



**SLOVENSKI STANDARD**  
**oSIST prEN 197-6:2022**  
**01-september-2022**

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**Cement - 6. Del: Cement z recikliranim gradbenim materialom**

Cement - Part 6: Cement with recycled building materials

Zement - Teil 6: Zement mit rezyklierten Baustoffen

Ciment - Partie 6 : Ciment à base de matériaux de construction recyclés

**Ta slovenski standard je istoveten z: prEN 197-6**

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**ICS:**

91.100.10 Cement. Mavec. Apno. Malta Cement. Gypsum. Lime.  
Mortar

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## Cement - Part 6: Cement with recycled building materials

Ciment - Partie 6 : Ciment à base de matériaux de construction recyclés

Zement - Teil 6: Zement mit rezyklierten Baustoffen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 51.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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## European foreword

This document (prEN 197-6:2022) has been prepared by Technical Committee CEN/TC 51 “Cement and building lime”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

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## Introduction

Different cements have different properties and performance. The performance tests available at the time of publication of this document (i.e. for the determination of setting time, strength, soundness and heat of hydration) have been included in this document. 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, mortar, grout, etc. valid in the place of use.

The purpose of this document is to specify the requirements for cement with recycled building materials. The fitness of these cement types for the intended use to produce structural concrete (reinforced or not) has been experimentally assessed by testing programs, the results of which have been included in a dossier [1] approved by CEN/TC 51.

The cement types and strength classes defined in this document allow the specifier and/or the user to fulfil objectives of sustainability for cement-based constructions and of circular economy and to minimize the use of natural resources in accordance with local conditions of production.

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## 1 Scope

This document deals with cement with recycled building materials whose intended use is the preparation of concrete, mortar, grout, etc.

## 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 197-1:2011, *Cement - Part 1: Composition, specifications and conformity criteria for common cements*

EN 197-2:2020, *Cement - Part 2: Assessment and verification of constancy of performance*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 197-1:2011 apply.

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

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

## 4 Constituents and composition

### 4.1 General

Cement covered by this document contains recycled concrete fines and cement constituents covered by EN 197-1.

The requirements on constituents are specified in 4.2 and 4.3.

The composition of cement covered by this document is specified in Table 1.

### 4.2 Recycled concrete fines

Recycled concrete fines are specially selected and prepared mineral materials coming from plants producing recycled concrete aggregates and/or sands. Recycled concrete fines shall fulfil the following requirements:

- a) TOC content  $\leq 0,8$  % by mass;
- b) Sulfate content (as  $\text{SO}_3$ )  $\leq 2,0$  % by mass.

**prEN 197-6:2022 (E)****4.3 Cement constituents covered by EN 197-1**

The constituents of cement covered by this document, other than recycled concrete fines, shall fulfil the requirements specified in EN 197-1:2011, Clause 5.

However, the following requirement for limestone (L, LL) replacing 5.2.6 a) of EN 197-1:2011 shall apply:

The calcium carbonate ( $\text{CaCO}_3$ ) content calculated from the calcium oxide content shall be at least 40 % by mass and the sum of calcium carbonate and magnesium carbonate ( $\text{CaCO}_3$  and  $\text{MgCO}_3$ ) content calculated from the calcium oxide and magnesium oxide content respectively shall be at least 75 % by mass.

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**Table 1 — Cement with recycled building materials**

Main types	Notation of the products (types of cement)		Composition (percentage by mass) <sup>a</sup>												
			Main constituents										Minor additional constituents		
	Clinker	Recycled concrete fines	Blast-furnace slag	Silica fume	Pozzolana		Fly ash		Burnt shale	Limestone					
					natural	natural calcined	siliceous	calcareous		L <sup>c</sup>	LL <sup>c</sup>				
Type name	Type notation	K	F	S	D <sup>b</sup>	P	Q	V	W	T	L <sup>c</sup>	LL <sup>c</sup>			
CEM II	Portland-recycled-fines cement	CEM II/A-F	80-94	6-20	—	—	—	—	—	—	—	—	—	0-5	
	Portland-composite cement <sup>d</sup>	CEM II/A-M	80-88	6-14	←----- 6-14 ----->										0-5
		CEM II/B-M	65-79	6-20	←----- 6-29 ----->										0-5
		CEM II/C-M	50-64	6-20	←----- 16-44 ----->										0-5
<sup>a</sup> The values in the table refer to the sum of the main and minor additional constituents. <sup>b</sup> In case of the use of silica fume, the proportion of silica fume is limited to 6-10 % by mass. <sup>c</sup> In case of the use of limestone, the proportion of the sum of limestone and recycled concrete fines (sum of L, LL and F) is limited to 6-20 % by mass. <sup>d</sup> The number of main constituents other than clinker is limited to two and these main constituents shall be declared by designation of the cement (for examples, see Clause 6).															

## 5 Requirements

Cements covered by this document shall fulfil the requirements specified in EN 197-1:2011, 7.1, 7.2 and 7.4.1.

The requirements listed in EN 197-1:2011, Table 3 for low early strength, indicated by L, are applicable for cements covered by this document.

In addition, cement covered by this document shall conform to the requirements listed in Table 2.

**Table 2 — Additional requirements and Limit values for single results for cement with recycled building materials**

1	2	3	4	5
Property	Test reference	Strength class	Requirements given as characteristic values <sup>a</sup>	Limit values for single results <sup>a</sup>
Sulfate content (as SO <sub>3</sub> )	EN 196-2	all	≤ 4,0 <sup>b</sup>	≤ 4,5
Chloride content	EN 196-2	all	≤ 0,10	≤ 0,10
<sup>a</sup> Requirements are given as percentage by mass of the final cement. <sup>b</sup> Cement with a T content > 20 % may contain up to 4,5 % sulfate (as SO <sub>3</sub> ) for all strength classes.				

## 6 Standard designation

Cements covered by this document shall be designated by at least the notation of the cement type as specified in Table 1 and the figures 32,5, 42,5 or 52,5 indicating the strength class. In order to indicate the early strength class, the letter L, N or R shall be added as appropriate.

When in the same factory a manufacturer produces different cements complying with the same standard designation, these cements receive an additional identification in the form of a number or of two lower case letters, between brackets, in order to distinguish these cements from each other. For the numbering system, this number should be 1 for the second certified cement, 2 for the next, and so on. For the lettering system, the letters shall be chosen in such a way as to avoid confusion.

Low heat cement in accordance with EN 197-1:2011, 7.2.3 shall be additionally designated by the notation LH.

### EXAMPLE 1

Portland-recycled-fines cement CEM II/A-F containing in total a quantity of recycled concrete fines (F) of between 6 % and 20 % by mass and of strength class 52,5 with ordinary early strength is designated by:

**Portland-recycled-fines cement EN 197-6 – CEM II/A-F 52,5 N**

### EXAMPLE 2

Portland-composite cement CEM II/A-M containing in total a quantity of recycled concrete fines (F) of between 6 % and 14 % by mass and a quantity of limestone (LL) of between 6 % and 14 % by mass and of strength class 42,5 with high early strength is designated by:

**Portland-composite cement EN 197-6 – CEM II/A-M (F-LL) 42,5 R**