



Standard Test Method for Determination of Relative Density and Absorption of Fine, Coarse and Blended Aggregate Using Combined Vacuum Saturation and Rapid Submersion¹

This standard is issued under the fixed designation D7370/D7370M; 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.

1. Scope

1.1 This test method covers the determination of relative density and absorption of fine aggregates by Method A and coarse and blended aggregates by Method B.

1.2 A multi-laboratory precision and bias statement for coarse and combined aggregate tests in this standard has not been developed at this time. Therefore, this standard should not be used for acceptance or rejection of coarse and combined aggregate materials for purchasing purposes.

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

1.4 *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

C29/C29M Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate

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

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

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.51 on Aggregate Tests.

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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.

C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates

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

C702 Practice for Reducing Samples of Aggregate to Testing Size

D75 Practice for Sampling Aggregates

D4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing

D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Summary of Test Method

3.1 Sufficient aggregate sample is dried to constant mass. For each test two representative dry aggregate samples of the same material are selected for testing. One sample is evacuated in a vacuum chamber inside a plastic bag and opened under water for rapid saturation of the aggregate. The dry mass and submerged mass of the sample is used for calculation of apparent relative density. The second sample of the same aggregate is tested in a known volume metal pycnometer. The known mass of the pycnometer with water, mass of the dry aggregate and mass of the aggregate and pycnometer filled with water is used for calculation of unsaturated density. The results from the two samples tested are then used to calculate absorption, and relative density (OD).

3.2 This test can be completed in less than 30 min and can be used for rapid determination of aggregate properties in construction testing laboratories.

3.3 This test can be performed on fine, coarse and blended (combined) aggregates by using appropriate plastic bag and pycnometer sizes.

4. Significance and Use

4.1 Relative density (specific gravity) is the characteristic generally used for calculation of the volume occupied by the aggregate in various mixtures containing aggregate, including Portland cement concrete, bituminous concrete, and other