



# Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory<sup>1</sup>

This standard is issued under the fixed designation C 940; 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.

## 1. Scope

1.1 This test method determines the amount of expansion and accumulation of bleed water at the surface of freshly mixed hydraulic-cement grout used in the production of preplaced-aggregate (PA) concrete.

1.2 It is for use with cement grout whether or not it includes fine aggregate or mineral admixtures or both.

1.3 The values stated in SI units are to be regarded as standard.

1.4 *This standard may involve hazardous materials, operations, and equipment. 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:

C 125 Terminology Relating to Concrete and Concrete Aggregates<sup>2</sup>

C 937 Specification for Grout Fluidifier for Preplaced-Aggregate Concrete<sup>2</sup>

## 3. Terminology

3.1 *Definition of Terms*—Terms used in this test method are defined in Terminology C 125 or in this section.

3.1.1 *expansion*—increase in the volume of a grout, expressed as a percentage of the original volume of the grout.

3.1.2 *bleeding*—This term is defined as stated in Terminology C 125, with the exception that it pertains to grout in this test method.

## 4. Summary of Test Method

4.1 Grout is placed in a graduated cylinder. Changes in total volume and accumulation of bleed water, if any, on the surface of the grout are observed over a period of time.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee C-9 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.41 on Concrete for Radiation Shielding.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.02.

## 5. Significance and Use

5.1 This method is useful for determining the expansion and bleeding characteristics of freshly mixed fluid grout used in PA concrete.

## 6. Interferences

6.1 Failure to obtain a uniformly smooth mixture, free of lumps, will cause excessive bleeding and may result in reduced expansion.

6.2 The capability of most admixtures to produce expansion and the tendency to bleed is related to the temperature of the grout during the period of test.

## 7. Apparatus

7.1 *Glass Graduate*, 1000 mL, reading to 10 mL.

7.2 *Glass Graduate*, 25 mL, reading to 1 mL.

7.3 *Thermometer*, accurate to 0.5°C (1°F) for measuring grout and air temperature.

## 8. Test Sample

8.1 The grout test sample shall consist of approximately 1500 mL and shall be representative of the grout in the mixer.

## 9. Procedure

9.1 When sampling and testing are being performed in the laboratory for the purpose of designing or comparing mixtures or for qualifying admixtures including grout fluidifiers proceed in the following manner:

9.1.1 Maintain the ambient temperature of the room in which the test is performed at  $23.0 \pm 2^\circ\text{C}$  ( $73.4 \pm 3^\circ\text{F}$ ), unless otherwise specified.

9.1.2 Bring the temperature of all dry materials and mixing water to a constant temperature of  $23.0 \pm 2^\circ\text{C}$  ( $73.4 \pm 3^\circ\text{F}$ ) before mixing, unless otherwise specified.

9.1.3 Start volume measurements within 3 min of completion of mixing.

9.2 When sampling and testing are being performed in the field, record the temperature of the grout sample and the ambient temperature of the area in which the test readings are made. Record the time interval between completion of mixing and start of test.

9.3 Immediately after the completion of mixing, measure the temperature of the grout. Then introduce the grout into a