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WS

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

WS/T 668-2019

Replacing GBZ 116-2002; GBZ 124-2002

**Requirements for radiological protection for radon in public
underground structure and using geothermal water
(English Translation)**

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References

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GBZ 116-2002 "Control Standards for Underground Building Concrete and Its Progeny" and GBZ 124-2002 "Ground Water Application in Geothermal Water Radiological Protection Standards. Compared with GBZ 116-2002 and GBZ 124-2002, in addition to editorial changes, the main technical changes are as follows.

-Deleted the content of the control level of radon concentration in geothermal water (see 4.1, 4.2 and 4.3 of GBZ 124-2002);

-Modified the content of radon concentration control in underground buildings and geothermal water applications (see 4.2, 4.2 of GBZ 116-2002 and GBZ 124-2002 4.4);

-Added measurement of radon concentrations in underground buildings and geothermal water applications (see 5.1, 5.2, 5.3, 5.4 and 5.5).

This standard was drafted. Hunan Provincial Occupational Disease Control Center, Beijing Centers for Disease Control and Prevention, Beijing Institute of Chemical Industry and Metallurgy, Nuclear Industry.

1 Scope

This standard specifies the measurement and measurement of radon (^{222}Rn) in public underground buildings and geothermal water (including hot spring water) development and utilization sites.

Control requirements.

This standard applies to the public protection requirements for underground buildings and places for the development and use of geothermal water.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB 6566 Limit of radionuclides for building materials GBZ/T 182-2006 Specification for measurement of indoor radon and its decay products

3 Terms and definitions

The following terms and definitions apply to this document.

Underground structure any construction project or underground place with a certain space purposely constructed below the ground.

Geothermal water

Underground hot water is extracted from deep underground artificial drill holes or seeps naturally from the surface.

radon

The atomic number 86 element produced by the decay of radium atoms is a colorless, odorless radioactive inert gas.

Note: There are three isotopes of thallium in nature. This standard refers only to thorium-222 (^{222}Rn).

Radon concentration

Activity concentration of radon in unit volume of air.

Note: The SI unit is Bq/m³.

Reference level

The radon concentration control level set for underground buildings and geothermal water development and utilization sites for the development and utilization of underground buildings and geothermal water Control of continuous exposure due to radon concentration in the place.

Instantaneous measurement A method of measuring the concentration value at a moment

in a relatively short time range.

Note: Such as the scintillation flask method, double filter membrane method, balloon method, ionization chamber method, etc.

Continuous measurement Measurements are performed continuously at regular intervals and the results of each interval can be obtained.

Integral measurement an integral measurement performed at a specific time period, and the result is the average concentration in that time period.

Screening measurement A measurement program for quickly understanding the radon concentration in the air at the measured place, used to determine whether the radon concentration in the measured place meets the requirements of this standard Set a reference level to determine if further measurements are needed.

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Follow-up measurement A verification radon concentration measurement program for sites that may be found to be out of specification during screening measurements to determine the Whether radon concentration meets the reference level specified in this standard provides a basis for possible intervention and treatment.

4.1 Control Principles

4.1.1

In the design and construction related to radiation protection, the principle of radiation protection optimization should be observed.

4.1.2 Appropriate measures to attach personnel to radon in the air in underground buildings

Exposure is controlled to the lowest acceptable level.

4.2 Reference level

The reference level for average radon concentration in underground buildings is 400 Bq/m³.

The reference level of average radon concentration in geothermal water development and utilization sites is 800 Bq/m³.

4.3 Control measures

4.3.1

When selecting the location of a new underground building, avoid areas with high radium content in soil or rocks, and choose construction materials that comply with GB 6566 during construction.

4.3.2

When the radon concentration in the existing underground building is between 400 Bq/m³ and 1000 Bq/m³, it is advisable to adopt strengthening machinery within 6 months after the measurement.

Ventilation, shielding radon sources, purifying and removing radon; for radon concentrations > 1000 Bq/m³, it is advisable to adopt mechanical ventilation and shielding within 3 months.

Radon sources, purification radon removal and other radon reduction measures; when the average radon concentration still exceeds the reference level after taking the measures, block or remove radon sources Land improvement and other permanent measures to reduce radon.

4.3.3

When the radon concentration in the local hot water development and utilization place is 800 Bq/m³ ~ 1000 Bq/m³, it should be taken within 6 months after the measurement.

Strengthening mechanical ventilation, shielding radon sources, purifying and removing radon; for radon concentrations > 1000 Bq/m³, it is advisable to take mechanical Measures to reduce radon, such as wind, shielding radon sources, purifying and removing radon; take measures to block or remove radon sources, Carry out permanent reduction measures such as base reconstruction.

5 Measurement of radon concentration in underground buildings and geothermal water applications

5.1 Measurement scheme

It adopts two-level measurement method of screening measurement and tracking measurement. First, a quick screening measurement was performed to determine whether the radon concentration in the place was consistent.

Meet the requirements of the reference level in this standard; for places where radon concentrations are greater than or equal to the reference level, follow-up measurements are used to confirm recognize.

5.2 Preparation before measurement

5.2.1

Understand the basic situation of the measured place in detail before measurement, including the type, partition, use, building (production) year, building Materials, surrounding geological background, whether relevant tests have been performed.