

HJ

Sector Standard for Environmental Protection of the People's Republic of China

HJ/T 297-2006

Technical requirement for environmental labeling products

Ceramics tiles

Issued on August 23, 2006

Putting into effect as of September 1, 2006

Issued by Ministry of Environmental Protection

Foreword

This standard is developed for the purpose of implementing the Law of the People's Republic of China on Environmental Protection, minimizing the adverse impacts of the production, use and disposal of ceramic tiles on the environment and human health, guiding and promoting the production and utilization of environment-friendly products.

Referring to the environmental standard for the Building Materials for Civil Engineering and Domestic Use of the Republic of Korea, this standard specifies the limits of soluble lead and cadmium in ceramic tiles; identifies the friction coefficient of ceramic ground tiles according to the international friction coefficient definition & classification, develops the radioactive specific activity limit for ceramic tiles in line with the utilization situation of the raw materials of such tiles in China; and identifies the recycling and reuse rate of industrial solid waste generated during the production of ceramic tiles.

This standard is a recommendation standard and applicable to the certification of environmental labeling products in China.

This standard is put forward by the Department of Science, Technology and Standards of the Ministry of Environmental Protection.

Major organizations in charge of the development of this standard: Environment and Development Center of MEP and National Building Materials Test Center.

This standard was approved by the Ministry of Environmental Protection on August 23, 2006.

This standard shall be put into effect as of September 1, 2006.

This standard shall be interpreted by the Ministry of Environmental Protection.

Technical Requirement for Environmental Labeling Products

Ceramics Tiles

1. Application Scope

This standard specifies the definition, basic requirements, technical contents and determination method for environmental labeling product — ceramics tiles.

This standard is applicable to ceramics tiles manufactured from various technologies.

2. Standard Quotation Documents

The provisions of the following documents become the provisions of the current standard through quotation. All quoted document with specified date and their follow-up medications (excluding corrigenda) or revised versions shall be not applicable to the current standard. However, it is encouraged that all stakeholders reaching an agreement according to this standard study the possibility of utilizing the latest versions of these documents. The latest versions of all quotation documents without any specific date are applicable to the current standard.

GB/T 4100 Ceramics tiles

GB 6566 Limit of radioactive nuclide for building materials

GB/T 15555.2—1995 Solid waste — Determination of copper, zinc, lead and cadmium — Atomic absorption spectrometry

3. Terminology and Definition

3.1 Internal radiation index

It refers to the quotient of the radioactive specific activity of natural radioactive nuclide of radium-226 in ceramics tiles divided by the limit specified by the current standard.

Its formula is as the following:

$$I_{Ra} = C_{Ra} / 200$$

Where I_{Ra} —Internal radiation index;

C_{Ra} — The radioactive specific activity of natural radioactive nuclide radium -226 in ceramics tiles, Bq/kg;

200 — It refers to the limit for radioactive specific activity of radioactive nuclide of radium-226 in ceramics tiles specified in this standard with the consideration of only internal radiation with unit as Bq/kg.

3.2 External radiation index

It refers to the summary of the quotient of radioactive specific activity of natural radioactive nuclide radium -226, thorium-232 and potassium -40 in ceramics tiles divided by the limit of individual existence specified by the current standard.

The formula is as the following:

$$I_{\gamma} = \frac{C_{Ra}}{370} + \frac{C_{Th}}{260} + \frac{C_K}{4200}$$

Where I_{γ} — external radiation index;

C_{Ra} , C_{Th} , C_K — is the radioactive specific activity of natural radioactive nuclide of radium-226, thorium-232 and potassium-40 respectively in ceramics tiles, Bq/kg;

370, 260 and 4200 — They refer to the specified limits for radioactive specific activity of

natural radioactive nuclide radium -226, thorium-232 and potassium -40 with individual existence in ceramics tiles specified in the current standards under only external radiation, Bq/kg.

3.3 Radioactive specific activity

It is the quotient of radioactive specific activity of certain radioactive nuclide in substance divided by its mass.

The formula is as the following:

$$C = A/m$$

Where C— radioactive specific activity, Bq/kg;

A— radioactive specific activity of radioactive nuclide, Bq;

m— substance mass, kg.

4. Basic Requirements

4.1 The quality of the products shall comply with the requirements of national standard GB/T 4100.

4.2 The discharge of pollutants from the enterprises shall comply with the requirements of national or local standards for the discharge of pollutants.

5. Technical Contents

5.1 The internal radiation index of ceramic tiles shall be no bigger than 0.9 and external radiation index no bigger than 1.2.

5.2 The contents of soluble lead in ceramics tiles shall not exceed 20 mg/kg and soluble cadmium not exceed 5 mg/kg.

5.3 The friction coefficient of ceramic floor tiles shall be no less than 0.5.

5.4 The recycling & reuse rate of industrial solid waste generated during the production of ceramics tiles shall be over 70%.

6. Determination Method

6.1 Technical contents in 5.1 shall be tested according to the method specified in GB 6566.

6.2 Technical contents in 5.2 shall be tested according to the method specified in Annex A.

6.3 Technical contents in 5.3 shall be tested according to the testing process (dry method) specified in M.4.4 of Annex M of national standard GB/T 4100 (Standard annex).

6.4 Technical contents in 5.4 shall be verified by site inspection and document review.

Annex A

(Standard Annex)

Determination of Lead and Cadmium in Ceramic Sample

A.1 Principle

Employ strong acid to treat the powder sample of ceramic tiles, use flame atomic absorption spectrometry to determine lead and cadmium concentration in the sample solution.

A.2 Reagents

- HNO_3 , $\rho = 1.42 \text{ g/ml}$, GR;
- (1+1) nitric acid;
- Deionized water or distilled water.

A.3 Instruments

- Atomic absorption spectrophotometer;
- Filtering device: filter with glass sand core, fiber membrane (porous diameter of $\Phi 0.45 \mu\text{m}$);
- Adjustable electric heating plate.

A.4 Sample Preparation

After washing, drying, smashing and reduction process, grind the sample so that it can pass $80 \mu\text{m}$ (180 mesh) sieve, store the sample in a clean weighing bottle in reserve. Impurities shall be avoided in sample preparation process.

A.5 Preparation of test solution

Weigh 10 g (with accuracy down to 0.0001 g) sample into a 100 ml beaker, add 25 ml nitric acid, employ small amount of distilled water to wash the beaker wall, blend it until the solution is homogeneous, cover the solution with watch glass. Put the solution onto a 200°C low-temperature heating plate for 2h heating, cool it for 1 h, immediately filter it into a 50 ml volumetric flask and wash to the mark, shake the flask until the solution is homogeneous. This is the test solution of the sample.

A.6 Blank test solution

Employ deionized water or distilled water to replace the sample with the application of same procedures and reagents with that of the sample, prepare the blank solution when handling the sample.

A.7 Determination

The determination of the concentrations of soluble lead and cadmium in the subject solution shall be conducted in line with the method specified in GB/T 15555.2—1995.

A.8 Result calculation

The concentration of heavy metals is calculated with the following formula:

$$\omega = (a_1 - a_0) \times 50 \times F/m$$

Where ω — concentration of soluble heavy metals (lead, cadmium), mg/kg;

a_0 — concentration of the reagent blank, $\mu\text{g/ml}$;

a_1 — concentration of test solution (lead, cadmium) measured from the standard curve, $\mu\text{g/ml}$;

F — dilution factor;

50 — constant volume of the extract, ml;

m — sample mass, g.