Designation: C531 – 00 (Reapproved 2012)

Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes[1]

This standard is issued under the fixed designation C531; 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 Department of Defense.

1. Scope

1.1 This test method covers the measurement of the linear shrinkage during setting and curing and the coefficient of thermal expansion of chemical-resistant mortars, grouts, monolithic surfacings, and polymer concretes.

1.2 A bar of square cross-section is cast to a prescribed length in a mold that holds measuring studs that are captured in the ends of the finished casting.

1.2.1 The change in length after curing is measured and used to calculate shrinkage.

NOTE 1—Shrinkage determinations should not be made on sulfur mortars, since this test method cannot truly reflect the overall linear shrinkage of a sulfur mortar.

1.2.2 The change in length at a specific elevated temperature is measured and used to calculate the coefficient of thermal expansion.

1.3 This test method is limited to materials with aggregate size of 0.25 in. (6 mm) or less.

1.4 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.

1.5 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C287 Specification for Chemical-Resistant Sulfur Mortar

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

C904 Terminology Relating to Chemical-Resistant Nonmetallic Materials

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, see Terminology C904.

4. Significance and Use

4.1 This test method offers a means of comparing the relative linear shrinkage and coefficient of thermal expansion.

4.1.1 The material to be tested is placed in the mold in a fluid or plastic state. As the material makes a transition to a solid state, it adheres to and captures the end studs.

4.1.2 The linear shrinkage measured is the change in length that occurs after the material is rigid enough and strong enough to move the studs.

4.2 This test method can be used for research purposes to provide information on linear changes taking place in the test materials. Other dimensional changes may occur that do not manifest themselves as changes in length.

5. Apparatus

5.1 *Weighing Equipment,* shall be capable of weighing materials or specimens to ±0.3 % accuracy.

[1] This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.46 on Industrial Protective Coatings.

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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.