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

GB 15208.1-2018

Replacing GB 15208.1-2005

**Micro-dose X-ray security inspection systems - Part 1: General
technical requirements**

微剂量X射线安全检查设备 第1部分：通用技术要求

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Foreword

All technical content in this section is mandatory. GB 15208 "Micro Dose X-ray Safety Inspection Equipment" is divided into the following five parts.

- Part 1. General technical requirements;
- Part 2. Transmissive bag security inspection equipment;
- Part 3. Transmissive cargo safety inspection equipment;
- Part 4. Human body safety inspection equipment;
- Part 5. Backscattering items safety inspection equipment. This part is the first part of GB 15208. This part is drafted in accordance with the rules given in GB/T 1.1-2009. This part replaces GB 15208.1-2005 "Micro-dose X-ray safety inspection equipment Part 1. General technical requirements", and The main technical changes compared with GB 15208.1-2005 are as follows:
 - Added 8 terms. equivalent atomic number, ambient dose equivalent rate, transmission X-ray safety inspection equipment, backscatter X Radiation safety inspection equipment,

control area, supervision area, open micro-dose X-ray safety inspection equipment, closed micro-dose X-ray Line safety inspection equipment (see 3.1, 3.8, 3.12, 3.13, 3.16, 3.17, 3.18, 3.19);

--- Revised the names of the five terms (see 3.2, 3.3, 3.4, 3.14, 3.15, 3.11, 3.12, 3.13, 3.22, 3.23 of the 2005 edition);

--- Revised the definition of three terms. single-check dose, micro-dose X-ray safety inspection equipment, safety interlock (see 3.7, 3.11, 3.20, 3.17, 3.21, 3.24 of the 2005 edition);

--- Removed 11 terms (see 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10,

--- Added equipment classification (see Chapter 4);

--- Removed performance indicator requirements (see version

1 Scope

Part 1 of China's mandatory series on micro-dose X-ray security inspection equipment, and the part that carries everything common to the family: the baggage scanners at airports and stations, the cargo scanners at ports and depots, and the other transmission systems that look inside a closed container with radiation. This part specifies the classification, the general technical requirements, the test methods and the inspection rules for micro-dose X-ray security inspection equipment. It is applied together with the parts that follow, which take the individual machines: Part 2 the transmission baggage systems, Part 3 the transmission cargo systems. The word micro-dose is the point of the series. These machines are operated continuously in public places by staff who stand beside them all day, next to a stream of passengers and, in the baggage case, next to their belongings, so the standard is built around two things that pull against each other: the image has to be good enough to find what is being looked for, and the radiation has to be low enough that nobody outside the tunnel receives a dose that matters. The general requirements therefore cover the radiation safety and the leakage limits at defined distances, the interlocks and warnings that prevent exposure while the tunnel is open, and the shielding, alongside the imaging performance that decides whether the machine is any use - the wire resolution, the penetration through steel, the spatial resolution, the contrast sensitivity and the discrimination of materials by their effective atomic number. To those are added the electrical safety, the environmental and electromagnetic requirements, the conveyor and mechanical provisions, and the software, image storage and access control that decide what happens to the images afterwards. Issued on 19 November 2018 and in force since 1 December 2019, it replaces GB 15208.1-2005.

This part of GB 15208 specifies the classification, general technical requirements, test methods and inspection rules for micro-dose X-ray safety inspection equipment. Then,

packaging, marking, storage and transportation, and random technical documents. This section applies to the design, manufacture, acceptance and use of various micro-dose X-ray safety inspection equipment. This section does not apply to computed tomography (CT), electron accelerators, and X-ray generating devices with energy greater than 500 keV. Radiation safety inspection equipment.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 191-2008 packaging storage and transportation icon

GB/T 2423.1-2008 Environmental testing of electric and electronic products - Part 2. Test methods Test A. Low temperature

GB/T 2423.2-2008 Environmental testing of electrical and electronic products - Part 2. Test methods Test B. High temperature

GB/T 2423.3-2016 Environmental testing - Part 2. Test method test Cab. constant damp heat test

GB/T 2423.5-1995 Environmental testing for electric and electronic products - Part 2. Test methods Test Ea and guide. Impact

GB/T 2423.10-2008 Environmental testing of electric and electronic products - Part 2. Test method test Fc. Vibration (sinusoidal)

GB/T 4208-2017 enclosure protection grade (IP code)

GB 4793.1-2007 Safety requirements for electrical equipment for measurement, control and laboratory - Part 1. General requirements

GB/T 9254-2008 Radio disturbance limits and methods of measurement for information technology equipment

GB/T 17626.2-2006 Electromagnetic compatibility test and measurement technology Electrostatic discharge immunity test

GB/T 17626.3-2016 Electromagnetic compatibility test and measurement technology RF electromagnetic field radiation immunity test

GB/T 17626.4-2008 Electromagnetic compatibility test and measurement technology Electrical fast transient burst immunity test

GB/T 17626.5-2008 Electromagnetic compatibility test and measurement technology Surge (impact) immunity test

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Equivalent atomic number Z_{eff} An atomic number representing the theoretical element of a material property that has the same X-ray attenuation characteristics as this material.

3.2 Equivalent organic matter A substance with an equivalent atomic number below 10.

3.3 Equivalent inorganic effective inorganic material A substance with an equivalent atomic number higher than 18.

3.4 Equivalent mixture effective mixed material A substance whose equivalent atomic number is between 10 and 18.

3.5 Wear impenetrable area impenetrable area The intensity of X-ray penetration of the object to reach the X-ray detector is almost zero, and the device cannot recognize the basic structural features of the object under test. region.

3.6 Material uncertainty area undetermined area Although the ray can penetrate, it is impossible to identify the area of the material property of the object to be inspected.

3.7 Single dose dose exposure inspection The subject undergoes an examination to absorb the absorbed kinetic energy of the air.

Note. The single-dose dose unit is Gy, $1\text{Gy}=1\text{J/kg}$.

3.8 Peripheral dose equivalent rate ambient dose equivalent rate $\dot{H}^{(10)}$ The quotient of $dH^{(10)}$ and dt , where $dH^{(10)}$ is the increment of the surrounding dose equivalent within the time interval dt . $\dot{H}^{(10)} = dH^{(10)} / dt$

Note. The International System of Units (SI) unit for the surrounding dose equivalent rate is [Watt] per second (Sv/s). The unit of the surrounding dose equivalent rate is [Watt] or its multiple Or the quotient of the score with the appropriate time unit (for example. mSv/h). [GB/T 4835.1-2012, definition 3.3]

3.9 Scatter scatterblock An object that scatters radiation to produce the worst radiation conditions.

3.10 X-ray security inspection equipment X-ray security inspection system X-ray intensity distribution or energy spectrum distribution is measured by the interaction of X-rays with the object to be inspected, and an X-ray image of the object to be inspected is generated. An apparatus that recognizes the safety of the object to be inspected based on the information of the material to be inspected.

3.11 Micro-dose X-ray safety inspection equipment micro-dose X-ray security inspection system A single inspection of X-ray safety inspection equipment with a dose less than or equal to $10\text{ }\mu\text{Gy}$.