



BSI Standards Publication

Method for the determination of C3A in the clinker from cement analysis

National foreword

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English Version

Method for the determination of C3A in the clinker from cement analysis

Verfahren für die Bestimmung des C3A-

Gehalts im Klinker aus der Zementanalyse

This Technical Report was approved by CEN on 12 May 2019. It has been drawn up by the Technical Committee CEN/TC 51.

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Contents

Page

European foreword	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Principle of the method	5
5 Expression of masses, volumes, factors and results	6
6 Ignitions	6
7 Determination of constant mass	6
8 Preparation of a test sample of cement	6
9 Reagents	7
9.2 EDTA - dihydrated disodium salt of ethylenediaminetetra-acetic acid	7
9.3 0,025M EDTA solution	7
9.11 Hydrochloric acid, dilute (1 + 1)	7
9.12 Hydrochloric acid, dilute (1 + 100)	8
9.14 Sulfo-5-salicylic acid dehydrate	8
9.15 Sulphosalicylic acid indicator:	8
9.17 Acetic buffer solution at pH 4,7-4,8	8
9.20 buffer solution, ammoniacal	8
9.22 Potassium hydroxide solution 4N,	8
9.23 Methylthymol blue complexone indicator	8
9.24 Methyl orange indicator	8
9.26 Methylthymol blue mix complexone indicator	8
9.28 Copper complexonate solution	8
9.30 Murexide indicator	9
9.33 Reagent for determination of carbon dioxide	9
10 Apparatus	9
10.3 Electric furnace or Bunsen burner for temperatures up to 950 °C	9
10.4 Electromagnetic stirrer	9
10.6 Vacuum filtration device	9
10.10 Platinum crucibles, 10 to 20 cm ³ capacity, with lids	9
10.11 Hot plate (or sand bath) capable of being set to temperatures up to 350°C	9
10.12 Sand bath set to a temperature of 105 ± 5°C (or bain-marie).	9
11 Determination of BCR residue on cement	12
11.1 Procedure	12
12 Decomposition of the test sample for CEM I and IV type cements	13
12.1 General	13
12.2 Precipitation of silica: treatment with perchloric acid in covered beaker	13
13 Decomposition of the BCR residue and precipitation of silica in the residue	14
14 Chemical analysis of the filtrate obtained from treatment of the test sample and of the filtrate obtained from treatment of the BCR residue	15
14.1 General	15
14.2 Determination of ironoxide (Fe ₂ O ₃)	15
14.3 Determination of aluminium oxide (Al ₂ O ₃)	15
15 Determination of Sulfur trioxide (SO₃)	16
16 Volumetric determination of carbon dioxide (CO₂) in the cement test sample	16
17 Chemical analysis by X-ray fluorescence	18
18 Calculation and expression of results	18

18.1	General	18
18.2	Calculation of the gypsum content	18
18.3	Calculation of the CaCO_3 content	18
18.4	Calculation of the pozzolana content	18
18.5	Calculation of the correction factor for cement types I	19
18.6	Calculation of the correction factor for cement types IV/A and IV/B	19
18.7	Calculation of the C_3A , C_4AF of clinker according to Bogue for cement types I:	19
18.8	Calculation of the C_3A , C_4AF of clinker according to Bogue for cement types IV/A and IV/B:	19
19	Repeatability and reproducibility	19
	Bibliography	21

European foreword

This document (CEN/TR 17365:2019) has been prepared by Technical Committee CEN/TC 51 “Cement and building limes”, the secretariat of which is held by NBN.

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1 Scope

This document describes the analytical procedures used to determine the content of C_3A in the clinker starting from a chemical analysis on cement. The method can be applied to CEM type I and IV for the determination of the requirement of C_3A , as defined on EN 197-1.

This document describes two methods, traditional wet and XRF analysis (EN 196-2), which can be considered to be equivalent, in the scope of this CEN/TR 17365, for the determination of Al_2O_3 , Fe_2O_3 and SO_3 .

The same methods are described in EN 196-2, but for the scope of this document, the X-ray fluorescence (XRF) is the preferred method to be used for the determination of Al_2O_3 , Fe_2O_3 and SO_3 .

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 196-2, *Method of testing cement — Part 2: Chemical analysis of cement*

EN 196-7, *Methods of testing cement — Part 7: Methods of taking and preparing samples of cement*

ISO 385, *Laboratory glassware — Burettes*

ISO 835, *Laboratory glassware — Graduated pipettes*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Principle of the method

The principle of the method is based on the calculation of the amounts of Al_2O_3 and Fe_2O_3 that may be occurring in the clinker by the chemical analysis of cement corrected for the oxide fraction resulting from materials other than clinker.

Once Al_2O_3 and Fe_2O_3 values are obtained, the amount of C_3A in the clinker is calculated according to Bogue.

The following assumptions should be made to determine the Al_2O_3 and Fe_2O_3 amounts in the clinker:

- a) Any sulfate occurring in the cement is ascribable to $CaSO_4 \cdot 2H_2O$; all determined CO_2 is $CaCO_3$. Moreover, the Al_2O_3 and Fe_2O_3 input from minor additional constituents and calcium sulfate is assumed to be zero.
- b) The residue from the base-complexing agent treatment (BCR) is constituted by pozzolanic materials only (natural pozzolana, siliceous fly ash and microsilica) and the dissolution is selective and complete.

Based on the above assumptions and on the calculated quantities of $CaSO_4 \cdot 2H_2O$ and $CaCO_3$, Al_2O_3 and Fe_2O_3 percentages in the clinker can be calculated by subtracting the oxide fraction in the cement and the BCR, corrected for the amount of gypsum and pozzolanic materials (see [Figure 1](#)).