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## DRAFT TANZANIA STANDARD

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**Specification of Portland – Composite Cement CEM II/C - M and  
Composite Cement CEM VI.**

**TANZANIA BUREAU OF STANDARDS**

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The organizations marked with an asterisk (\*) in the above list, together with the following were directly represented on the Technical Committee entrusted with the preparation of this draft Tanzania Standard:

- Dar es salaam Institute of Technology (DIT)
- Tanzania National Roads Agency (TANROADS)
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## 0 National foreword

The Tanzania Bureau of Standards is the statutory national standards body for Tanzania, established under the Act.No.3 of 1975, amended by Act.No.2 of 2009.

This draft Tanzania Standard is being prepared by BCDC 4 Cement and building lime Technical Committee under the supervision of the Building and Construction Standards Divisional Committee (BCDC).

In the preparation of this Tanzania Standard, reference was made to **EN 197-5:2021 Cement – Part 5: Portland-composite cement CEM II/C-M and composite cement CEM VI.**

DRAFT STANDARD

## 1. Scope

This document deals with Portland-composite cement CEM II/C-M, not covered by EN 197-1, and a different type of Composite cement CEM VI, also not covered by EN 197-1, whose intended use is the preparation of concrete, mortar, grout etc.

This document does not cover:

- common cement covered by EN 197 – 1;
- very low heat special cement covered by EN 14216
- supersulfated cement covered by EN 15743;
- calcium aluminated cement covered by EN 14647;
- masonry cement covered by EN 413-1.

## 2. Normative references

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.

TZS 727-1:2018/EAS 18-1, 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.

TZS 760 -2:2018/EAS 148-2, Method of testing cement – Part 2: Chemical analysis of cement.

## 3. Terms and definitions

For the purposes of this document, the terms and definitions given in TZS 727-1:2018/EAS 18-1 apply.

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 <https://www.iso.org/obp>

## 4. Constituents and composition

Constituents of cement covered by this document shall fulfil the requirements specified in Clause 5 of TZS 727-1:2018/EAS 18-1.

However, the following requirement for limestone (L, LL) replacing 5.2.6 a) of TZS 727-1:2018/EAS 18-1 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 ( $\text{CaCO}_3$  and  $\text{MgCO}_3$ ) content calculated from the calcium oxide and magnesium oxide content respectively shall be at least 75% by mass. The composition of Portland-composite cement CEM II/C-M and Composite cement CEM VI covered by this document is specified in Table 1.

**Table 1 — Portland-composite cement CEM II/C-M and Composite cement CEM VI**

Main types	Notation of the products (types cement)		Composition (percentage by mass <sup>a</sup> )										Minor additional constituents
			Main constituents										
			Clinker	Blast – furnace slag	Silica fume	Pozzolana		Fly ash		Burnt shale	Limestone		
	Natural	Natural calcined				siliceous	calcareous						
	Type name	Type notation	K	S	D <sup>b</sup>	P	Q	V	W	T	L	LL	
CEM II	Portland-composite cement <sup>c</sup>	CEM II/C-M	50-64	<div>← 36-50 →</div>									0-5
CEM VI	Composite cement	CEM VI(S-P)	35-49	31-59	-	6-20	-	-	-	-	-	-	0-5
		CEM VI(S-V)	35-49	31-59	-	-	-	6-20	-	-	-	-	0-5
		CEM VI(S-L)	35-49	31-59	-	-	-	-	-	-	6-20	-	0-5
		CEM VI(S-LL)	35-49	31-59	-	-	-	-	-	-	-	6-20	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> 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 7.1, 7.2 and 7.4.1 of EN 197-1:2011.

The requirements listed in Table 3 of TZZ 727-1:2018/EAS 18-1 for low early strength, indicated by L, are applicable for CEM II/C-M and CEM VI cements

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

**Table 2- Additional requirements and limit values for single results for Portland composite cement CEM II/C-M and Composite cement CEM VI**

1	2	3	4	5
Property	Test reference	Strength class	Requirements given as characteristic	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 <sup>c</sup>	≤ 0.10 <sup>c</sup>
<sup>a</sup> Requirements are given as percentage by mass of the final cement.				
<sup>b</sup> Portland composite cement with a T content >20% may contain up to 4.5% sulfate (as SO <sub>3</sub> ) for all strength classes.				
<sup>c</sup> Composite cement CEM VI may contain more than 0.10% chloride by mass. If so, the value of 0.10% chloride by mass shall be replaced by the upper limit for the chloride content expressed as a percentage by mass with two decimal places and this upper limit shall be stated on the packaging and/or the delivery note.				

## 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 7.2.3 of TZZ 727-1:2018/EAS 18-1 shall be additionally designated by the notation LH.

### EXAMPLE 1

Portland-composite cement CEM II/C-M containing in total a quantity of silicious fly ash (V) of between 16 % and 44 % by mass and a quantity of limestone (LL) of between 6 % and 20 % by mass and of strength class 32.5 with high early strength and a low heat of hydration is designated by:

## **Portland-composite cement EN 197-5 – CEM II/C-M (V-LL) 32.5 R – LH**

### **EXAMPLE 2**

Portland-composite cement CEM II/C-M containing in total a quantity of granulated blast furnace slag (S) of between 6 % and 44 % by mass and a quantity of silicious fly ash (V) of between 6 % and 44 % by mass and of strength class 42,5 with ordinary early strength and a low heat of hydration is designated by:

## **Portland-composite cement EN 197-5 – CEM II/C-M (S-V) 42.5 N – LH**

### **EXAMPLE 3**

Composite cement CEM VI containing in total a quantity of granulated blast furnace slag (S) of between 31 % and 59 % by mass and limestone (L) of between 6 % and 20 % by mass and of strength class 32,5 with high early strength is designated by:

## **Composite cement EN 197-5 – CEM VI (S-L) 32.5 R**

### **EXAMPLE 4**

Composite cement CEM VI containing in total a quantity of granulated blast furnace slag (S) of between 31 % and 59 % by mass and natural pozzolana (P) of between 6 % and 20 % by mass and of strength class 42.5 with low early strength is designated by:

## **Composite cement EN 197-5 – CEM VI (S-P) 42.5 L**

## **7. Conformity criteria**

For cements covered by this document the conformity criteria specified in Table 2 and in Clause 9 of TZS 727-1:2018/EAS 18-1 shall apply. In particular, conformity criteria specified for “all cements” in TZS 727-1:2018/EAS 18-1 shall also apply for cement covered by this document.

The conformity of cements covered by this document should be demonstrated by:

- factory production control, including product assessment, in accordance with Clause 4 of EN 197-2:2020;
- assessment of the performance of the cement in accordance with 5.1 of EN 197-2:2020;
- initial inspection of the manufacturing plant and of factory production control in accordance with 5.2 of EN 197-2:2020;
- continuing surveillance, assessment and evaluation of factory production control in accordance with 5.3 of EN 197-2:2020;
- audit-testing of samples taken at the factory/depot in accordance with 5.4 of EN 197-2:2020.

Information concerning reports is given in 5.5 of EN 197-2:2020. Actions to be taken in the event of non-conformity are specified in 5.6 of EN 197-2:2020.

## **8. Attestation of conformity**

For the attestation of conformity of cements covered by this document the procedure specified in Clause 6 of EN 197-2:2020 shall apply. When compliance with the conditions of this document is achieved, a certificate of conformity should be issued. The certificate shall include:

- name, address and identification number of the certification body;
- standard designation of the cement;
- name and address of the manufacturer or distributor and place of production;
- provisions to which the product conforms (i.e. this EN 197-5);
- conditions of validity of the certificate, where applicable;
- the number of the certificate;
- name of, and position held by, the person empowered to sign the certificate.

The procedures to be used to evaluate the representativeness and the accuracy of the 28-day strength test results are described in the normative Annex A of EN 197-2:2020.

Information concerning the procedure for certification of constancy of performance of cement is given in the informative Annex B of EN 197-2:2020.

## **9. Marking and labelling**

The choice of cement covered by this document, particularly as regards type and strength class for different applications and exposure classes, as well as the marking and labelling shall follow the appropriate standards and/or regulations valid in the place of use.

On the packaging, or for bulk product on the delivery documents, at least the following information shall be given:

- standard designation of the cement;
- manufacturer or distributor (name and address, plant);
- weight (nominal weight of bags or net weight of bulk cement);
- name or symbol of the product certification body.
- batch number
- date of manufacture



## Bibliography

- 1) EN 413-1, Masonry cement — Part 1: Composition, specifications and conformity criteria
- 2) EN 14216, Cement — Composition, specifications and conformity criteria for very low heat special cements.
- 3) EN 14647, Calcium aluminate cement — Composition, specifications and conformity criteria
- 4) EN 15743, Super sulfated cement — Composition, specifications and conformity criteria
- 5) Doc CEN/TC 51/WG 6 N 333, Joint report CRIC – Lafarge, Development of new ternary Cements with reduced Clinker content<sup>1</sup>)
- 6) Doc CEN/TC 51 N 1232, Technical dossier K-S-V cements and Letter of TC 51 Chairman<sup>1</sup>
- 7) Doc CEN/TC 51 N 1382, Dossier KSP Cements<sup>1</sup>
- 8) Commission Delegated Regulation (EU) No 568/2014 of 18 February 2014 amending Annex V to Regulation (EU) No 305/2011 of the European Parliament and of the Council as regards the assessment and verification of constancy of performance of construction products