

ICS 19.100
CCS J04



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

GB/T 43143-2023

**Non-destructive testing - Acoustic emission testing - Test
method for classification of active cracks in concrete structures**

无损检测 声发射检测 混凝土结构活动裂缝分类的检测方法

Issued on: September 7, 2023

Implemented on: September 7, 2023

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents" Drafting. This document is modified to adopt ISO 16838.2019 "Non-destructive testing of acoustic emission detection of active cracks in concrete structures - Classification of active cracks" method". The technical differences between this document and ISO 16838.2019 and their reasons are as follows:

- a) Replaced ISO 12716 (see Chapter 3) with normatively cited GB/T 12604.4 to adapt to my country's technical level, adding operability;
- b) Replaced ISO 12713 and ISO 12714 (see 4.1) with the normatively cited GB/T 19800 and GB/T 19801, respectively. In line with my country's technical level, increase operability;
- c) Replaced ISO 16836 (see Chapter 6) with the normatively cited GB/T 42871 to adapt to my country's technical level and increase operation work nature;
- d) Delete "The selection of acoustic emission sensors does not have much impact on the results" (see Chapter 6) to improve the operability of detection;
- e) The type of acoustic emission sensor used was changed (see Figure 1) to improve the effectiveness of detection;
- f) Changed the description of the ratio of abscissa and ordinate, range of abscissa and ordinate, and indexing number of the RA-Fa data chart (see Figure 1), to improve the operability of judgment and eliminate ambiguity. The following editorial changes have been made to this document.

---Added Appendix A (informative) "Determination of transition lines of tension cracks and

other types of cracks including shear cracks". Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents. This document is proposed and coordinated by the National Nondestructive Testing Standardization Technical Committee (SAC/TC56). This document was drafted by: Hydraulic Metal Structure Quality Inspection and Testing Center of the Ministry of Water Resources, Shanghai Materials Research Institute Co., Ltd., Beijing Kehaiheng Biotechnology Co., Ltd., Beijing Tianchuang Lingnan Technology Co., Ltd., Central South University, Southeast University, Changsha University of Science and Technology. The main drafters of this document. Li Dongfeng, Wu Weiping, Ding Jie, Dong Longjun, Chen Moucai, Gao Zhimeng, Duan Qingru, Xu Jingzhong, Hu Hongwei, Ding Hui, Wang Lei, Yan Jingli, Wu Xinfang, Kong Chuiyu, Cheng Shengjin. Nondestructive testing of acoustic emission testing of concrete structures Detection method for classification of active cracks

1 Scope

GB/T 43143-2023 gives the acoustic emission method for classifying active cracks in concrete structures, adopting ISO 16838 with modifications. Every old concrete structure has cracks, and the question that matters is not how wide they are but whether they are still moving: a crack that has stopped is a cosmetic and durability problem, while one that opens under each load cycle is a structural one. Acoustic emission answers it directly, because a crack that is growing emits and a dormant one does not. The standard sets the detection system, the treatment of environmental noise, the testing procedure and the test report, and the classification of the crack that follows from the emission observed under load. It took effect on 7 September 2023.

This document specifies the acoustic emission detection (AE) method for classifying active cracks in concrete structures. This document is suitable for assessing the classification of active cracks in concrete structures.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

GB/T 12604.4 Non-destructive testing terminology acoustic emission testing (GB/T 12604.4-2005, ISO 12716.2001, IDT)

GB/T 19800 First-level calibration of acoustic emission detection sensors for non-destructive testing (GB/T 19800-2005, ISO 12713. 1998,IDT)

GB/T 19801 Secondary calibration of acoustic emission sensors for non-destructive testing of acoustic emission (GB/T 19801-2005, ISO 12714. 1999,IDT)

GB/T 42871 Measurement method for acoustic emission signals in concrete during non-destructive testing (GB/T 42871-2023,

ISO 16836.2019,IDT) ISO /T R13115 Absolute calibration method for acoustic emission transducers for non-destructive testing of mutual inductance technology (Non-destructive testing-

3 Terms and definitions

The terms and definitions defined in GB/T 12604.4 and the following apply to this document.

3.1 RA valueRA value The rise time is divided by the amplitude to obtain the reciprocal of the waveform gradient.

3.2 averagefrequencyaveragefrequency Fa The ratio of ring count divided by duration.

4 Detection system

4.1 AE sensor Before testing, the acoustic emission sensor should be calibrated in accordance with GB/T 19800, GB/T 19801 and ISO /T R13115.Consider acoustic coupling In combination, the acoustic emission sensor that detects the acoustic emission signal generated by the concrete structure should have sufficient sensitivity. Acoustic emission sensors should also have sufficient