



BSI Standards Publication

# Liming materials — Determination of the amount of residual finely ground carbonate in soils — Volumetric method

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

**National foreword**

This Published Document is the UK implementation of CEN/TS 16375:2013.

The UK participation in its preparation was entrusted to Technical Committee CII/37, Fertilisers and related chemicals.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013. Published by BSI Standards Limited 2013

ISBN 978 0 580 75378 7

ICS 65.080

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 January 2013.

**Amendments issued since publication**

Date	Text affected
------	---------------

---

TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

**CEN/TS 16375**

January 2013

---

ICS 65.080

English Version

**Liming materials - Determination of the amount of residual finely  
ground carbonate in soils - Volumetric method**

Amendements minéraux basiques - Détermination de la  
teneur en carbonate résiduel finement broyé dans les sols -  
Méthode volumétrique

Calcium-/Magnesium-Bodenverbesserungsmittel -  
Bestimmung der Menge feingemahlener  
Carbonatrückstände in Böden - Volumetrisches Verfahren

This Technical Specification (CEN/TS) was approved by CEN on 27 May 2012 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

Page

Foreword.....	3
1 Scope.....	4
2 Normative references.....	4
3 Principle.....	4
4 Reagents.....	4
5 Apparatus .....	4
6 Procedure .....	7
6.1 Preparation of the apparatus .....	7
6.2 Sample preparation.....	8
6.3 Measurement procedure.....	8
7 Method by controlled additions.....	9
7.1 General .....	9
7.2 Procedure .....	9
7.3 Calculation and expression of the results .....	9
8 Method by direct measurement.....	10
8.1 General .....	10
8.2 Choice of a pilot soil without carbonate .....	10
8.3 Calibration of the calcimeter.....	10
8.3.1 Procedure .....	10
8.3.2 Calculation and expression of the result .....	10
8.4 Measurement of an unknown sample .....	11
8.4.1 Procedure .....	11
8.4.2 Calculation and expression of the results .....	11
9 Precision.....	11
9.1 Inter-laboratory test .....	11
9.2 Repeatability.....	12
9.3 Reproducibility.....	12
10 Test report .....	13
Annex A (informative) Using spread sheet software to calculate linear regression .....	14
Bibliography.....	15

## **Foreword**

This document (CEN/TS 16375:2013) has been prepared by Technical Committee CEN/TC 260 “Fertilizers and liming materials”, the secretariat of which is held by DIN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This Technical Specification specifies a method for the determination of low contents (as < 5 g CaCO<sub>3</sub> per kilogram) of carbonate in soil samples. It applies to any type of carbonate liming material, such as limestone, chalk, and dolomite.

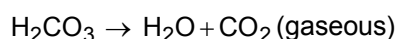
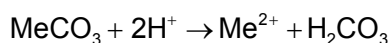
## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

## 3 Principle

Hydrochloric acid is added to a soil sample to decompose any carbonates present. The reaction in simplified form reads as follows (Me means metal):



The volume of the carbon dioxide produced is measured with a measuring burette, and is compared with the volume of gas produced by increasing amounts of calcium carbonate added to test portions. To avoid making corrections for differences in temperature and pressure, all determinations are carried out under the same conditions, with a very strict control of ambient conditions and determination timing, e.g. air-conditioned room and water bath, short time during which the variation of atmospheric pressure is supposed to be constant.

## 4 Reagents

Use only reagents of recognized analytical grade.

**4.1 Water**, with a specific electrical conductivity not higher than 0,2 mS/m at 25 °C (conforming to grade 2 of EN ISO 3696).

**4.2 Hydrochloric acid**,  $c(\text{HCl}) = 4 \text{ mol/l}$ .

Dilute 340 ml of 37 % hydrochloric acid in water (4.1) and then fill up to 1 000 ml with water (4.1).

**4.3 Sulfuric acid**, (H<sub>2</sub>SO<sub>4</sub>) solution 95 % to 97 %.

**4.4 Sodium sulfate**, (Na<sub>2</sub>SO<sub>4</sub>), powder, purity higher than 99 %.

**4.5 Internal liquid of the calcimeter**, 50 g/l of sodium sulfate (4.4) and 50 ml/l of sulfuric acid (4.3).

**4.6 Calcium carbonate**, (CaCO<sub>3</sub>), powder, purity higher than 99 %.

## 5 Apparatus

**5.1 Apparatus for the volumetric measurement of produced gas**, inspired of Bernard calcimeter according to Figure 1.

The apparatus is composed of a glass tube of 20 ml graduated every 0,02 ml. The total length shall not exceed 80 cm. Another non graduated glass tube with the same length and the same diameter is connected to the first glass tube with a transparent flexible pipe of about 1 m. A small volume of reserve of 50 ml can be inserted right at the inferior end of the graduated tube. The higher end of the graduated tube is connected by a standard flexible pipe to the Erlenmeyer flask (5.2) of attack.