

საქართველოს სტანდარტი

ცემენტი-ნაწილი 1: შემადგენლობა, სპეციფიკაციები და შესაბამისობის
კრიტერიუმები საერთო-სამშენებლო ცემენტისთვის

საქართველოს სტანდარტების და მეტროლოგიის
ეროვნული სააგენტო
თბილისი

სსტ ენ 197-1:2011/2013

საინფორმაციო მონაცემები

1 შემუშავებულია საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს სტანდარტების დეპარტამენტის მიერ

2 დამტკიცებულია და შემოღებულია სამოქმედოდ საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს 2013 წლის 11 ნოემბრის № 84 განკარგულებით

3 მიღებულია გარეკანის თარგმნის მეთოდით სტანდარტიზაციის ევროპული კომიტეტის სტანდარტი ენ 197-1:2011 „ცემენტი-ნაწილი 1: შემადგენლობა, სპეციფიკაციები და შესაბამისობის კრიტერიუმები საერთო-სამშენებლო ცემენტისთვის”

4 პირველად

5 რეგისტრირებულია საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს რეესტრში: 2013 წლის 11 ნოემბერი №268-1.3-5578

წინამდებარე სტანდარტის სრული ან ნაწილობრივი აღწარმოება, ტირაჟირება და გავრცელება საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს ნებართვის გარეშე არ დაიშვება

English Version

Cement - Part 1: Composition, specifications and conformity criteria for common cements

Ciment - Partie 1 : Composition, spécifications et critères
des conformité des ciments courants

Zement - Teil 1: Zusammensetzung, Anforderungen und
Konformitätskriterien von Normalzement

This European Standard was approved by CEN on 6 August 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland 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.....	4
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions.....	8
4 Cement	9
5 Constituents	10
5.1 General.....	10
5.2 Main constituents	10
5.2.1 Portland cement clinker (K)	10
5.2.2 Granulated blast furnace slag (S)	11
5.2.3 Pozzolanic materials (P, Q).....	11
5.2.4 Fly ashes (V, W)	11
5.2.5 Burnt shale (T).....	12
5.2.6 Limestone (L, LL)	13
5.2.7 Silica fume (D).....	13
5.3 Minor additional constituents.....	13
5.4 Calcium sulfate	14
5.5 Additives	14
6 Composition and notation	14
6.1 Composition and notation of common cements	14
6.2 Composition and notation of sulfate resisting common cements (SR-Cements)	16
6.3 Composition and notation of low early strength common cements	17
7 Mechanical, physical, chemical and durability requirements	17
7.1 Mechanical requirements.....	17
7.1.1 Standard strength	17
7.1.2 Early strength.....	17
7.2 Physical requirements.....	18
7.2.1 Initial setting time	18
7.2.2 Soundness.....	18
7.2.3 Heat of hydration	18
7.3 Chemical requirements	18
7.4 Durability requirements.....	19
7.4.1 General.....	19
7.4.2 Sulfate resistance	19
8 Standard designation	20
9 Conformity criteria.....	22
9.1 General requirements.....	22
9.2 Conformity criteria for mechanical, physical and chemical properties and evaluation procedure	24
9.2.1 General.....	24
9.2.2 Statistical conformity criteria	24
9.2.3 Single result conformity criteria.....	27
9.3 Conformity criteria for cement composition.....	28
9.4 Conformity criteria for properties of the cement constituents	29

Annex A (informative) **List of common cements considered as sulfate resisting by National Standards in different CEN member countries but not included in Table 2 or not fulfilling the requirements given in Table 5** 30

Annex ZA (informative) **Clauses of this European standard addressing the provisions of the EU**

Construction Products Directive 31

ZA.1 Scope and relevant characteristics 31

ZA.2 Procedure for the attestation of conformity of products 33

ZA.2.1 System of attestation of conformity 33

ZA.2.2 EC certificate of conformity 34

ZA.3 CE marking and labelling 35

Bibliography 38

Foreword

This document (EN 197-1:2011) has been prepared by Technical Committee CEN/TC 51 "Cement and building limes", the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2012, and conflicting national standards shall be withdrawn at the latest by June 2013.

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.

This document supersedes EN 197-1:2000, EN 197-4:2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of EN 197-1.

Annexes A and ZA are informative.

In addition to consolidating EN 197-1:2000/A1:2004, EN 197-1:2000/prA2, EN 197-1:2000/A3:2007, EN 197-4:2004 and EN 197-4:2004/prA1 into a single standard, the principal changes from EN 197-1:2000 are the introduction of additional requirements for common cements with a low heat of hydration and common cements with sulfate resisting properties.

The preparation of a standard for cement was initiated by the European Economic Community (EEC) in 1969 and, at the request of a member state later in 1973, the work was given to the European Committee for Standardization (CEN). The Technical Committee CEN/TC 51 was entrusted with the task of preparing a cement standard for the countries of Western Europe, comprising the EEC and EFTA members.

In the early eighties, CEN/TC 51 decided to include in the standard for cement only those cements which are intended for use in plain and reinforced concrete and which are familiar in most countries in Western Europe because they have been produced and used in these countries for many years. The EU Construction Products Directive (89/106/EEC) requires the incorporation of all traditional and well-tried cements in order to remove technical barriers to trade in the construction field. There are currently no criteria for the descriptions "traditional" and "well tried" and it was considered necessary to separate the "common cements" from special cements, i.e. those with additional or special properties.

The requirements in this standard are based on the results of tests on cement in accordance with EN 196-1, EN 196-2, EN 196-3, EN 196-5, EN 196-6, EN 196-7, EN 196-8, and EN 196-9. The scheme for the evaluation of conformity of common cements including common cements with low heat of hydration and common cements generally accepted as being sulfate resisting are specified in EN 197-2.

In order to find out which common cements are generally accepted as being sulfate resisting and should be included in EN 197-1, there was an investigation within CEN/TC 51 comprising all national specifications and recommendations in the European Union. The review of these investigations led to the following results:

- a wide variety of cements has been classified in the EU Member States as sulfate resisting. This is due to the different geographical and climatic conditions under which sulfate attacks on mortar and concrete occur at the place of use and the traditionally different rules governing the production and use of sulfate resistant mortars and concretes;
- sulfate resistance is an additional property and therefore sulfate resisting cements have first to conform to the requirements of the standards which define the product, e.g. EN 197-1 for common cements;

- the additional requirements to be met by the nationally specified sulfate resisting cements refer to selected characteristics for which the required limit values are more stringent than those for common cements;
- having satisfied the local requirements for various cement types many countries apply further restrictions to the production of concrete to be used in a sulfate environment, such as minimum cement contents and/or maximum water/cement ratio that vary depending on the cement type and the type and intensity of the sulfate conditions.

Based on the above results common cement types to be harmonized at the European level have been chosen. The predominant part of the common cements considered to be sulfate resisting in the market is covered by this selection. It was not possible to take into account national particularities the use of which is laid down within national standards, national application rules and regulations/provisions.

The strength attained at 28 days is the important criterion in classifying cement for most uses. In order to achieve a specific strength class at 28 days the early strength, at 2 days or at 7 days, can vary and some types of cement may not attain the minimum early strengths specified in EN 197-1 for common cements.

The heat of hydration is linked to the early reactivity and lower early strengths indicate lower heat evolution and lower temperatures in concrete. For these cements additional precautions in use can be necessary to ensure adequate curing and safety in construction.

The purpose of this standard is to specify the composition requirements and conformity requirements for common cements, including common cements with low heat of hydration and common cements with adequate sulfate resistance as well as low early strength blast furnace cements and low early strength blast furnace cements with low heat of hydration.

Cement types and strength classes defined in this European Standard allow the specifier and/or the user to fulfil objectives of sustainability for cement based constructions. Cement types produced by using constituents listed and defined in Clause 5 allow the manufacturer to minimize the use of natural resources in accordance with local conditions of production.

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

Introduction

It is recognised that different cements have different properties and performance. Those performance tests now available (i.e. setting time, strength, soundness and heat of hydration), have been included in this standard. In addition, work is being carried out by CEN/TC 51 to identify any additional tests which are needed to specify further performance characteristics of cement. Until further performance tests are available it is necessary that the choice of cement, especially the type and/or strength class in relation to the requirements for durability depending on exposure class and type of construction in which it is incorporated, follows the appropriate standards and/or regulations for concrete or mortar valid in the place of use.