



Designation: C1634 – 23

Standard Specification for Concrete Facing Brick and Other Concrete Masonry Facing Units¹

This standard is issued under the fixed designation C1634; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification covers solid, dry-cast, concrete facing brick and other solid concrete masonry facing units intended for interior and exterior use in constructing structural and facing masonry components and are made from portland cement, water, and suitable mineral aggregates with or without the inclusion of other materials.

NOTE 1—Specification C55 addresses concrete building brick used in non-facing, utilitarian applications (previously referred to in earlier editions of Specification C55 as Grade S—for general use where moderate strength and resistance to frost action and moisture penetration are required). This specification differs from Specification C55 in that it includes expanded consideration for properties of concrete units used in facing applications and other exposures (previously referred to in earlier editions of Specification C55 as Grade N—for use as architectural veneer and facing units in exterior walls and for use where high strength and resistance to moisture penetration and severe frost action are desired).

1.2 The text of this specification 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.

NOTE 2—Concrete facing brick and other solid concrete masonry facing units covered by this specification are made from lightweight or normal weight aggregates, or both.

NOTE 3—When particular features are desired, such as density classification, high compressive strength, surface textures for appearance or bond, finish, color, fire resistance, insulation, acoustical properties, or other special features, such properties should be specified separately by the purchaser. Suppliers should be consulted as to the availability of concrete facing brick and other concrete masonry facing units having the desired features.

1.4 *This international standard was developed in accordance with internationally recognized principles on standard-*

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.

Current edition approved Jan. 1, 2023. Published January 2023. Originally approved in 2006. Last previous edition approved in 2020 as C1634 – 20. DOI: 10.1520/C1634-23.

ization 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

C55 Specification for Concrete Building Brick

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

C426 Test Method for Linear Drying Shrinkage of Concrete Masonry Units

C595/C595M Specification for Blended Hydraulic Cements

C618 Specification for Coal Fly 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.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *concrete building brick, n*—a concrete masonry unit, with a maximum width of four (4) inches and of a weight that will typically permit it to be lifted and placed with one hand, that is manufactured for general use in non-facing, utilitarian applications.

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.

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

3.2.2 *concrete facing brick, n*—a concrete masonry unit, with a maximum width of four (4) inches and of a weight that will typically permit it to be lifted and placed with one hand, that is manufactured to be typically used in an application where one or more faces of the unit is intended to be exposed.

4. Materials and Manufacture

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 *Blast Furnace Slag Cement*—Specification C989/C989M.
- 4.1.7 *Silica Fume*—Specification C1240.

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

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

NOTE 4—The grading requirements of Specifications C33/C33M and C331/C331M may not be suitable for concrete masonry production. Because of this, producers are allowed to modify grading to meet their needs and the requirements of this specification.

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 facing brick and other concrete masonry facing units and shall conform to applicable ASTM standards or shall be shown by test or experience not to be detrimental to the durability of the concrete facing brick or other concrete masonry facing units or any material customarily used in masonry construction.

5. Physical Requirements

5.1 At the time of delivery to the purchaser, units shall conform to the physical requirements prescribed in Table 1.

Units shall be free of defects that significantly impair the strength or permanence of the construction.

5.1.1 When higher compressive strengths than those listed in Table 1 are specified, the tested average net area compressive strength of three units shall equal or exceed the specified compressive strength, and the following single unit strength requirements shall apply.

5.1.1.1 When the specified compressive strength is less than 5000 psi, no single unit net area compressive strength test result shall be less than the specified compressive strength minus 500 psi. Compressive strength shall be tested in accordance with 8.2.

5.1.1.2 When the specified compressive strength is 5000 psi or greater, no single unit net area compressive strength test result shall be less than 90 % of the specified compressive strength. Compressive strength shall be tested in accordance with 8.2.

5.2 At the time of delivery to the purchaser, the average total linear drying shrinkage of the three units tested shall not exceed 0.065 % when tested in accordance with 8.3.

NOTE 5—The purchaser is the public body or authority, association, corporation, partnership, or individual entering into a contract or agreement to purchase or install, or both, concrete facing brick and other concrete masonry facing units. The time of delivery to the purchaser is FOB plant when the purchaser or the purchaser’s agent transports the concrete facing brick and other concrete masonry facing units, or at the time unloaded at the worksite if the manufacturer or the manufacturer’s agent transports the concrete facing brick and other masonry facing units.

6. Dimensions and Permissible Variations

6.1 No overall dimension (width, height, and length) shall differ by more than ±1/8 in. (3.2 mm) from the specified standard dimensions.

NOTE 6—Standard dimensions of concrete facing brick and other concrete masonry facing units are the manufacturer’s designated dimensions. Nominal dimensions of modular size concrete facing brick and other concrete masonry facing units are equal to the standard dimensions plus the thickness of one mortar joint. Nominal dimensions of nonmodular size concrete facing brick and other concrete masonry facing units usually exceed the standard dimensions by 1/8 to 1/4 in. (3.2 to 6.4 mm).

6.1.1 For those units with faces altered for aesthetic purposes, overall dimensional tolerances apply only to those dimensions not affected by the altering.

NOTE 7—For such units, dimensions will vary. Consult with suppliers to determine achievable dimensional tolerances.

6.2 For cored concrete facing brick and other solid concrete masonry facing units, the net cross-sectional area in any plane parallel to the surface containing the cores shall be at least 75 % of the gross cross-sectional area measured in the same

TABLE 1 Strength, Absorption, and Density Classification Requirements^A

Density Classification	Oven-Dry Density of Concrete, lb/ft ³ (kg/m ³)	Maximum Water Absorption, lb/ft ³ (kg/m ³)		Minimum Net Area Compressive Strength, lb/in ² (MPa)	
		Average of 3 Units	Individual Units	Average of 3 Units	Individual Units
Lightweight	Less than 105 (1680)	15 (240)	17 (272)	3500 (24.1)	3000 (20.7)
Medium Weight	105 to less than 125 (1680–2000)	13 (208)	15 (240)	3500 (24.1)	3000 (20.7)
Normal Weight	125 (2000) or more	10 (160)	12 (192)	3500 (24.1)	3000 (20.7)

^ACompressive strength, absorption, and density determined in accordance with 8.2.

plane. No part of any hole shall be less than $\frac{3}{4}$ in. (19.1 mm) from any edge of the unit.

7. Finish and Appearance

7.1 Where units are to be used in exposed wall construction, the faces shall not show chips or cracks not otherwise permitted in 9.2.2 and 9.2.3 or other imperfections when viewed from a distance of not less than 20 ft (6.1 m) under diffused lighting.

7.2 The color and texture shall be specified by the purchaser. The exposed faces shall conform to an approved sample consisting of not less than four units, representing the range of texture and range of color permitted.

NOTE 8—Concrete facing brick and other concrete masonry facing units are produced using a wide variety of natural aggregates and other materials. As such, slight variations inherent from natural materials should be expected. Since specifying units and approving samples can take place several months prior to production of actual units for a project, slight variations in appearance from the approved sample are to be expected.

8. Methods of Sampling and Testing

8.1 The purchaser or authorized representative shall be accorded proper facilities to inspect and sample the concrete facing brick and other concrete masonry facing units at the place of manufacture from the lots ready for delivery.

8.2 Compressive strength, absorption, density, and dimensional tolerances shall be based on tests of concrete facing brick and other concrete masonry facing 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 A2, and not more than 12 months prior to delivery.

8.3 Total linear drying shrinkage shall be based on tests of concrete facing brick and other concrete masonry facing units of any configuration or dimensions made with the same materials, concrete mix design, manufacturing process, and curing method, conducted in accordance with Test Method C426 and not more than 24 months prior to delivery.

9. Compliance

9.1 Minor cracks, incidental to the usual method of manufacture or minor chipping resulting from customary methods of handling in shipment and delivery, are not grounds for rejection.

9.2 *Non-conforming Units*—No more than 5 % of the units in the shipment shall exhibit any of the characteristics described in 9.2.1 through 9.2.5.

9.2.1 Units that do not comply with the requirements of Section 6 or 7.1.

9.2.2 Units with finished face(s) containing chips larger than $\frac{1}{2}$ in. (12.7 mm) in any direction, except for units specified to have particular features or finished such as split-face or tumbled units.

9.2.3 Unit with finished face(s) containing cracks wider than 0.02 in. (0.5 mm) and longer than 25 % of the nominal height of the unit.

9.2.4 Units with cracks or other defects that interfere with the proper placement of the unit.

9.2.5 Units that are broken.

9.3 After units are placed in usage, the manufacturer or manufacturer's agent are not responsible for non-conforming units defined in 9.2.

9.4 If a sample fails to conform to the specified physical 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 physical requirements, the remaining portion of the shipment represented by the sample meets the specified physical requirements. If the second sample fails to meet the specified physical requirements, the remaining portion of the shipment represented by the sample fails to meet the specified physical requirements.

NOTE 9—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 absorption; compressive strength; concrete brick; concrete building brick; concrete masonry facing brick; concrete masonry units; linear drying shrinkage; portland cement; solid concrete masonry facing units