking Paving Units.
 3. C 979, Standard Specification for Pigments for Integrally Colored Concrete.
 4. C 1645, Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units.
- B. Interlocking Concrete Pavement Institute (ICPI)
 1. ICPI Tech Spec Technical Bulletins

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. Concrete pavers:
 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 of paving unit requirements to ASTM C 936.
 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.
- D. 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 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 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 pavers during heavy rain or snowfall.
 2. Do not install pavers over frozen aggregate base materials.
 3. [Do not install frozen joint sand.]

1.07 MAINTENANCE

- A. Extra Materials: Provide [Specify area] [Specify percentage.] additional material for use by owner for maintenance and repair.
- B. Pavers 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. Interlocking Concrete Pavers:
 1. Paver Type: [Specify name of product group, family, series, etc.].
 - a. Material Standard: Comply with material standards in ASTM C 936.
 - b. 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.

Note: If 3 1/8 in. (80 mm) thick pavers are specified, their compressive strength test results per ASTM C 140 should be adjusted by multiplying by 1.18 to equate the results to that from 2 3/8 in. (60 mm) thick pavers.

- e. Average Compressive Strength (C 140): 8000 psi (55 MPa) with no individual unit under 7200 psi (50 MPa).
- f. Average Water Absorption (ASTM C 140): 5% with no unit greater than 7%.
- g. Freeze/Thaw Resistance (ASTM C 1645): Provide test results to 28 freeze/thaw cycles with no greater loss than 225 g/m² of surface area or 49 cycles with no greater loss than 500 g/m² of surface area. 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 POLYMER ADHESIVE

- A. Specifically manufactured for use with concrete pavers.
- B. [Manufacturer]

Note: Joint sand may not be used in some applications. Delete or retain 2.04 below as required.

2.04 [JOINT SAND]

- A. Joint Sand Material Requirements: Conform to the grading requirements of ASTM C 144.

2.05 ACCESSORIES

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

- A. [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 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 interlocking concrete pavers.
 - 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 concrete base materials, thickness, surface tolerances and elevations conform to specified requirements.
 - d. Provide written test results for concrete base materials to the Owner, General Contractor and paver installation subcontractor.
 - e. 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 interlocking concrete pavers until base conditions are corrected by the General Contractor or designated subcontractor.

3.03 PREPARATION

- A. Verify base is dry, certified by General Contractor as meeting material, installation and grade specifications.
- B. Verify that base is clean and ready to accept polymer adhesive, support pavers, and imposed loads.

3.04 INSTALLATION

- A. Ensure that pavers are free of foreign material before installation.
- B. Lay pavers without adhesive in pattern(s) shown on drawings. Place units hand tight without using hammers. Make horizontal adjustments to placement of laid pavers with rubber hammers and pry bars as required.

Note: Contact manufacturer of interlocking concrete paver units for recommended joint widths.

- C. Provide joints between pavers between [1/16 in. and 3/16 in. (2 and 5 mm)] wide. No more than 5% of the joints shall exceed 1/4 in. (6 mm) wide to achieve straight bond lines.
- D. Joint (bond) lines shall not deviate more than $\pm 1/2$ in. (± 15 mm) over 50 ft. (15 m) from string lines.
- E. Fill gaps at the edges of the paved area with cut pavers or edge units.
- F. Cut pavers to be placed along the edge with a [double blade paver splitter or] masonry saw.

Note. Specify requirements for edge treatment in paragraph below.

- G. [Adjust bond pattern at pavement edges such that cutting of edge pavers is minimized.]
[Cut pavers at edges as indicated on the drawings.]
- H. Keep skid steer and forklift equipment off newly laid pavers.
- I. Remove pavers from pattern and apply polymer adhesive on the bottom surface of the pavers according to manufacturer's instructions.
- J. Set pavers with adhesive to the concrete base in pattern(s) shown on the drawings.
- K. Maintain straight joint lines and joint widths.
- L. The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

Note: Joint sand may not be required in some applications. Delete articles M through Q below if no joint sand is applied.

- M. After adhesive has cured, spread and sweep dry joint sand into joints continuously until full.
- N. All work within 6 ft. (2 m) of the laying face must shall have sand-filled joints at the end of each day. Cover the laying face or any incomplete areas with plastic sheets overnight if not closed with cut and adhered pavers with joint sand.

- O. Remove excess sand from surface when installation is complete.

Note: Excess joint sand can remain on surface of pavers to aid in protecting their surface especially when additional construction occurs after their installation. If this is the case, delete the article above and use the article below. Designate person responsible for directing timing of removal of excess joint sand.

- P. Allow excess joint sand to remain on surface to protect pavers from damage from other trades. Remove excess sand when directed by [Architect].
- Q. Surface shall be broom clean after removal of excess joint 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. to 1/4 in. (3 to 6 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] [JOINT SAND STABILIZATION]

- A. [Clean] [Seal] [Apply joint sand stabilization materials between] 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