



Designation: C744 – 21

Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units¹

This standard is issued under the fixed designation C744; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification covers prefaced concrete and calcium silicate masonry units with the finished face(s) covered at the point of manufacture with resin, resin and inert filler, or cement and inert filler to produce a smooth tile-like surface feature. This specification does not address, and therefore is not applicable to, ground-face concrete masonry units that are manufactured by grinding a thin layer off the surface of a concrete masonry unit to expose aggregates within and polishing to produce a smooth, architectural finish.

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.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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.*

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 Dec. 1, 2021. Published December 2021. Originally approved in 1973. Last previous edition approved in 2016 as C744 – 16. DOI: 10.1520/C0744-21.

2. Referenced Documents

2.1 *ASTM Standards:*²

C55 Specification for Concrete Building Brick

C73 Specification for Calcium Silicate Brick (Sand-Lime Brick)

C90 Specification for Loadbearing Concrete Masonry Units

C129 Specification for Nonloadbearing Concrete Masonry Units

C140/C140M Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

C501 Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser

C1232 Terminology for Masonry

C1634 Specification for Concrete Facing Brick and Other Concrete Masonry Facing Units

D822/D822M Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings

D2244 Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

D2486 Test Methods for Scrub Resistance of Wall Paints

E84 Test Method for Surface Burning Characteristics of Building Materials

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 *prefaced concrete masonry unit, n*—a concrete masonry unit where the finished face(s) are covered at the point of manufacture with either resin, resin and an inert filler, or cement and an inert filler to produce a smooth, tile-like surface feature.

3.2.1.1 *Discussion*—Some prefaced units may also be referred to as *glazed* concrete masonry units.

3.2.2 *prefaced calcium silicate masonry unit, n*—a calcium silicate masonry unit where the finished face(s) are covered at

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

the point of manufacture with either resin, resin and an inert filler, or cement and an inert filler to produce a smooth, tile-like surface feature.

3.2.2.1 *Discussion*—Some prefaced units may also be referred to as *glazed* calcium silicate masonry units.

4. Materials

4.1 Concrete masonry units on which prefaced surfaces are molded shall meet the requirements of:

4.1.1 Specification **C55** for Concrete Building Brick.

4.1.2 Specification **C90** for Loadbearing Concrete Masonry Units.

4.1.3 Specification **C129** for Nonloadbearing Units.

4.1.4 Specification **C1634** for Concrete Facing Brick and Other Concrete Masonry Facing Units.

4.2 Calcium silicate units on which prefaced surfaces are molded shall meet the requirements of Specification **C73** for Calcium Silicate Brick (Sand-Lime Brick).

NOTE 1—The purchaser of prefaced units should indicate the applicable specification and the type and grade of unit required. Where prefaced units are required for exterior use, the manufacturer should be consulted for material suitable for this purpose.

5. Facing Requirements

5.1 *Resistance to Cracking, Cracking, or Spalling*—There shall be no crazing, cracking, or spalling of the facing material when the unit is tested in accordance with **7.2**.

5.2 *Resistance to Chemicals*—The condition of the surface shall show no change after testing with each of the chemicals listed in **7.3**.

5.3 *Adhesion*—When viewed without magnification, there shall be no failure of the adhesion of the facing material to the unit subsequent to failure of the entire prefaced unit when tested in compression in accordance with **7.4**.

5.4 *Abrasion*—The wear index shall exceed 130 when tested in accordance with **7.5**.

5.5 *Surface Burning Characteristics*—When tested in accordance with **7.6**, the surfaces of the prefaced units shall have a flame spread classification not greater than 25 without evidence of continued progressive combustion and shall have a smoke density rating not greater than 50.

5.6 *Color, Tint, or Texture*—Color, tint, or texture shall be as specified. When tested in accordance with **7.7** and then compared with an unexposed unit, there shall be no change in texture, and color differences shall not exceed 5.0 Delta units.

5.7 *Soiling and Cleansability*—There shall not be a stain visible when specimens are tested in accordance with **7.8.1** and then viewed from a distance of 10 ft (3 m) under an illumination of not less than 50 fc (538.2 lm/m²) by an observer with normal vision. Spotting media shall be observed to be completely removed from specimens when tested in accordance with **7.8.2** and **7.8.3** and then viewed from a distance of 10 ft (3 m) under an illumination of not less than 50 fc (538.2 lm/m²) by an observer with normal vision.

5.8 *Report*—Test reports shall show the results of tests required by **5.1** through **5.7**.

6. Dimensional Tolerances

6.1 *Face Dimension*—The total variation from specified dimensions in the finished face dimensions of the units shall not exceed $\pm 1/16$ in. (1.6 mm) from specified dimensions.

6.2 *Distortion*—The distortion of the plane and edges of the face of individual units from the corresponding plane surface and edges of the unit shall not exceed $1/16$ in. (1.6 mm).

7. Sampling and Testing

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

7.2 *Crazing*—Resistance to crazing of prefaced units shall be determined by oven drying from a saturated condition in accordance with the absorption testing procedure of Test Methods **C140/C140M**, allowing the specimen to cool to room temperature, and resaturating.

7.3 *Resistance to Chemicals*—Apply a convenient quantity of the chemicals, as shown in **Table 1**, one at a time on the facing material and leave covered with a watchglass for the duration of the test period. For volatile chemicals, place a saturated wad under the watchglass and keep saturated. Upon completion of the test period, wipe the test area clean with a clean cloth. The condition of the test area shall show no change after testing with each chemical for the specified time prescribed in **Table 1**.

7.4 *Adhesion of Facing*—Test three prefaced units for compressive strength in accordance with Test Methods **C140/C140M**. Apply the compressive load until failure of the entire unit occurs. Subsequent to failure of the entire unit, view without magnification the interface between the unit and the facing material and note any adhesion failures.

7.5 *Abrasion*—Determine the wear index in accordance with Test Method **C501** using a Taber Abraser with Taber CS-17 abrasive wheels and 1000-g load for 500 wear cycles. Load references are per abramer arm (not combined) and include the mass of the arm.

7.6 *Surface Burning*—Determine flame spread and smoke ratings in accordance with Test Method **E84**.

7.7 *Color Change*—Determine color difference using CIE L*, a*, b*, or CIELAB (1976) with two-degree observer, illuminant C, and specular excluded in accordance with Test Method **D2244**. Take measurements before and after 500 h of

TABLE 1 Resistance to Chemicals

Chemical	Duration of Test, h
Acetic acid (CH ₃ COOH) (5 %)	24
Hydrochloric acid (HCl) (10 %)	3
Potassium hydroxide (KOH) (10 %)	3
Trisodium phosphate (Na ₃ PO ₄) (5 %)	24
Hydrogen peroxide (H ₂ O ₂) (3 %)	24
Household detergent (10 %)	24
Vegetable oil	24
Blue-black ink	1
Ethyl alcohol, industrial denatured (95 %)	3

accelerated weathering using the single-arc apparatus in accordance with Practice **D822/D822M**. Use test panels not less than 3 in. (76.2 mm) wide by 6 in. (152.4 mm) long. Test panels need not be conditioned.

7.8 Soiling and Cleansability:

7.8.1 *Staining Media*—Pour a stain consisting of 0.5 g of oil-soluble dye (C.I. Solvent Orange 7, C.I. 12140), 1.0 g of lanolin, and 5.0 g of SAE 10 oil one at a time on an area approximately ½ in. (12.7 mm) in diameter on the preface side of units. Allow the stain to remain on the specimens for a period of 4 days. Clean the specimen for 80 cycles in accordance with Test Method **D2486** using an industrial-grade cleaning agent. Examine the cleaned surface for the following degrees of intensity (see **5.7**):

7.8.1.1 Stain completely removed.

7.8.1.2 Trace.

7.8.1.3 Evident.

7.8.1.4 Pronounced.

7.8.1.5 Very pronounced.

7.8.2 *Spotting Media*—Apply each of the following stains on each specimen:

7.8.2.1 *Writing Pencil, No. 2*—Apply the pencil soil by wedging it in a glass tube that fits snugly but floats freely in a wooden block. Apply the soil by placing a 500-g weight on top of the pencil in such a manner that the soil is uniform in width and thickness.

7.8.2.2 *Magic Marker*—Apply the Magic-Marker soil by wedging it in a glass tube that fits snugly but floats freely in a wooden block. Apply the soil by placing a 500-g weight on top of the Magic Marker in such a manner that the soil is uniform in width and thickness.

7.8.2.3 *Lanolin*—Smear the lanolin on the surface using an artist's or similar brush.

7.8.2.4 *Carbon Paper*—Apply the carbon paper soil by placing a 500-g weight on 1 in.² (645.2 mm²) of paper and drawing the weighted paper across the surface in a single stroke.

7.8.3 Clean the stained areas as specified in **7.8.1** except as follows:

7.8.3.1 Use 100 % isopropyl alcohol to clean the Magic-Marker medium; clean spotting of writing pencil medium for 10 cycles; clean spotting of Magic-Marker medium for 150 cycles; clean spotting of lanolin and of carbon paper media for 60 cycles.

8. Inspection

8.1 All prefaced units shall be sound and free of cracks or other defects that interfere with the proper placing of the units or impair the strength or permanence of the construction.

8.2 *Surface*—The coated surface shall be free of chips, crazes, cracks, blisters, crawling, holes, and other imperfections detracting from the appearance of the units when viewed from a distance of 5 ft (1.5 m) perpendicular to the coated surface and using daylight without direct sunlight.

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 2—Unless otherwise specified in the purchase order, the cost 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 calcium silicate masonry units; concrete masonry units; masonry units; prefaced units

SUMMARY OF CHANGES

Committee C15 has identified the location of selected changes to this standard since the last issue (C744 – 16) that may impact the use of this standard. (December 1, 2021)

(1) Added safety statement to 1.4.

(2) Added 4.1.4 to include C1634 to the list of allowable concrete masonry units that prefaced surfaces can be applied.

(3) Revised Section 7.5 to remove specific model of Taber Abraser and clarify that the applied load is 'per arm' of the apparatus.

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; <http://www.copyright.com/>