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

GB 6566-2010

Replacing GB 6566-2001

Limits of radionuclides in building materials

建筑材料放射性核素限量

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Table of Contents

- 1 Scope
- 2 Terms and definitions
- 5 Other requirements

Foreword

Provisions of Chapter 3 in this standard are mandatory and others are voluntary . This standard replace GB 6566-2001 Limits of radionuclides in building materials. Compared with GB 6566-2001,this standard has the following major changes. -the application scope of the standard is modified; -the part of "Test Rules" of the former standard is deleted; -for uncertainty of measurement, the terms and definitions specified in the International basic and genera/ terms of metrology are used; -sample quantity is changed from no less than 3 kg to no less than 2 kg; -in the part of "Apparatus", provisions on the use of balances are introduced, according to which samples shall be weighed to an accuracy of 0. 1 g; -calculation results are required to be rounded to one decimal place; -some sections are adjusted in accordance with new requirements on the formulation of standards. This standard was proposed by China Building Materials Federation. This standard is centrally managed by China Building Materials Federation. This standard was drafted by China Building Materials Academy; National Institute for Radiological Protection,China CDC; Exploration Center of Building Materials Industry; China University of Geosci- ences (Beijing); -and China Building Material Test and Certification Center. Organizations participating in drafting this standard include China National Radioactive and Hazard- ous Materials Supervision, Inspection and Testing Center for the Building Materials Industry; Hubei Fangyuan Environment Protection Technology Co. ,Ltd.; and CNNC (Beijing) Nuclear Instrument Fac- tory. The main authors of this standard are Ma Zhenzhu, Han Ying, Wang Nanping, Xu Cuihua, Wang Yuhe, Li Zengkuan,and Zhang Yonggui. Limits of radionuclides in building materials

1 Scope

China's mandatory standard for the natural radioactivity of building materials - the document that decides whether a granite, a tile, a slag cement or a phosphogypsum board may be used inside a dwelling, in a public building, or only outdoors. It specifies the terms and definitions, the classification, the limits of the radionuclides and the test method, and it applies to the inorganic building and decorative materials produced, sold and used in China, including the industrial waste products that are made into building materials, in which the natural radionuclides are concentrated by the process. The three nuclides

measured are radium-226, thorium-232 and potassium-40, and their specific activities are combined into the two indices the standard turns on: the internal exposure index, which weighs the radium content alone because of the radon it gives off indoors, and the external exposure index, which weighs all three because of the gamma radiation they emit. Building materials are then classified by those indices into the classes that decide where they may be used, from unrestricted use in any building through use limited to the exteriors of dwellings to use outside buildings altogether, with the hollow and the solid products treated differently because the same activity in a hollow product exposes the occupant less. The determination is made by low background gamma spectrometry on a dried, milled and sealed sample held long enough for radon and its daughters to come into equilibrium, which is why the standard is as specific about the preparation and the sealing of the specimen as it is about the counting. Issued on 2 September 2010 and in force since 1 July 2011, it replaces GB 6566-2001.

This standard specifies the limits of radionuclides in building materials and the test method for specific activities of natural radionuclides radium-226, thorium-232 and potassium-40. This standard is applicable to inorganic non-metallic building materials which have requirements on the limits of radionuclides.

2 Terms and definitions

The following terms and definitions are applicable to this standard.

2.1 main materials for building Main materials for building in this standard refer to materials used to build the main body of buildings.

2.2 decorative materials Decorative materials refer to materials used for interior and exterior finishes of buildings.

2.3 building Buildings refer to houses or indoor spaces for production, work, living or other activities of human beings. This standard divides buildings into civil buildings and industrial buildings.

2.3.1 civil building Civil buildings refer to buildings for living, work, study, entertainment and shopping of human beings. This standard divides civil buildings into Type 11 and Type 112 civil buildings.

1 Type I civil buildings include dwelling houses for the elderly, nurseries, hospitals, schools, office buildings, hotels, etc.

2 Type 11 civil buildings include shopping malls, entertainment places, bookstores, libraries, exhibition halls, gymnasiums, public transport waiting rooms, restaurants, barbershops, etc.

2 External exposure index External exposure index is calculated via expression (2). where, I_{CRa} , I_{Cn} , I_{K} = 370 + 260 + 4 200 - External exposure index; A_{Ra} , A_{Th} , A_{K} (2) - Specific activities of natural radionuclides radium-226, thorium-232 and potassium-40 in building materials respectively, Bq · kg⁻¹; 370, 260 and 4 200 - Limits of natural radionuclides

radium-226, thorium-232 and potassium-40 in building materials when each of them exists individually in the case where only external exposure is considered, Bq/kg - 1 - 4.

5 Requirements for uncertainty of measurement When the sum of the specific activities of radionuclides radium-226, thorium-232 and potassium-40 in the test sample is more than

37 Bq/kg, the test method stated in this standard requires that the uncertainty of measurement (expansion factor $k=1$) be not more than 20%. 4.

6 Calculation results shall be rounded to one decimal place.

5 Other requirements

1 Building material manufacturers shall clearly indicate the level and category of radioactivity of their product on the package or in the specification sheet in accordance with Chapter 3 of this standard. 5.

2 For areas with a higher natural radionuclide background, building material products made of local raw materials can only be locally used as long as the specific activity of radionuclides is not more than the average background level of the corresponding natural radionuclides in the surface soil. END