Standard Method of Test for

Air Content of Freshly Mixed Concrete by the Volumetric Method

AASHTO Designation: T 196M/T 196-11 (2019)

Technical Subcommittee: 3b, Fresh Concrete

Release: Group 1 (April)

ASTM Designation: C173/C173M-10

AASHTO

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1. SCOPE

1.1. This test method covers determination of the air content of freshly mixed concrete containing any type of aggregate, whether it be dense, cellular, or lightweight.

1.2. The values stated in either inch-pound or SI units shall be regarded separately as standard. The inch-pound units are shown in brackets. The values stated are not exact equivalents; therefore each system must be used independently of the other. Combining values from the two units may result in nonconformance.

1.3. *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*.

Warning—Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- R 60, Sampling Freshly Mixed Concrete
- T 19M/T 19, Bulk Density ("Unit Weight") and Voids in Aggregate
- T 23, Making and Curing Concrete Test Specimens in the Field
- T 119M/T 119, Slump of Hydraulic Cement Concrete
- T 121M/T 121, Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- T 152, Air Content of Freshly Mixed Concrete by the Pressure Method

2.2. *ASTM Standard*:

- C670, Standard Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

3. SIGNIFICANCE AND USE

3.1. This test covers the determination of the air content of freshly mixed concrete. It measures the air contained in the mortar fraction of the concrete but is not affected by air that may be present inside porous aggregate particles. Therefore, this is the appropriate test to determine the air content of concretes containing lightweight aggregates, air-cooled slag, and highly porous or vesicular natural aggregates.

3.2. This test method requires the addition of sufficient isopropyl alcohol, when the meter is initially being filled with water, so that after the first or subsequent rolling, little or no foam collects in the neck of the top section of the meter. If more foam is present than that equivalent to 2 percent air above the water level, the test is declared invalid and must be repeated using a larger quantity of alcohol. Addition of alcohol to dispel foam any time after the initial filling of the meter to the zero mark is not permitted.

3.3. The air content of hardened concrete may be either higher or lower than that determined by this test method. This depends on the methods and amounts of consolidation effort applied to the concrete from which the hardened concrete specimen is taken; uniformity and stability of the air bubbles in the fresh and hardened concrete; accuracy of the microscopic examination, if used; time of comparison; environmental exposure; stage in the delivery, placement, and consolidation processes at which the air content of the unhardened concrete is determined, that is, before or after the concrete goes through a pump; and other factors.

4. APPARATUS

4.1. *Air Meter*—An air meter consisting of a bowl and a top section (Figure 1) conforming to the following requirements:

4.1.1. The bowl and top sections shall be of sufficient thickness and rigidity to withstand rough field use. The material shall not be attacked by high pH cement paste, deform when stored at high temperatures in closed spaces, or become brittle or crack at low temperatures. A watertight seal must be obtained when the top section is attached to the bowl.