



Designation: D 4373 – 9602

Standard Test Method for Rapid Determination of Calcium Carbonate Carbonate Content of Soils¹

This standard is issued under the fixed designation D 4373; 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 This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.13 on Marine Geotechnics. Current edition approved Oct. 10, 1996; 2002. Published June 1997; November 2002. Originally published as D 4373 – 84. Last previous edition D 4373 – 84 (1990)ε ² D 4373 – 96.

1. Scope *

1.1 This test method covers the quantitative determination of the calcium carbonate (CaCO_3) content of soils and soft rock which can be readily broken down by mechanical effort. It is a gasometric method that utilizes a simple portable apparatus. The test method is quickly performed. Results should be clearly stated as the calcite equivalent in percent because different carbonate species cover a wide range of percent calcite equivalent as shown below for soils containing calcium carbonate.

NOTE 1—The presence a number of carbonates:

Species	Cation	Calcite Equivalent, %
Magnesite	Mg	117.0
Dolomite	Ca, Mg	108.6
Calcite	Ca	100.0
Aragonite	Ca	100.0
Rhodocrosite	Mn	87.1
Siderite	Fe	86.4
Smithsonite	Zn	79.8
Witherite	Ba	50.7
Cerussite	Pb	37.5

For example, a 100 % dolomite $\text{CaMg}(\text{CO}_3)_2$ would be expected to yield 108.6 % calcite equivalent while 100 % siderite would yield only 86.4 % calcite equivalent. Calcite and reducing minerals such as sulfide and sulfate in the soil aragonite reactions will interfere with the determination of the amount of CaCO_3 present. Therefore, this test typically complete within about 10 min. This method is an approximate method that determines does not distinguish between the calcium carbonate species and such determination must be made using quantitative chemical analysis methods such as atomic absorption.

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

1.3 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D 6026.

1.4 The method used to specify how data are collected, calculated, or recorded in this standard is not directly related to the accuracy to which the data can be applied in design or other uses, or both. How one applies the results obtained using this standard is beyond its scope.

1.5 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. For specific precaution statements, see Section 6. 8.

2. Referenced Documents

2.1 ASTM Standards:

C 25 Methods for Chemical Analysis of Limestone, Quicklime and Hydrated Lime²

D 653 Terminology Relating to Soil, Rock, and Contained Fluids³

² Reagent Chemicals, American Chemical Society Specifications, American Chemical Society, Washington, DC. For suggestions on the testing Annual Book of reagents not listed by the American Chemical Society, see *Analar ASTM Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD: Vol 04.01.

³ Dunn, D. A., "Revised Techniques for Quantitative Calcium Carbonate Analysis Using the "Karbanat-Bombe," and Comparisons to Other Quantitative Carbonate Analysis Methods," *Journal*

*A Summary of Changes section appears at the end of this standard.