



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

GB/T 33643-2022

**Non-destructive testing - Test methods for leak detection by
means of acoustic emission**

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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 replaces GB/T 33643-2017 "Non-destructive Testing Acoustic Emission Leak Detection Method", compared with GB/T 33643-2017,

In addition to structural adjustments and editorial changes, the main technical changes are as follows.

- Added the content of normative references (see Chapter 2, Chapter 2 of the.2017 edition);
- Deleted the safety requirements (see Chapter 5 of the.2017 edition);
- Increased the requirements for the fixation of the sensor (see 7.3.2);
- Increased the requirements for the protection level of the sensor housing (see 7.3.3);
- Increased the requirements for measurement parameters (see 7.5);
- Deleted the requirements for pressure indicating devices (see 8.6 of the.2017 edition).

This document is drafted with reference to ISO 18081.2016 "Non-destructive Testing Acoustic Emission Detection Acoustic Emission Leak Detection Method", and the degree of consistency is

Not equivalent.

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

1 Scope

This document describes a leak detection method and result evaluation based on acoustic emission (AE) technology.

This document applies to acoustic emission detection of structures or components that leak due to pressure differences.

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 4208 enclosure protection class (IP code)

GB/T 9445 Qualification and Certification of Nondestructive Testing Personnel

GB/T 12604.4 Nondestructive Testing Terminology Acoustic Emission Testing

GB/T 12604.7 Non-destructive testing term leak detection

GB/T 19800 Primary Calibration of Acoustic Emission Detection Transducers for Nondestructive Testing

GB/T 19801 Nondestructive Testing Acoustic Emission Testing Acoustic Emission Sensor Secondary Calibration

GB/T 20737 General Terms and Definitions of Nondestructive Testing

GB/T 27025 General requirements for the competence of testing and calibration laboratories

3 Terms and Definitions

Terms and definitions defined in GB/T 12604.4, GB/T 12604.7 and GB/T 20737 apply to this document.

4 Personnel requirements

Personnel who implement acoustic emission testing in this document shall be qualified and certified in accordance with GB/T 9445 or the system agreed by the parties to the contract.

certificate, and the employer or its agent shall carry out on-the-job training and operation authorization.

5.1 The phenomenon of acoustic emission caused by leakage

The fluid stored in the closed equipment leaks out through the leakage hole due to the pressure difference.

Gasification and collision of solid particles produce mechanical waves that propagate outward, that is, the phenomenon that leakage produces acoustic waves, also known as the generalized acoustic emission phenomenon. Book

The method detects the leakage of closed equipment and determines the leakage location by collecting and analyzing the acoustic emission signal.

Figure 1 shows the schematic diagram of the acoustic emission signal generated by leakage and the principle of acoustic emission leakage detection. The continuous acoustic emission signal generated by leakage can be regarded as a

significantly enhanced background noise. During the leakage process, the transient changes of pressure fluctuations near the leakage point are different, and the resulting acoustic emission signal has

have a wider spectral range.