



Designation: C1319 – 23

Standard Specification for Concrete Grid Paving Units¹

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1. Scope*

1.1 This specification covers the requirements for concrete grid paving units for vehicular trafficways, parking areas, soil stabilization, and revetments.

NOTE 1—When particular features are desired, such as weight classification, higher compressive strength, surface texture, finish, color, or other special features, such properties should be specified separately by the purchaser. However, local sellers should be consulted as to availability of units having the desired features.

1.2 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- C33/C33M Specification for Concrete Aggregates
- C140/C140M Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
- C150/C150M Specification for Portland Cement
- C331/C331M Specification for Lightweight Aggregates for Concrete Masonry Units
- C595/C595M Specification for Blended Hydraulic Cements

¹ This specification is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.03 on Concrete Masonry Units and Related Units.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- C618 Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- C979/C979M Specification for Pigments for Integrally Colored Concrete
- C989/C989M Specification for Slag Cement for Use in Concrete and Mortars
- C1157/C1157M Performance Specification for Hydraulic Cement
- C1232 Terminology for Masonry
- C1240 Specification for Silica Fume Used in Cementitious Mixtures

3. Terminology

3.1 Terminology defined in Terminology C1232 shall apply for this specification.

4. Materials

4.1 *Cementitious Materials*—Materials shall conform to the following applicable specifications:

- 4.1.1 *Portland Cement*—Specification C150/C150M.
- 4.1.2 *Modified Portland Cement*—Portland cement conforming to Specification C150/C150M, modified as follows:
 - (1) *Limestone*—If calcium carbonate is added to the cement, the CaCO₃ content shall not be less than 85 %.
 - (2) *Limitation on Insoluble Residue*—1.5 %.
 - (3) *Limitation on Air Content of Mortar*—Volume percent, 22 % max.
 - (4) *Limitation on Loss on Ignition*—7 %.
- 4.1.3 *Blended Hydraulic Cements*—Specification C595/C595M.
- 4.1.4 *Hydraulic Cement*—Specification C1157/C1157M.
- 4.1.5 *Pozzolans*—Specification C618.
- 4.1.6 *Slag Cements*—Specification C989/C989M.
- 4.1.7 *Silica Fume*—Specification C1240.

4.2 *Aggregates*—Aggregates shall conform to the following specifications, except for the grading requirements:

- 4.2.1 *Normal Weight Aggregates*—Specification C33/C33M.
- 4.2.2 *Lightweight Aggregates*—Specification C331/C331M.

NOTE 2—The grading requirements of Specifications C33/C33M and C331/C331M may not be suitable for concrete grid paving unit production. Because of this, producers are allowed to modify grading to meet their needs and the requirements of this specification.

*A Summary of Changes section appears at the end of this standard

TABLE 1 Physical Requirements

Compressive Strength Net Area, min. psi (MPa)		Water Absorption, max lb/ft ³ (kg/m ³)		Percent Solid		Web Width in. (mm)	
Average of 3 units	Individual	Average of 3 units	Individual	Minimum	Maximum	Minimum ^A	Average ^B
5000 (35)	4500 (31)	10 (160)	12 (192)	45	75	1.00 (25)	1.25 (32)

^AMeasured at the thinnest point.

^BAverage of measurements along the height of the web.

4.3 Pigments for Integrally Colored Concrete— Specification C979/C979M.

4.4 *Other Constituents*—Air-entraining agents, integral water repellents, and other constituents, shall be previously established as suitable for use in concrete grid paving units and shall conform to applicable ASTM standards, or they shall be shown by test or experience satisfactory to the specifier and not to be detrimental to the durability of the concrete grid paving unit or any material customarily used in grid paving construction.

5. Physical Requirements

5.1 Units shall have maximum length and width dimensions of 24 in. by 24 in. (610 mm by 610 mm).

5.2 Units shall have a minimum specified thickness of 3 1/8 in. (80 mm).

5.3 At the time of delivery to the work site, the units shall conform to the physical requirements prescribed in Table 1.

5.4 *Durability*—Durability shall be demonstrated by proven field performance satisfactory to the specifier that the grid paver units have adequate durability for the intended use.

5.4.1 *Proven Field Performance*—Satisfactory field performance is demonstrated when units similar in composition and made with the same manufacturing process as those to be supplied to the purchaser, maintain the physical requirements specified in Table 1 after three years of use. The units used as the basis for proven field performance shall have been exposed to the same general type of environment, temperature range, and traffic volume as is expected for the units supplied to the purchaser.

6. Permissible Variations in Dimensions

6.1 Length or width of units shall not differ by more than ± 1/8 in. (±3.2 mm) from specified dimensions. Heights of units shall not differ by more than ± 1/8 in. (±3.2 mm) from the specified dimensions. Tests shall be performed as required in 7.2.

7. Sampling and Testing

7.1 The purchaser or his authorized representative shall be accorded proper facilities to inspect and sample the units at the place of manufacture from lots ready for delivery.

7.2 Compressive strength, absorption, density, and dimensional tolerances shall be based on tests of concrete grid paving units of any configuration or dimensions made with the same materials, concrete mix design, manufacturing process, and curing method, conducted in accordance with Test Methods C140/C140M, Annex A5, and within 12 months of production of the units.

8. Visual Inspection

8.1 Units shall be free of defects that interfere with the proper placing of the unit or impair the strength or permanence of the construction.

9. Compliance

9.1 If a sample fails to conform to the specified requirements, the manufacturer shall be permitted to remove units from the shipment. A new sample shall be selected by the purchaser from remaining units from the shipment with a similar configuration and dimension and tested at the expense of the manufacturer. If the second sample meets the specified requirements, the remaining portion of the shipment represented by the sample meets the specified requirements. If the second sample fails to meet the specified requirements, the remaining portion of the shipment represented by the sample fails to meet the specified requirements.

NOTE 3—Unless otherwise specified in the purchase order, the costs of tests is typically borne as follows: (1) if the results of the tests show that the units do not conform to the requirements of this specification the cost is typically borne by the seller; (2) if the results of the tests show that the units conform to the specification requirements, the cost is typically borne by the purchaser.

10. Keywords

10.1 concrete grid paving units; revetments; soil stabilization; vehicular trafficways