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

**GB 15208.5-2018**

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**Micro-dose X-ray security inspection systems - Part 5:  
Backscatter object security inspection systems**

微剂量X射线安全检查设备 第5部分：背散射物品安全检查设备

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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 fifth part of GB 15208. This part is drafted in accordance with the rules given in GB/T 1.1-2009. This part is proposed and managed by the Ministry of Public Security of the People's Republic of China. This section drafted by: Ministry of Public Security First Institute, Beijing Zhongduan Anmin Analysis Technology Co., Ltd., Tongfang Weishi Technology Co., Ltd. Division, National Security and Alarm System Product Quality Supervision and Inspection Center (Beijing), National Security and Alarm System Product Quality Supervision and Inspection Heart (Shanghai). The main drafters of this section. Xing Yu, Chen Li, Meng Zhiqiang, Wang Fenghua, Yu Wei, Lu Peng, Liu Caixia, Jin Yingkang, Yan Yaping. Micro-dose X-ray safety inspection equipment Part 5. Backscattering article safety inspection equipment

## 1 Scope

Part 5 of China's mandatory series on micro-dose X-ray security inspection equipment, covering the backscatter systems - the machines that read the radiation scattered back from an object rather than what passes through it. The distinction is the whole point of this part. A transmission machine needs the source on one side and the detector on the other, so it can only look at something that fits inside its tunnel; a backscatter machine puts the source and the detector on the same side, which lets it look at a vehicle, a container, a wall or a large object that could never pass through a scanner, and which makes it strongly sensitive to the low atomic number materials - organics, explosives, drugs - that a transmission image of a dense load tends to hide. It specifies the classification, the general technical requirements, the test methods, the inspection rules, the packaging and marking, the storage and transport and the accompanying technical documentation of backscatter object security inspection systems, applied together with the general requirements of Part 1. The requirements cover the imaging performance in the terms that suit the technique - the detection of organic material of defined thickness at defined depth, the spatial resolution, the contrast and the uniformity of the image across the scanned area - and then the radiation safety, which on a machine whose beam is not confined inside a tunnel is a harder problem than on a transmission system: the leakage and scatter around the equipment, the controlled area, the interlocks and warnings, and the limits that apply where the operator is close to the beam path. The electrical, environmental and electromagnetic requirements and the image handling complete the part. Issued on 19 November 2018 and in force since 1 December 2019.

This part of GB 15208 specifies the classification, general technical requirements, test methods, inspection rules, and safety inspection equipment for backscattered articles. Packaging, marking, storage and transportation, and random technical documentation. This

section applies to various micro-dose X-ray safety inspections that use X-ray backscatter imaging technology to carry out safety inspections on articles. Design, manufacture, assembly, acceptance and use. This section does not apply to portable backscatter 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 15208.1-2018 Micro-dose X-ray safety inspection equipment - Part 1. General technical requirements

## 3 Terms and definitions

The following terms and definitions defined in GB 15208.1-2018 apply to this document.

3.1 Backscatter X-ray backscatterX-ray Scattered X-rays greater than 90° with respect to incident X-rays.

3.2 Micro-dose X-ray backscatter article security inspection equipment  
micro-doseX-raybackscatterobjectsecurityinspectionssystem A backscattered microdose X-ray safety inspection device for inspecting articles.

3.3 Mobile backscatter X-ray safety inspection equipment  
mobilebackscatterX-raysecurityinspectionssystem Mobile X-ray generating device and detector for backscattering X-ray imaging of backscattered articles device.

3.4 Fixed backscatter X-ray safety inspection equipment  
fixedbackscatterX-raysecurityinspectionssystem The X-ray generating device does not move, and the back-scattered article micro-dose of the object to be examined is realized by back-scattering X-ray imaging through the inspection area X-ray safety inspection equipment.

3.5 Open backscatter X-ray security inspection equipment  
unshieldedbackscatterX-raysecurityinspectionssystem Radiation protection devices for shielding, leaking rays, etc. generated during the inspection process are not installed, and it is necessary to delineate the supervision area or place it in compliance. Radiation protection requires a backscattered item of micro-dose X-ray safety inspection equipment.

3.6 Closed backscatter X-ray safety inspection equipment  
shieldedbackscatterX-raysecurityinspectionssystem Micro-dose X-rays of backscattered articles with radiation protection devices for shielding scattering, leaking rays, etc. generated during inspection Safety inspection equipment.

3.7 Backscattering penetration backscattersimplepenetration The ability of the device to resolve organic matter behind a certain thickness of the steel plate.

Note. It is expressed by the thickness (mm) of the steel plate.

3.8 Backscatter spatial resolution backscatterspatialresolution The ability of the device to distinguish pairs of polyethylene wires in an air background.

Note. Indicated by the line width (mm) of the pair.

3.9 Backscatter line resolution backscatterwiredisplay The device distinguishes the ability of a single polyethylene rod in an air background.

Note. Indicated by the diameter of the rod (mm).

3.10 Backscatter line detection force backscatterwiredetection The device's ability to resolve a single solid copper wire in the context of a strong scatterer.

## 4 Equipment classification

4.1 Micro-dose X-ray backscattering article safety inspection equipment (hereinafter referred to as equipment) is classified according to the type of inspection object.

- a) line-package equipment;
- b) Container and vehicle equipment.

4.2 The equipment is divided according to the type of equipment structure.

- a) mobile equipment;
- b) Fixed equipment.

4.3 Equipment is classified according to the type of protection.

- a) open equipment;
- b) Closed equipment.

## 5 General technical requirements

5.1 Overview A device with multiple scattering viewing angles, the performance index of any viewing angle should meet the requirements of 5.2; with multiple scattering inspection channels Equipment, the performance indicators of any of its channels should meet the requirements of 5.2. Overall performance of a device with multiple scattering viewing angles or multiple scattering channels The test results of the viewing angle or channel marked with the worst performance index shall prevail. Xray generators should be maintained when performing tests 5.2.1~

5.2.5 The tube voltage, tube current and other parameters are unchanged. When applied to