



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

GB/T 41123.1-2021

**Non-destructive testing - Radiation methods for industrial
computed tomography - Part 1: Principles, equipment and
samples**

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foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for Standardization Work Part 1: Structure and Drafting Rules of Standardization Documents"

drafted:

This document is the first part of GB/T 41123 "Non-destructive testing of industrial radiographic computer tomography": GB/T 41123

The following sections have been published:

--- Part 1: Principles, equipment and samples;

--- Part 2: Operation and interpretation;

--- Part 3: Verification:

This document is equivalent to ISO 15708-2:2017 "Non-Destructive Testing Ray Computed Tomography Testing Part 2: Principles and Equipment

and samples":

The following minimal editorial changes have been made to this document:

--- In order to harmonize with existing standards, the name of the standard is changed to "Non-Destructive Testing Industrial Radiation Computed Tomography Testing Part 1:

Principles, Equipment and Samples";

--- Changed the incorrectly programmed vacuum value (see A:1:1):

Please note that some content of this document may be patented: The issuing agency of this document assumes no responsibility for identifying patents:

Introduction

Industrial ray computed tomography detection (referred to as industrial CT) is obtained by ray projection measurement of objects at different angles:

The imaging technology of object cross-section information involves many disciplines such as radiation physics, mathematics, computer science, graphic imaging and mechanics:

Industrial CT has the advantages of not being limited by the type of material, composition, surface condition, etc: of the measured object, and can give the composition, density, geometric

The tomographic images corresponding to the structure and size characteristics are characterized by intuitive imaging, high spatial and density resolution, and have been widely used in aerospace, aviation, etc:

Air, weapons, metallurgy, machinery, automobile manufacturing, high-speed rail, electronics, geology, biology, archaeology and other fields, for defect detection, size measurement, density meter

characterization, assembly structure analysis, reverse engineering and other occasions:

In order to standardize the inspection work of industrial CT and be in line with international standards, on the basis of summarizing the experience of industrial CT research and application over the years, the

ISO 15708 (a total of four parts) is converted into my country's standard documents, of which ISO 15708-1 is modified and converted into GB/T 12604.12 "No

NDT Terminology Part 12: Industrial X-ray Computed Tomography Inspection, included in the standard system of NDT terminology in my country:

ISO 15708-2~ISO 15708-4 are equivalently converted into GB/T 41123 series of documents: GB/T 41123 consists of 3 parts:

--- GB/T 41123:1 Non-destructive testing of industrial ray computed tomography testing - Part 1: Principles, equipment and samples;

--- GB/T 41123:2 Non-destructive testing of industrial ray computed tomography testing - Part 2: Operation and interpretation;

--- GB/T 41123:3 Non-destructive testing of industrial ray computed tomography testing - Part 3: Verification:

GB/T 41123 specifies the principles, equipment and samples, operation and interpretation, verification, etc: of industrial CT:

Cheng put forward quality control requirements, which is conducive to promoting the development, exchange and cooperation of industrial CT technology, and has great

significance for the application of industrial CT in various industries:

important guiding significance:

This document is part 1 of GB/T 41123, which specifies the general principles of X-ray computed tomography (CT), the equipment used

And basic notes about samples, materials, and geometry:

Nondestructive Testing Industrial Radiography Computed Tomography Testing

Part 1: Principles, equipment and samples

1 Scope

This document specifies the general principles of X-ray computed tomography (CT), the equipment used and information on samples, materials and geometries

Basic considerations:

This document is applicable to industrial computed tomography (non-medical applications) detection and defines a set of CT system performance parameters, as well as these properties:

Relationship between performance parameters and CT system specifications:

This document applies to computed axial tomography and does not apply to other types of tomography such as translational tomography and tomosynthesis

imaging:

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text: Among them, dated citations

documents, only the version corresponding to that date applies to this document; for undated references, the latest edition (including all amendments) applies to

this document:

GB/T 41123:2-2021 Nondestructive Testing Industrial Radiography Computed Tomography Testing Part 2: Operation and Interpretation

(ISO 15708-3:2017, IDT)

GB/T 41123:3-2021 Nondestructive Testing Industrial Radiography Computed Tomography Testing Part 3: Verification (ISO 15708-4:

2017, IDT)

ISO 9712 Non-destructive testing non-destructive testing personnel qualification and certification (Non-destructive testing-Qualification and certification of NDT personnel)

Note: GB/T 9445-2015 Non-destructive testing personnel qualification and certification (ISO 9712:2012, IDT)

ISO 15708-1:2017 Non-destructive testing - Radio-computed tomography testing - Part 1: Terminology (Non-destructive testing-Radiation methods for computed tomography-Part 1: Terminology)

Note: GB/T 12604.12-2021 Non-destructive testing terminology Part 12: Industrial ray computed tomography (CT) testing (ISO 15708-1:2017, MOD)

3 Terms and Definitions

Terms and definitions defined in ISO 15708-1 apply to this document:

The web addresses of terminology databases used in standardization work maintained by ISO and IEC are as follows:

---IEC Electrotechnical Encyclopedia: <http://www.electropedia.org/>;

---ISO online browsing platform: <https://www.iso.org/obp>:

4 General principles

4.1 Basic principles

Computed tomography (CT) is a radiographic detection method that uses a certain number of ray projections to reconstruct tomographic sections (CT cuts):