
Standard Method of Test for

Effect of Organic Impurities in Fine Aggregate on Strength of Mortar

AASHTO Designation: T 71-22¹

Technically Revised: 2022

Technical Subcommittee: 1c, Aggregates

ASTM Designation: C87/C87M-10



**American Association of State Highway and Transportation Officials
555 12th Street NW, Suite 1000
Washington, D.C. 20004**

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1. SCOPE

- 1.1. This test method covers the determination of the effect on mortar strength of the organic impurities in fine aggregate, whose presence is indicated by tests with T 21M/T 21. Comparison is made between compressive strengths of mortar made with washed and unwashed fine aggregate.
- 1.2. The values stated in SI units are to be regarded as the standard.
- 1.3. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user of this procedure to consult and establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to its use.*
- 1.4. *The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of R 18 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with R 18 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of R 18 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- M 6, Fine Aggregate for Hydraulic Cement Concrete
 - M 85, Portland Cement
 - M 152M/M 152, Flow Table for Use in Tests of Hydraulic Cement
 - M 231, Weighing Devices Used in the Testing of Materials
 - M 339M/M 339, Thermometers Used in the Testing of Construction Materials
 - R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
 - R 76, Reducing Samples of Aggregate to Testing Size
 - R 90, Sampling Aggregate Products
 - T 21M/T 21, Organic Impurities in Fine Aggregates for Concrete

- T 84, Specific Gravity and Absorption of Fine Aggregate
- T 106M/T 106, Compressive Strength of Hydraulic Cement Mortar (Using 50-mm or 2-in. Cube Specimens)
- T 162, Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency

2.2. *ASTM Standards:*

- C670, Standard Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials
- E1, Standard Specification for ASTM Liquid-in-Glass Thermometers
- E230/E230M, Standard Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples
- E2877, Standard Guide for Digital Contact Thermometers

2.3. *Federal Standard:*

- Fed. Std. No. 29, CFR 1910.1200 OSHA Hazard Communication Standard; see also Permissible Exposure Limits—Annotated Tables, available from <https://www.osha.gov/dsg/annotated-pels/>

2.4. *International Electrotechnical Commission Standard:*

- IEC 60584-1:2013, Thermocouples - Part 1: EMF Specifications and Tolerances

3. SIGNIFICANCE AND USE

- 3.1. This test method is of significance in making a final determination of the acceptability of fine aggregates with respect to the requirements of M 6 concerning organic impurities.
- 3.2. This test method is only applicable to those samples which, when tested in accordance with T 21M/T 21, have produced a supernatant liquid with a color darker than that of organic plate No. 3 or color solution.

4. BASIS FOR COMPARISON

- 4.1. The fine aggregate that produced a color darker than the standard in T 21M/T 21 shall be compared in mortar, as described in this test method, with a sample of the same aggregate that has been washed in a solution of sodium hydroxide followed by thorough rinsing in water. The washing shall be repeated a sufficient number of times until the supernatant liquid obtained in T 21M/T 21 has a color lighter than standard (Note 1).
- 4.2. Unless otherwise specified or permitted, strength comparisons shall be made at seven days in accordance with the following conditions:
- 4.2.1. Mix three batches of mortar with the aggregate washed in sodium hydroxide and three batches with the unwashed aggregate on the same day. All batches shall have the same quantity of fine aggregate. Mix the batches for the two conditions alternately.
- 4.2.2. Mold three 50-mm or 2-in. cubes from each batch.
- 4.2.3. Test the three cubes from each batch at the age specified.

Note 1—T 21M/T 21 describes a standard procedure and an alternative procedure for the determination of color value. In the standard procedure, there is a single reference standard color.