



Designation: C426 – 22

# Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units<sup>1</sup>

This standard is issued under the fixed designation C426; 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 ( $\epsilon$ ) 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 test method covers a routine standardized procedure for determining the linear drying shrinkage of concrete masonry units or related concrete units under specified accelerated drying conditions.

1.2 The text of this test method references notes and footnotes that 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.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

**C490 Practice for Use of Apparatus for the Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete**

**C1093 Practice for Accreditation of Testing Agencies for Masonry**

<sup>1</sup> This test method 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

**C1232 Terminology for Masonry**

2.2 *ANSI Standard:*

**B94.11M—1993 Twist Drills**<sup>3</sup>

## 3. Terminology

3.1 Terminology defined in Terminology C1232 shall apply for this test method.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *linear drying shrinkage, n*—in this test method, the change in linear dimension of the test specimen due to drying from a saturated condition to an equilibrium weight and length under specified accelerated drying conditions.

## 4. Significance and Use

4.1 This test method is intended to evaluate the drying shrinkage characteristics of a given unit. The results of this laboratory method are considered in determining concrete masonry crack control provisions.

NOTE 1—The testing laboratory performing this test method should be evaluated in accordance with Practice C1093.

## 5. Apparatus

5.1 *Strain Gauge*—The instruments for measuring linear drying shrinkage shall be so designed as to permit or provide the conditions described in 5.1.1 through 5.1.5.

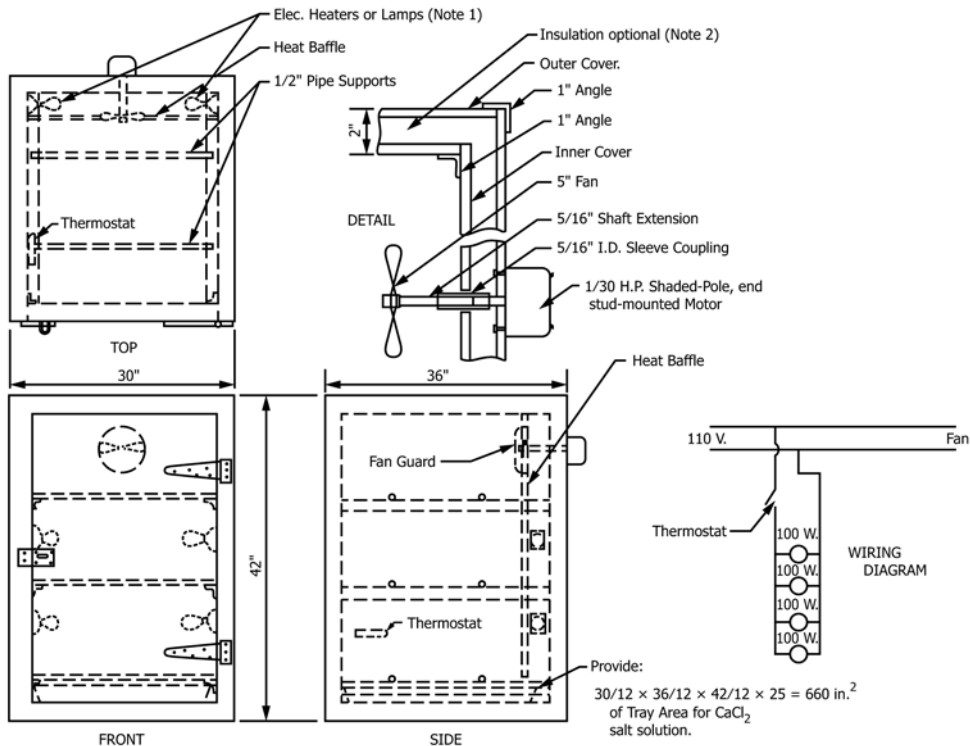
NOTE 2—Strain gauges may be obtained with various gauge lengths. The 10-in. (254-mm) gauge length is recommended for use with regular concrete masonry units, however, particular sizes of products may require other lengths. The length of the shrinkage specimen shall not be less than required for a minimum gauge length (distance between gauge plugs) of 6 in. (152.4 mm).

5.1.1 A means of positive contact with the specimen that will ensure reproducible measurements of length.

5.1.2 Means for precise measurement, consisting of a dial micrometer or other measuring device graduated to read in 0.0001-in. (0.0025-mm) units, and accurate within 0.0001 in. (0.0025 mm) in any 0.0010-in. (0.025-mm) range, and within 0.0002 in. (0.0050-mm) in any 0.0100-in. (0.254-mm) range.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

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



NOTE 1—Provide access to heaters.

NOTE 2—Insulating fill is recommended in cabinets having outer covers of sheet metal

NOTE 3—The following materials are required:

Quantity	Description
1	5-in. (127-mm) fan assembly, as shown
1	1/30-hp (25-W) shaded-pole, fan-cooled, stud-mounted electric motor
75 ft (22.9 m)	1-in. (25.4-mm) angle, steel or aluminum
60 ft <sup>2</sup> (5.6 m <sup>2</sup> )	Outer cover, 1/2-in. (12.7-mm) plywood or equivalent, faced with sheet metal or other material to provide a positive vapor barrier
60 ft <sup>2</sup> (5.6 m <sup>2</sup> )	Inner cover, 3/8-in. (9.5-mm) asbestos board or equivalent
1	Heat baffle, 25 by 34-in. (635 by 864-mm), sheet metal
16 ft (4.8 m)	1/2-in. iron pipe
4	100-W porcelain light fixtures
1	500-W thermostat
1	24 x 30 x 1 1/2-in. (610 x 762 x 38-mm) tray, borosilicate glass or equivalent
1 pr	8-in. (203-mm) hinges and hasp

FIG. 1 Drying Oven Suitable for Determining Drying Shrinkage of Concrete Block

5.1.3 Sufficient range to allow for small variations in the gauge lengths.

NOTE 3—If the shrinkage reference points are set carefully to position, a dial micrometer with a travel of 0.2 or 0.3 in. (5.1 or 7.6 mm) provides ample range in the instrument.

5.1.4 Means for checking the strain gauge at regular intervals against a standard reference bar. The standard reference bar shall be protected from air currents by placing it inside a wooden box which should be closed except when the strain gauge is being checked against it.

NOTE 4—A standard reference bar shall be furnished by the manufacturer of the instrument. A standard bar of ordinary steel is satisfactory, but corrections must be made for variations in its length due to temperature changes. When a more nearly constant datum is desired, Invar is preferable because of its low coefficient of thermal expansion.

5.1.5 Convenient and rapid measurement of specimens.

5.2 *Comparator*—When desirable to measure specimens end to end, a comparator conforming to the requirements of

Practice C490 may be used as an alternative to the strain gauge for measuring linear drying shrinkage.

5.3 *Gauge Plugs*—The gauge plugs shall be made from metal that is resistant to corrosion. Plugs for use with strain gauges shall be 3/8 to 1/2 in. (9.5 to 12.7 mm) in diameter and 1/2 ± 1/8 (12.7 ± 3.2 mm) in thickness. Plugs for use with the comparator shall consist of 1/4-in. (6.4-mm) diameter stainless steel gauge studs shown in Practice C490.

5.4 *Drying Oven*—The oven shall be reasonably airtight and provide the features described in 5.4.1 through 5.4.4.

NOTE 5—One suggested oven construction is shown in Fig. 1.

5.4.1 A minimum storage capacity of three whole test specimens and a clearance of 1 in. (25.4 mm) on all sides of each test specimen.

5.4.2 A constant, uniform temperature of 122 ± 2°F (50 ± 0.9°C) throughout the insulated cabinet attained by means of an electrical heat source (Note 6).