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

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Non-destructive testing - Leak testing - Tracer gas method

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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"

Drafting.

This document uses the redrafting method to modify and adopt ISO 20485.2017 "Non-destructive testing leak detection tracer gas method".

Compared with ISO 20485.2017, this document has technical differences.

The set vertical single line (|) is marked, and the corresponding technical differences and reasons are given in Appendix A.

1 Scope

This document specifies the technical methods for leak detection using tracer gas and tracer gas leak detectors.

This document applies to the use of tracer gas leak detection to detect leaks and determine the location of the leak.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations

Only the version corresponding to that date is applicable to this document. For undated reference documents, the latest version (including all amendments) applies to

This document.

GB/T 12604.7 Non-destructive testing terminology leak detection (GB/T 12604.7-2021, ISO 20484.2017, MOD)

3 Terms and definitions

The terms and definitions defined in GB/T 12604.7 apply to this document.

4 Detection principle

A partial pressure difference of tracer gas is established on both sides of the boundary of the test piece. After the tracer gas passes through the leak, it is detected by its chemical or physical properties

Measurement. Based on the detection of the chemical properties of the tracer gas, the detection is usually due to a chemical reaction that produces a local color change on the surface of the test piece, so

The inspected parts are required to be visually visible. Based on the detection of the physical properties of the tracer gas, the feedback electrical signal is usually used to change the partial pressure of the tracer gas.

sensor. Commonly used instruments and equipment containing sensors are as follows.

- Mass spectrometer leak detector. used for specific tracer gas, generally 4He;
- Alkali ion diode. used for halogen gas;
- Electronic capture equipment. used for SF₆, etc.;
- Pirani vacuum gauge. used for tracer gases with different thermal conductivity from air;
- Photometer. The emission or absorption frequency of the tracer gas is within the bandpass filter frequency range of the photometer.

The detection conditions should be jointly determined and agreed by the leak detection personnel and the customer, and the leak detection personnel should record the detection report in detail (see

Chapter 10).

5.1 Vacuum testing (Group A technology)

The test piece is evacuated or placed in a pressurized container to generate a pressure difference between the inner and outer walls of the test piece (usually using a vacuum method). Adopt full indication

A shield or container of tracer gas wraps the inspected part (whole or partial), or a spray gun is used to apply the tracer gas to the outer wall of the inspected part. By built-in or

The sensor connected to the inside of the inspected piece detects the tracer gas leaking to the inspected piece.