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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 28629-2024

Replacing GB/T 28629-2012

Method for the chemical analysis of free silica in cement clinker

水泥熟料中游离二氧化硅化学分析方法

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Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting: This document replaces GB/T 28629-2012 "Chemical analysis method for free silicon dioxide in cement clinker" and is consistent with GB/T 28629-2012 Compared with the previous version, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- Deleted "Ammonium nitrate solution (20g/L)" (see 4:14 of the:2012 edition);
- Added "nitric acid-ammonia mixed solution" (see 5:14);
- Deleted the free silicon dioxide determination device (see 5:9 of the:2012 edition);
- Added the determination of free silicon dioxide
- phosphoric acid decomposition-hydrofluoric acid treatment weighing method (see Chapter 8);
- Change "wash with hot ammonium nitrate solution for more than 10 times" to "wash with hot nitric acid-ammonia mixed solution for at least 14 times, Wait until the last wash liquid has leaked out before washing again (see 8:2:1, 7:2:1 of the:2012 edition)";

--- Added the method of melting insoluble slag with potassium hydroxide (see 10:2, 8:2 of the:2012 edition);

--- Added the usage rules of "allowable difference" (see Chapter 11);

--- Deleted "Repeatability Limits and Reproducibility Limits of Chemical Analysis Methods" (Chapter 9 of the:2012 edition): Please note that some of the contents of this document may involve patents: The issuing organization of this document does not assume the responsibility for identifying patents: This document was proposed by China Building Materials Federation: This document is under the jurisdiction of the National Cement Standardization Technical Committee (SAC/TC184): This document was drafted by: China National Testing Holding Group Co., Ltd., Hefei Cement Research and Design Institute Co., Ltd., Guangxi Yongzheng Engineering Quality Inspection Co., Ltd., Shanghai Municipal Highway Engineering Inspection Co., Ltd., Tianjin Cement Industry Design and Research Institute Co., Ltd., Liaocheng Xinyuan Group Co., Ltd., China Railway 16th Bureau Group Co., Ltd., Qufu Zhonglian Cement Co., Ltd., Quyang Jinyu Cement Co., Ltd., Anhui Mei Nofu Technology Co., Ltd., Ningxia Zhongce Measurement Testing and Inspection Institute (Co., Ltd.), Hailar Mengxi Cement Co., Ltd., Qingzhou Zhonglian Cement Co., Ltd.: Co., Ltd., Hunan Runyou Technology Development Co., Ltd., Jiangshan Hejiashan Cement Co., Ltd., Inner Mongolia Jidong Cement Co., Ltd., Wuhai Xishui Cement Co., Ltd., Sinoma Pingxiang Cement Co., Ltd., and the government investment project construction agency of the 12th Division of the Xinjiang Production and Construction Corps center: The main drafters of this document are: Wang Wei, Wang Ruihai, Cui Hongkun, Gu Xiaohua, Ye Anli, Dai Ping, Liu Jie, Yuan Song, He Xiaolong, Guo Meng, Hu Guang, Xu Zhicheng, Zhang Gang, Zhu Yingxin, Wang Jun, Chen Bo, Pan Li, Liao Liping, Lei Zhen, Zhang Tiebin, Han Zhengqi, Wu Duanjing, Deng Chenghong, Feng Yuanqian, Luo Rongshu, Tao Jianguo, Liu Jiang, Wu Shenghong, Wang Xiaojia, Gu Yi, Zhang Huaitao, Sun Haiwen, Li Baoming, Liu Xiaojuan, Ye Ronghai, Shen Yuqiang, Liu Jing, Lu Juanjuan, Cui Jian, Gao Dandan, Jiang Hao, Wang Yalan, Song Laishen, Liu Bo, Wang Changan: This document was first published in:2012 and this is the first revision: Chemical analysis method for free silicon dioxide in cement clinker

1 Scope

GB/T 28629-2024 specifies the chemical analysis of free silica in cement clinker. Free silica, that is quartz that has not reacted during burning, is a defect with two separate consequences: it means the raw meal was too coarse or the burning insufficient, so the clinker will be weaker than its bulk chemistry suggests, and crystalline silica is a respirable hazard in the plant. Measuring it is harder than it sounds, because the analysis must dissolve away the silica that is combined in the clinker minerals while leaving the free quartz untouched, and the selectivity of that step is the whole method. The standard sets the principle, the reagents and materials, the apparatus, the preparation of the sample, the

selective dissolution procedure and its conditions, the determination of the residue, the calculation of the result, the permissible difference between determinations and the test report. The 2024 edition replaces GB/T 28629-2012. For a cement plant, a clinker buyer or a laboratory in China, this is the reference method.

This document describes the phosphoric acid decomposition-hydrofluoric acid treatment weighing method, phosphoric acid decomposition-silicon molybdenum blue spectrophotometric method, phosphoric acid decomposition-potassium fluorosilicate capacity method Chemical analysis method for the determination of free silicon dioxide in cement clinker: This document is applicable to the determination of free silica in cement clinker:

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document: For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document: GB/T 2007:

1 General rules for sampling and sample preparation of bulk mineral products Manual sampling method

GB/T 6682 Specifications and test methods for water used in analytical laboratories

GB/T 8170 Rules for rounding off values and expression and determination of limit values

JJG196 Commonly used glass measuring vessels

3 Terms and definitions

There are no terms or definitions that require definition in this document:

4 Basic requirements for testing

1 Test times and requirements Each sample is tested twice independently using the method listed in this document, and the average of the two test results is used to express the test result: According to GB/T 8170: 4:

2 Expression of mass, volume, volume ratio and titer The unit of mass is "gram (g)", accurate to 0.0001g: The unit of volume of the burette is "milliliter (mL)", accurate to 0.01mL: The titer unit is expressed in "milligrams per milliliter (mg/mL)", and the titer is rounded to four decimal places: The results were expressed as mass fractions, and the analysis values were expressed as percentages (%) to two decimal places: 4:

3 Blank test Without adding the sample, the test is carried out according to the same measurement steps and the same amount of reagents are used, and the obtained

measurement results are corrected: 4:

4 Burning Put the filter paper and precipitate or insoluble residue into a pre-burned and constant-weight crucible, and cover the crucible with a lid (leaving a gap) to avoid fire: Flame, slowly dry and ashed in an oxidizing atmosphere, and after ashing until there are no black carbon particles, put it into a high-temperature furnace and burn it at a specified temperature: Cool to room temperature in a desiccator and weigh: