

NITTERHOUSE MASONRY PRODUCTS SPECIFICATIONS FOR: INTERLOCKING PAVING STONES

INTERLOCKING CONCRETE PAVING STONES

SECTION 02780

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete paver units. [Concrete paver edge units.]
- B. Bedding and joint sand.

1.02 RELATED SECTIONS

- A. Section: [-]-Curbs and Drains.
- B. Section: [-]-Aggregate Base.
- C. Section: [-]-Cement Treated Base.
- D. Section: [-]-Asphalt Treated Base.
- E. Section: [-]-Pavements, Asphalt and Concrete.
- F. Section: [-]-Roofing Materials.
- G. Section: [-]-Bitumen and Neoprene Setting Bed, Acrylic Fortified Mortar Setting Bed.

- H. Section: [-]-Geotextiles.

1.03 REFERENCES

Note: Street, industrial, port and airport pavement thicknesses should be designed in consultation with a qualified civil engineer, in accordance with established flexible pavement design procedures, Pavespec software, and in accordance with the ICPI Tech Spec Technical Bulletins. Sample construction detail drawings are available from the ICPI. This specification may require modification for pavements with non-stabilized aggregate bases, asphalt or cement stabilized bases, or asphalt and concrete bases.

- A. American Society of Testing and Materials (ASTM):
 1. C 33, Specification for Concrete Aggregates.
 2. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
 3. C 140, Sampling and Testing Concrete Masonry Units.
 4. C 144, Standard Specification for Aggregate for Masonry Mortar.
 5. C 936, Specification for Solid Interlocking Concrete Paving Units.
 6. C 979, Specification for Pigments for Integrally Colored Concrete.
 7. D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
 8. D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
 9. D 2940, Graded Aggregate Material for Bases or Subbases for Highways or Airports.

1.04 QUALITY ASSURANCE

- A. Installation shall be by a contractor and crew with at least one year of experience in placing interlocking concrete pavers on projects of similar nature or dollar cost.
- B. Contractor shall conform to all local, state/provincial licensing and bonding requirements.

1.05 SUBMITTALS

- A. Submit shop or product drawings, and product data.
- B. Submit full size samples of concrete paving units to indicate color and shape selections. Color will be selected by

Architect/Engineer/Landscape Architect/Owner from manufacturer's available colors.

- C. Submit sieve analysis for grading of bedding and joint sand.
- D. Submit test results from an independent testing laboratory for compliance of paving unit requirements to ASTM C 936 or other applicable requirements.
- E. Indicate layout, pattern, and relationship of paving joints to fixtures and project formed details.

1.06 MOCK-UPS

- A. Install a 7 ft. x 7 ft. (2 m x 2 m) paver area as described in Article 3.02. This area will be used to determine surcharge of the bedding sand layer, joint sizes, lines, laying pattern(s), color(s), and texture of the job. This area shall be the standard form which the work will be judged.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver concrete pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by fork lift or clamp lift. Unload pavers at job site in such a manner that no damage occurs to the product.
- B. Sand shall be covered with waterproof covering to prevent exposure to rainfall or removal by wind. The covering shall be secured in place.
- C. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.

1.08 ENVIRONMENTAL CONDITIONS

- A. Do not install sand or pavers during heavy rain or snowfall.
- B. Do not install sand and pavers over frozen base materials.
- C. Do not install frozen sand.

PART 2 PRODUCTS

2.01 CONCRETE PAVERS

Note: Concrete pavers may have spacer bars on each unit. These insure a minimum joint between each unit into which sand is placed. Spacer bars help prevent contact of the edges with adjacent pavers and subsequent spalling. They are highly recommended for mechanically installed pavers. Manually installed pavers may be installed with or without spacer bars.

- A. The interlocking paver supplier shall be:

Nitterhouse Masonry Products LLC
859 Cleveland Ave.
Chambersburg, PA 17201
717-267-4500 Fax 717-267-4585
- B. Product name(s)/shape(s), color(s), overall dimensions, and thickness of the paver(s) shall be:

Interlocking Concrete Pavers
Color to be selected from manufacturers standard colors:
4" x 8" x 2 3/8", 8"x8"x 2 3/8", 6" x 6"x 2 3/8", 6" x 9" x 2 3/8",
Chateau Pavers – 6" x 12", 12" x 12", 12" x 18" all 2 3/8"
Urban Stone- 4"x 12"x 3-1/8", 6" x 12" x 3-1/8"
- C. Pavers shall meet the following requirements set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units:

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1. Average compressive strength of 8,000 psi (55 MPa) with no individual unit under 7,200 psi (50 MPa).
2. Average absorption of 5% with no unit greater than 6% when tested in accordance with ASTM C 140.
3. Resistance to 50 freeze-thaw cycles when tested in accordance with ASTM C 67.

D. Pigment in concrete pavers shall conform to ASTM C 979.

2.02 AGGREGATE BASE

The aggregate base shall consist of ¾" minus limestone. Suitable for road construction. Stone shall meet ASTM D 2940.

Base shall be a minimum of 12".

2.03 FILTER FABRIC

Geotextile filter fabric shall be Inbitex, Mirafi 140-N. or approved equal. To be placed over the aggregate base. The bedding sand is then to be screeded over the fabric.

2.04 BEDDING AND JOINT SAND

Note: The type of sand used for bedding is often called concrete sand. Sands vary regionally. Screenings and stone dust can be unevenly graded and have an excess amount of material passing the No. 200 (75 m) sieve. Bedding sands with these characteristics should not be used. Contact paver contractors local to the project and confirm sand(s) successfully used in previous similar applications.

A. Bedding and joint sand shall be clean, non-plastic, free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Limestone screenings or stone dust that do not conform to the grading requirements in Table 1 shall not be used. When concrete pavers are subject to vehicular traffic, the sands shall be as hard as practically available.

Note: If the hardness of the bedding sand is not sufficient or questionable for the application (usually a heavily trafficked thoroughfare), contact the ICPI for information and specifications on assessing bedding sand durability under heavy traffic loads.

B. Grading of sand samples for the bedding course and joints shall be done according to ASTM C 136. The bedding sand shall conform to the grading requirements of ASTM C 33 as shown in Table 1.

Table 1
Grading Requirements for Bedding Sand - ASTM C 33

Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (600 mm)	25 to 60
No. 50 (300 mm)	10 to 30
No. 100 (150 mm)	2 to 10

Note: Bedding sand may be used for joint sand. However, extra effort in sweeping and compacting the pavers may be required in order to completely fill the joints. If joint sand other than bedding sand is used, the gradations shown in Table 2 are recommended. Joint sand should never be used for bedding sand.

C. The joint sand shall conform to the grading requirements of ASTM C 144 as shown in Table 2 below:

Table 2
Grading for Joint Sand - ASTM C 144

Sieve Size	Natural Sand Percent Passing	Manufactured Sand Percent Passing
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (600 m)	40 to 75	40 to 100
No. 50 (300 mm)	10 to 35	20 to 40
No. 100 (150 mm)	2 to 15	10 to 25
No. 200 (75 mm)	0	0 to 10

PART 3 EXECUTION

3.01 EXAMINATION

Note: For installation on a compacted aggregate base and soil subgrade, the specifier should be aware that the top surface of the pavers may be 1/8 to 1/4 in. (3 to 6 mm) above the final elevations after compaction. This difference in initial and final elevation is to compensate for possible minor settling.

A. Verify that subgrade preparation, compacted density and elevations conform to the specifications.

Note: Compaction of the soil subgrade 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 continual vehicular traffic. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils. The Architect/Engineer should inspect subgrade preparation, elevations, and conduct density tests for conformance to specifications.

B. Verify that geotextiles, if applicable, have been placed according to specifications.

C. Verify that aggregate base materials, thickness, compaction, surface tolerances, and elevations conform to the specifications.

Note: Local aggregate base materials typical to those used for flexible pavements are recommended, or those conforming to ASTM D 2940. Compaction to not less than 95% Proctor Density in accordance with ASTM D 698 is recommended for pedestrian areas. Compaction to not less than 98% Modified Proctor Density according to ASTM D 1557 is recommended for vehicular areas. The aggregate base should be spread and compacted in uniform layers not exceeding 6 in. (150 mm) thickness. Recommended base surface tolerance should be plus or minus 3/8 in. (10 mm) over a 10 ft. (3 m) straight edge. The Architect/Engineer should inspect geotextile materials and placement (if applicable), base preparation, surface tolerances, elevations, and conduct density tests for conformance to specifications.

Note: Mechanical tampers are recommended for compaction of soil subgrade and aggregate base around lamp standards, utility structures, building edges, curbs, tree wells and other protrusions. In areas not accessible to roller compaction equipment, compact to specified density with mechanical tampers.

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- D. Verify location, type, installation and elevations of edge restraints around the perimeter area to be paved.
- E. Verify that base is dry, uniform, even, and ready to support sand, pavers, and imposed loads.
- F. Beginning of bedding sand and paver installation means acceptance of base and edge restraints.

3.02 INSTALLATION

- A. Spread the sand evenly over the base course and screed to a nominal 1 in. (25 mm) thickness, not exceeding 1 1/2 in. (40 mm) thickness. The screeded 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.
- B. Ensure that pavers are free of foreign material before installation.
- C. Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines.
- D. Joints between the pavers on average shall be between 1/16 in. and 3/16 in. (2 mm to 5 mm) wide.

Note: Some paver shapes require a larger joint. Consult manufacturer for recommended joint widths.

- E. Fill gaps at the edges of the paved area with cut pavers or edge units.

Note: Units cut no smaller than one-third of a whole paver are recommended along edged subject to vehicular traffic.

- F. Cut pavers to be placed along the edge with a double blade paver splitter or masonry saw.
 - G. Use a low amplitude, high frequency plate vibrator to vibrate the pavers into the sand. Use Table 3 below to select size of compaction equipment.
- Table 3 - Minimum Centrifugal Compaction Force

Paver Thickness	Compaction Force
60 mm	3000 lbs. (13 kN)
80 mm	5000 lbs. (22 kN)

- H. Vibrate the pavers, sweeping dry joints sand into the joints and vibrating until they are full. This will require at least two or three passes with the vibrator. Do not vibrate within 3 ft. of the unrestrained edges of the paving units.
- I. All work to within 3 ft. of the laying face must be left fully compacted with sand-filled joints at the completion of each day.
- J. Sweep off excess sand when the job is complete.
- K. The final surface elevations shall not deviate more than 3.8 in. under a 10 ft. long straightedge.
- 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.

3.03 FIELD QUALITY CONTROL

- A. After removal of excess sand, check final elevations for conformance to the drawings.

END OF SECTION

MANUFACTURER QUALIFICATIONS

As manufactured by Nitterhouse Masonry Products, LLC
859 Cleveland Ave. Chambersburg, PA 17201
Phone: 717-267-4500
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