



Designation: C1882/C1882M – 24

Standard Specification for Anti-washout Admixtures for Concrete¹

This standard is issued under the fixed designation C1882/C1882M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This specification covers the qualification of materials for use as anti-washout admixtures to be added to hydraulic-cement concrete mixtures for the purpose of minimizing washout of cement and other fine fractions of materials from concrete being placed underwater.

1.2 The results of the tests stipulated in this specification are to be used for the purpose of qualifying a material as an anti-washout admixture, and not for determination of dosage for specific applications.

1.3 This specification provides for three levels of testing.

1.3.1 *Level 1*—Initial proof of admixture compliance with the requirements of this specification (see 4.1).

1.3.2 *Level 2*—Limited retesting demonstrates continued conformity of the admixture with the requirements of the specification (see 4.2).

1.3.3 *Level 3*—If specified by the purchaser for acceptance of a lot, or for measuring uniformity within or between lots (see 4.3).

1.4 The text of this standard refers to 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.

1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined. Some values have only SI units because the inch-pound equivalents are not used in practice.

1.6 The following precautionary caveat pertains only to test method Sections 10-15 of this specification: *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. Warning—Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.²

1.7 *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*:³

C33/C33M Specification for Concrete Aggregates

C39/C39M Test Method for Compressive Strength of Cylindrical Concrete Specimens

C125 Terminology Relating to Concrete and Concrete Aggregates

C127/C127M Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate

C128/C128M Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate

C136/C136M Test Method for Sieve Analysis of Fine and Coarse Aggregates

C143/C143M Test Method for Slump of Hydraulic-Cement Concrete

C150/C150M Specification for Portland Cement

C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory

C231/C231M Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

C403/C403M Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance

C494/C494M Specification for Chemical Admixtures for Concrete

C595/C595M Specification for Blended Hydraulic Cements

E178 Practice for Dealing With Outlying Observations

¹ This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.23 on Chemical Admixtures.

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² See Section on Safety Precautions, *Manual of Aggregate and Concrete Testing*, Annual Book of ASTM Standards, Vol. 04.02

³ 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.



3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this specification, refer to Terminology [C125](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *anti-washout admixture, n*—an admixture that reduces the loss of fine material from fresh concrete when placed in water.

4. General Requirements

4.1 *Level 1*—During the initial approval stage, proof of compliance with the performance requirements defined in [Table 1](#) demonstrates that the admixture meets the requirements of this specification. This testing compares critical properties of concrete containing the anti-washout admixture, dosed at levels determined by the manufacturer to establish compliance with this specification, with the same properties of the reference concrete. Tests for uniformity and equivalence referenced in [Section 16](#), shall be made on the initial sample and the results retained for reference and comparison with the results of tests of samples taken from elsewhere within the lot or subsequent lots of admixture supplied for use in the work.

NOTE 1—If the reference concrete does not achieve at least 10 % washout, changes to the concrete mixture will be needed, such as changing the fine/total aggregate ratio, or using a slightly coarser sand.

4.2 *Level 2*—The purchaser is allowed to require limited retesting to confirm current compliance of the admixture to specification requirements. The limited retesting will cover physical properties and performance of the admixture.

4.2.1 Retesting of the physical properties shall consist of the uniformity and equivalence tests in [Section 16](#). The manufacturer shall state in writing that the infrared analysis spectrum, residue by oven drying, and relative density (specific gravity) of the admixture are within the limits in [Section 5](#) when compared to the initial sample tested under this specification.

4.2.2 The performance retesting shall consist of air content of fresh concrete and compressive strength at 7 and 28 days.

4.3 *Level 3*—If specified by the purchaser for acceptance of a lot or for measuring uniformity within or between lots, the uniformity and equivalence tests referenced in [Section 16](#) shall be used. At the request of the purchaser, the manufacturer shall state in writing that the infrared analysis spectrum, residue by oven drying, and relative density (specific gravity) of the admixture supplied are within the limits in [Section 5](#) when compared to the initial sample tested under this specification.

5. Uniformity and Equivalence Requirements

5.1 If specified by the purchaser, the uniformity of a lot, or the equivalence of different lots from the same source shall be established by complying with the requirements in Specification [C494/C494M](#).

6. Packaging and Marking

6.1 If the admixture is delivered in packages or containers, the proprietary name of the admixture and the net mass or volume shall be plainly marked thereon. Similar information shall be provided in the shipping form accompanying packaged or bulk shipments of admixtures.

7. Storage

7.1 The admixture shall be stored in such a manner as to permit easy access for inspection and identification of each shipment, and in an environment that will protect the admixture from dampness and freezing.

8. Sampling and Inspection

8.1 The purchaser shall be provided the opportunity for sampling and inspection. Samples shall be obtained and stored according to Specification [C494/C494M](#).

9. Rejection

9.1 For initial compliance testing, the purchaser has the right to reject the admixture if it fails to conform to the requirements of this specification.

9.2 For limited retesting, the purchaser has the right to reject the admixture if it fails to meet the uniformity and equivalence requirements in Specification [C494/C494M](#) and the strength and air content requirements in [Table 1](#).

9.3 An admixture stored at the point of manufacture for more than 6 months before shipment, or an admixture in local storage by the vendor for more than 6 months, after completion of initial testing tests, shall be tested for uniformity and equivalence if requested by the purchaser. The purchaser has the right to reject the admixture if it fails to conform to the uniformity and equivalence requirements.

TEST METHODS

NOTE 2—These tests are based on arbitrary stipulations which make possible standardized testing in the laboratory and are not intended to simulate actual job conditions. Refer to Specification [C494/C494M](#), Appendix X1 for a discussion of the required testing program and how test results are evaluated.

TABLE 1 Requirements for Concrete Mixtures

Property	Reference Concrete	Test Concrete
Washout (D_3)	At least 10 %	At least 50 % reduction of reference
Time of Setting	Record	Record
Compressive Strength, minimum percent of reference		
7 days	...	90
28 days	...	90
Air Content, maximum percentage points over reference	...	3.0

10. Materials

10.1 *Cement*—The cement in any series of tests shall comply with Specification **C150/C150M** Type I or II, or Specification **C595/C595M** Type IL. If the cement used results in an air content of the reference concrete greater than 3.5 %, select a different cement, so that the air content of the reference concrete will not exceed 3.5 %.

10.2 *Aggregates*—Fine and coarse aggregates used in any series of tests shall come from single lots that conform to the grading requirements of Specification **C33/C33M**, except that the aggregates shall conform to the requirements of **10.2.2** and **10.2.3**.

10.2.1 *Physical Properties*—Determine the relative density and absorption of the coarse aggregate in accordance with Test Method **C127/C127M** and of the fine aggregate in accordance with Test Method **C128/C128M**.

10.2.2 *Fine Aggregate Grading*—The fine aggregate shall be an uncrushed natural sand meeting the grading requirements in Specification **C33/C33M**.

10.2.3 *Coarse Aggregate Grading*—The coarse aggregate shall meet the requirements for size number 67 of Specification **C33/C33M**.

10.2.4 *Coarse Aggregate Preparation*—Prepare at least three sets of coarse aggregate in accordance with the procedure in Specification **C494/C494M**.

NOTE 3—A set refers to the quantity of aggregate required to make one batch of reference concrete, one batch of test concrete, and perform a sieve analysis. One or more spare sets may be needed in case any sets need to be discarded due to not being within desired grading tolerance, or concrete batches need to be discarded due to not meeting desired fresh concrete properties.

10.2.5 *Verification of Grading*—Test the coarse aggregate samples representing each set in accordance with Test Method **C136/C136M**. Discard any set for which the sample does not comply with size 67 requirements of Specification **C33/C33M**.

NOTE 4—The results required for demonstrating compliance under this specification are dependent on the uniformity of the aggregate quantities prepared and used.

10.3 *Preparation and Batching*—Prepare all material and make all mass determinations as prescribed in Practice **C192/C192M**.

11. Proportioning of Concrete Mixtures

11.1 *Proportions*—The reference concrete and test concrete shall be proportioned to conform to the requirements in **Table 2**. The reference concrete shall result in a washout of at least 10 % when tested in accordance with **14.6.4**.

11.2 *Mixture Categories*—Prepare concrete mixtures both with and without the admixture under test. The mixture without the anti-washout admixture is the reference concrete. The mixture with the anti-washout admixture is the test concrete. Add the admixture in the manner recommended by the manufacturer and in the amount necessary to comply with the requirements for anti-washout performance. If there is no recommended time of addition for the admixture, add the admixture with the first increment of mixing water added to the mixer.

NOTE 5—The time of addition of the admixture may affect washout and time of setting.

12. Mixing

12.1 Machine mix the concrete as prescribed in Practice **C192/C192M**.

13. Preparation of Test Specimens

13.1 Make at least three batches of the test concrete and at least three batches of the reference concrete. The volume of each batch shall be sufficient to produce one specimen for each type of test and test age. **Table 3** shows the tests and minimum number of test specimens required for the evaluation. On a given day, make at least one specimen for each test and test age from each concrete category. If desired, the preparation of all specimens can be completed in one, two, or three days of mixing, provided the same number of batches of test concrete and the reference concrete are made on the same day.

14. Test of Freshly Mixed Concrete and Specimen Preparation

14.1 Samples of freshly mixed concrete from at least three separate batches for each category of concrete shall be tested in accordance with the methods described in **14.2** through **14.6**.

14.2 *Slump*—Determine slump according to Test Method **C143/C143M**.

TABLE 2

Property or Characteristic	Reference Concrete	Test Concrete
Cement, kg/m ³ [lb/yd ³]	400 ± 15 [675 ± 25]	400 ± 15 [675 ± 25]
Water-cement ratio	0.40	0.40
Slump, mm [in.] ^A	165 ± 13 [6.5 ± 0.5]	190 ± 40 [7.5 ± 1.5]
Coarse aggregate size, Specification C33/C33M	Size 67	Size 67
Fine aggregate as percent of total aggregate, %	45 - 55	Same as Reference Mixture
Water reducing [Specification C494/C494M Type A, D, F or G] admixture ^B	As needed to achieve target slump	As needed to achieve target slump
Max. air content ^C	3.5 %	...

^AThe test concrete has a slightly higher slump target than the reference concrete to further increase the washout potential of the base mix, making it clearer that the reduction in washout of the test concrete is due to the admixture.

^BThe water reducing admixture selected for obtaining the required slump shall be the same for both reference and test concrete. The water reducing admixture shall not be formulated with a viscosity modifying component. Some anti-washout admixtures contain water reducing components that may have some effect on attempts to achieve target slumps.

^CAir content of the reference concrete needs to be low to ensure a sufficient amount of washout.