International Standard

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Non-destructive testing — Acoustic emission testing — Vocabulary

Essais non destructifs — Contrôle par émission acoustique — Vocabulaire

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Foreword

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This document was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee *SC9, Acoustic emission testing.,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 138, *Non-destructive testing,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 12716:2001), which has been technically revised.

The main changes are as follows:

— terms sorted in order of scientific and technical characteristics;

— terms and definitions revised and obsolete terms removed.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Non-destructive testing — Acoustic emission testing — Vocabulary

1 Scope

This document defines the terms used in acoustic emission testing and forms a common basis for standards and general use.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Terms related to the physical nature of acoustic emission

3.1.1
acoustic emission
AE
class of phenomena whereby transient elastic waves are generated by the rapid release of energy from localized sources or the transient waves so generated

Note 1 to entry: Local plastic deformation, crack propagation, erosion, corrosion, impact, leakage are examples of such phenomena.

3.1.2
acoustic emission event
event
physical phenomenon giving rise to *acoustic emission* (3.1.1)

3.1.3
acoustic emission source
source
spatial element from where one (or more) *acoustic emission event(s)* (3.1.2) originate(s)

3.1.4
acoustic emission wave
elastic wave
transient elastic wave generated by an *acoustic emission event* (3.1.2)

Note 1 to entry: Acoustic emission and acoustic emission wave are often used synonymously.

3.1.5
acoustic emission event mechanism
event mechanism
process or combination of processes, generating characteristic *acoustic emission events* (3.1.2)

Note 1 to entry: AE event mechanisms can be subdivided into several categories: material and mechanical, macroscopic and microscopic, primary and secondary.

Note 2 to entry: Instead of event mechanism, the term source mechanism is frequently used in AE literature. Source mechanism relates to the origin of the AE waves radiated in the course of characteristic AE events. In this sense, event mechanism and source mechanism are synonymic.

3.1.6
acoustic emission event energy
event energy
elastic energy released by an *acoustic emission event* (3.1.2)

Note 1 to entry: The event energy in units of joule (watt-second) is the integral of the event energy release rate (equivalent to the event power) over the duration of the event process.

3.1.7
Kaiser effect
absence of significant acoustic emission until the previous maximum applied load level has been exceeded

Note 1 to entry: The definition of the significant acoustic emission depends on the application.

3.1.8
Felicity effect
appearance of significant acoustic emission at a load level below the previous maximum applied level, e.g. as observed in composite materials

Note 1 to entry: The definition of the significant acoustic emission depends on the application.

3.1.9
Felicity ratio
ratio between the applied load at which significant acoustic emission reappears during the next application of loading and the previous maximum applied load

Note 1 to entry: The definition of the significant acoustic emission depends on the application.

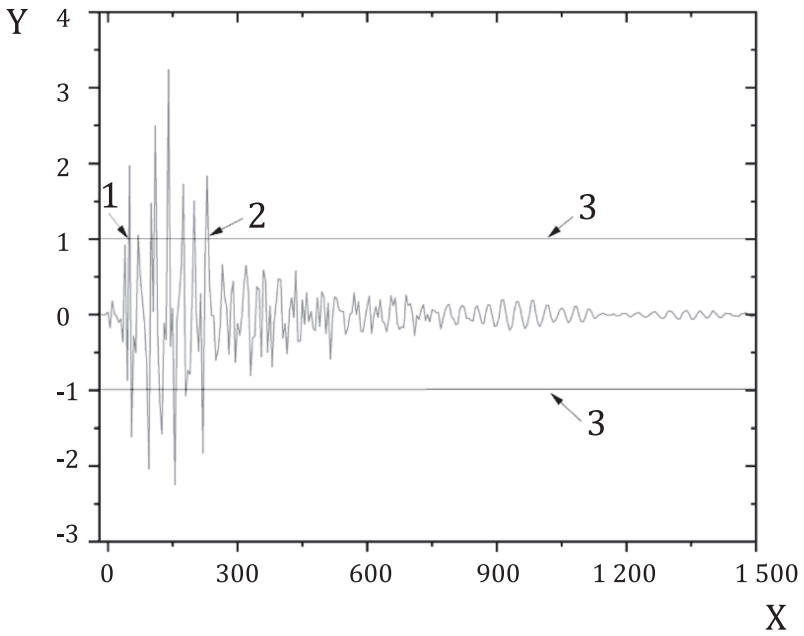
3.2 Terms related to the detection and acquisition of acoustic emission signals

3.2.1
acoustic emission signal
electrical signal from an *acoustic emission sensor* (3.3.1) converted from the *acoustic emission wave* (3.1.4)

Note 1 to entry: This includes burst signals as well as continuous signals.

3.2.2
burst signal
acoustic emission signal (3.2.1) having an identifiable beginning and an identifiable end

Note 1 to entry: See Figure 1.



Key

X	time in units of µs
Y	signal voltage in units of mV
1	burst signal beginning
2	burst signal end
3	acoustic emission detection threshold

Figure 1 — Burst signal

3.2.3
acoustic emission detection threshold
detection threshold
threshold
voltage level, usually stated in units of dB_{AE}, that needs to be exceeded in order to detect a *burst signal* (3.2.2)

3.2.4
burst signal beginning
recognized start of a *burst signal* (3.2.2), defined as the first time that the signal crosses the *detection threshold* (3.2.3)

3.2.5
burst signal end
recognized termination of a *burst signal* (3.2.2), defined as the last time that the signal crosses the *detection threshold* (3.2.3) for a preset period of time

3.2.6
burst signal features
characteristic quantities describing a burst signal (e.g. arrival time, peak amplitude, duration, rise time, energy)

Note 1 to entry: See Figure 2. Energy is not marked here.