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

GB/T 31040-2025

Replacing GB 31040-2014

**Test methods of residual formaldehyde from the concrete
admixtures**

混凝土外加剂中残留甲醛的测试方法

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Table of Contents

- 1 Scope
- 2 Normative references
- 3 Terms and Definitions
- 4 Test conditions
- 5 Acetylacetone spectrophotometric method (standard method)
- 5.2 Reagents
- 5.3 Instruments and Equipment
- 5.4 Test Procedure
- 5.4.1 Solution Preparation
- 5.4.1.3 Formaldehyde Standard Stock Solution. Transfer

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting. This document replaces GB 31040-2014 "Limits of Residual Formaldehyde in Concrete Admixtures". Compared with GB 31040-2014, except for structural... Aside from adjustments and editorial changes, the main technical changes are as follows:

- a) The scope has been changed (see Chapter 1, Chapter 1 of the.2014 edition);
- b) The limit requirement for residual formaldehyde in concrete admixtures has been removed (see Chapter 4 of the.2014 edition);
- c) A new chapter on "Test Conditions" has been added (see Chapter 4);
- d) A new chapter on "High Performance Liquid Chromatography" has been added (see Chapter 6);
- e) The chapter on "Inspection Rules" has been deleted (see Chapter 6 of the.2014 edition);
- f) A new chapter, "Test Report," has been added (see Chapter 8). Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the China Building Materials Federation. This document is under the jurisdiction of the National Technical Committee on Standardization of Cement Products (SAC/TC197). This document was drafted by: Suzhou Concrete and Cement Products Research Institute Co., Ltd., and

Suzhou Concrete and Cement Products Research Institute Testing Center Co., Ltd. The company, Guangdong Provincial Water Resources and Hydropower Third Engineering Bureau Co., Ltd., Northwest Survey and Design Institute of China Power Construction Group Co., Ltd., and Anhui Construction Engineering Inspection Co., Ltd. Test Technology Group Co., Ltd., Ningbo Xinli Building Materials Technology Co., Ltd., Yuncheng Comprehensive Inspection and Testing Center, Guangzhou Guangjian Construction Engineering Testing Center Co., Ltd., Zhejiang Wulong New Materials Co., Ltd., Shanghai Construction Group Co., Ltd., Zhenjiang Construction Engineering Quality Testing Center Xin Co., Ltd., Suzhou CITIC Energy Conservation and Environmental Testing Research and Development Center Co., Ltd., Suzhou No.

2 Construction Group Co., Ltd., Taizhou City Taijian Construction Engineering Testing Co., Ltd., Jiangsu Bositong New Materials Co., Ltd., China Railway 20th Bureau Group Third Engineering Co., Ltd., and Kezhijie New Materials Group Co., Ltd., China Railway Beijing Engineering Bureau Group Co., Ltd., Baisheng United Group Co., Ltd., China Merchants Chongqing Highway Engineering Inspection Testing Center Co., Ltd., China Construction Eighth Engineering Bureau Co., Ltd., China Railway Construction Group First Engineering Co., Ltd., Hefei University of Technology Engineering Testing Testing Limited Liability Company, China Railway 17th Bureau Group Urban Construction Co., Ltd., China Railway 21st Bureau Group Co., Ltd., China Railway Shanghai Engineering Bureau Group Co., Ltd., China Railway Bridge Engineering Bureau Group Co., Ltd., China Railway Seventh Group Third Engineering Co., Ltd., Ningxia Zhongce Measurement and Testing Co., Ltd. Testing and Inspection Institute (Limited Company), Foshan Global Power Equipment Co., Ltd., China Railway 14th Bureau Group Construction Engineering Co., Ltd., China Power Construction (Guangdong) Engineering Monitoring and Testing Technology Co., Ltd., CNNC Huachen Construction Engineering Co., Ltd., China 17th Metallurgical Construction Group Co., Ltd., and CCCC First Highway Engineering Bureau No.

7 Engineering Co., Ltd., China Railway 20th Bureau Group Fourth Engineering Co., Ltd., CCCC Second Harbor Engineering Co., Ltd. Wuhan Port New Materials Co., Ltd., CCCC First Harbor Engineering Co., Ltd. Third Engineering Co., Ltd., China Construction First Group Construction and Development Co., Ltd., China Anneng Group Third Engineering Bureau Co., Ltd., Anhui Zhongbao Building Materials Technology Co., Ltd., China Railway 15th Bureau Group Urban Rail Transit Engineering Co., Ltd., China Nuclear Concrete Co., Ltd., China Railway 19th Bureau Group The Sixth Engineering Company of the Group, China Communications First Highway Engineering Bureau Group Co., Ltd., Hainan Fengye Industrial Co., Ltd., and Shanxi Yuxin Building Materials Industry Technology Research Institute Institute Co., Ltd., Guangdong Harmony Power Communication Technology Co., Ltd., Suzhou Thermal Power Research Institute Co., Ltd., China Railway 11th Bureau Group First Engineering Co., Ltd. Limited Company, Western Railway Construction Engineering Materials Technology Co., Ltd., China Railway Seventh Group Xi'an Railway Engineering Co., Ltd., Beijing Times Sidong Technology Co., Ltd. Limited Company, China

Construction Fifth Engineering Bureau Co., Ltd., China Construction Second Engineering Bureau Co., Ltd., China Railway 22nd Bureau Group Fourth Engineering Co., Ltd. Limited Company, Chengdu Tongxin Real Estate Development Co., Ltd., Northwest Branch of China Railway 25th Bureau Group Co., Ltd., and Third Engineering Division of China Communications Construction Second Harbor Engineering Co., Ltd. Limited Liability Company, China Railway Sixth Group Guangzhou Engineering Co., Ltd., China Railway Construction Group Co., Ltd., Huapu Scientific Instruments (Beijing) Technology Co., Ltd. Jiaxing University and Dongguan Zhongming Construction Technology Co., Ltd. The main drafters of this document are. Li Longzi, Song Qiulei, Tian Yin, Wei Lin, Lü Kai, Lu Jun, Zhou Heng, Ge Daowen, Guo Xuewu, Chen Wei, and Nie Qingnian. Ding Jiying, Chen Shafeng, Zuo Junqing, Liu Guangming, Tu Guotu, Li Xinxian, He Jingjing, Li Hongjun, Li Liang, Zhang Wenge, Liu Weiwei, Yang Runlai, Li Jianglong Sha Weijun, Peng Xianbing, Deng Zhichuan, Cao Xincheng, Xia Ruqian, Wang Heng, Lei Zhen, Cheng Yan, Yang Lin, Li Peng, Li Geli, Wang Bengang, Sun Minghai, and other distinguished guests. Yang Dongling, Wei Pingyun, Chen Jin, Tian Zhongxian, Li Guixin, Cai Xiangong, Ji Youhua, Zhen Zongqiang, Li Guangjun, Tao Qi, Lü Biao, Zhu Xinbin, Ma Xiaoyun He Changjie, Li Jianwang, Deng Shoujun, Liu Xufeng, Zhang Lijun, Hu Kaiwei, Jin Rencai, Tang Gengshi, Wei Wuwei, Tang Li, Lin Fusheng, Gu Julong, Guo Zhangfeng Yang Weike, Chen Xiangjun, Shen Fangming, Zhang Xichun, Sun Chaoyuan, Yu Zhixun, Huang Xiuzhu, Yang Qing, He Kaifeng, Li Pengju, Huang Dianwu, Lian Yuan, Jin Qing Liao Kaixing, Wu Jianjian, Chen De, Lu Hongjie, Liang Di, Sun Yuefeng, Wang Xingguang, Lin Zuojiang, Xin Xue. This document was first published in 2014, and this is its first revision. Test methods for residual formaldehyde in concrete admixtures Warning. This document should be used by personnel with practical experience in formal laboratory work. This document does not address all potential safety issues. Users are responsible for taking appropriate safety and health measures and ensuring compliance with relevant national regulations.

1 Scope

GB/T 31040-2025 is the Chinese national standard covering residual formaldehyde in a concrete admixture - the extraction from a viscous polymer solution, the derivatisation and the determination, and the limit of quantification, on a residue that comes from the naphthalene and melamine condensates used as water reducers. It replaces GB 31040-2014 and moves it from mandatory to recommended status. In force from 1 August 2026. Issued on 5 October 2025, it has been in force since 1 August 2026, replacing GB 31040-2014.

This document specifies the test methods and test reports for residual formaldehyde in concrete admixtures. This document applies to the testing of residual formaldehyde in concrete admixtures.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 601 Preparation of Standard Titration Solutions for Chemical Reagents

GB/T 6682-2008 Specifications and test methods for water used in analytical laboratories

GB/T 8075-2017 Terminology for Concrete Admixtures

GB/T 8077-2023 Test Method for Homogeneity of Concrete Admixtures

3 Terms and Definitions

The terms and definitions defined in GB/T 8075-2017 and the following terms and definitions apply to this document.

3.1 concrete admixture It is added before or during the mixing process of concrete to improve the properties of fresh and/or hardened concrete. Materials whose dosage does not exceed 5% of the mass of cementitious materials. [Source: GB/T 8075-2017, Chapter 2, with modifications]

3.2 Residual formaldehyde Formaldehyde in concrete admixtures exists in a free state and formaldehyde from the depolymerization of polyoxymethylene.

4 Test conditions

The temperature of the test environment was $(23\pm 2)^{\circ}\text{C}$, and the relative humidity was $(50\pm 10)\%$.

5 Acetylacetone spectrophotometric method (standard method)

5.1 Principle Residual formaldehyde in the sample was distilled off. In an acetate-ammonium acetate buffer solution at pH 6, the formaldehyde in the distillate... It reacts with acetylacetone under heating conditions to form a stable yellow complex, and the absorbance is measured at a wavelength of 412 nm after cooling. Calculate the residual formaldehyde content in the sample based on the standard working curve.

5.2 Reagents

5.2.1 Reagents confirmed to be of analytical grade should be used, and the water used should meet the requirements for Grade III water in GB/T 6682-2008. The solutions used