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ISO 10843:1997

Australian/New Zealand Standard™

**Acoustics—Methods for the
description and physical
measurement of single impulses
or series of impulses**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EV/10, Acoustics, Community Noise. It was approved on behalf of the Council of Standards Australia on 16 January 1998 and on behalf of the Council of Standards New Zealand on 6 February 1998. It was published on 5 June 1998.

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Acoustics consulting interests, New Zealand
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Australian and New Zealand Environment and Conservation Council
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Bureau of Steel Manufacturers of Australia
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EV/10, Acoustics, Community Noise. This Standard is identical with and has been reproduced from ISO 10843:1997, *Acoustics—Methods for the description and physical measurement of single impulses or series of impulses*.

The objective of this Standard is to describe and specify the physical measurement of single impulsive sound or short series of impulsive sounds.

The term ‘informative’ has been used in this Standard to define the application of the annex to which it applies. An ‘informative’ annex is only for information and guidance.

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<i>Reference to International Standard</i>		<i>Australian, New Zealand or Australian/New Zealand Standard</i>	
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50-801	International electrotechnical vocabulary—Chapter 801: Acoustics and electroacoustics	—	
651	Sound level meters, and its Amendment 1:1993	1259.1	Acoustics—Sound level meters—Non-integrating
804	Integrating-averaging sound level meters, and its Amendment 1:1989 and Amendment 2:1993	1259.2	Acoustics—Sound level meters—Integrating—Averaging
942	Sound calibrators	—	
		AS/NZS	
1260	Electroacoustics—Octave-band and fractional-octave-band filters	4476	Acoustics—Octave-band and fractional-octave-band filters

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NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Acoustics — Methods for the description and physical measurement of single impulses or series of impulses

1 Scope

This International Standard describes preferred methods for the description and the physical measurement of single impulsive sounds or short series of impulsive sounds and for the presentation of the data. It does not provide methods for interpreting the potential effects of series of impulses of noise on hearing, community response or structures.

This International Standard applies to single impulsive sounds or short series of impulsive sounds such as those produced by explosions, artillery fire, bombing and similar activities, sonic booms, pistol and rifle fire, and cartridge-operated tools or machines.

Two different kinds of measurements are considered:

- a) measurements of phase-sensitive parameters, such as peak sound pressure level and duration, that directly characterize the variation of sound pressure with time; and
- b) measurements of time-integrated quantities such as frequency-weighted sound exposure level or sound energy level.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50-801:1994, *International electrotechnical vocabulary — Chapter 801: Acoustics and electroacoustics*

IEC 651:1979, *Sound level meters*, and its Amendment 1:1993.

IEC 804:1985, *Integrating-averaging sound level meters*, and its Amendment 1:1989 and Amendment 2:1993.

IEC 942:1988, *Sound calibrators*.

IEC 1260:1995, *Electroacoustics — Octave-band and fractional-octave-band filters*.

3 Definitions

For the purpose of this International Standard, the definitions given in IEC 50-801 and the following definitions apply.

NOTE — The prefix “un” is used to denote what is also termed “lin-” or “flat-” weighted sound. Unweighted is perhaps most descriptive.

3.1 Characteristics of an impulse noise

3.1.1 A-duration: Time, in seconds, required for the main or principal wave to reach its unweighted peak sound pressure and return momentarily to zero.

NOTES

- 1 See figure 1 a) and annex E, reference [25].
- 2 In practice, the A-duration is the total time between the onset of a signal level 20 dB below the peak level and the first crossing of the signal 20 dB below peak level.
- 3 The notation used for duration in this definition and in 3.1.2 and 3.1.3 should not be confused with the A-, B- and C-frequency weightings.

3.1.2 B-duration: Total time, in seconds, that the envelope of unweighted sound pressure fluctuations (both positive and negative) exceeds one tenth of the unweighted peak sound pressure, including the duration of that part of any reflection pattern that exceeds one tenth of the unweighted peak sound pressure.

NOTE — See figure 1 b) and annex E, reference [25].

3.1.3 C-duration: Total time, in seconds, that the main or principal wave and the following oscillations, both negative and positive, are within 10 dB of the unweighted peak sound pressure level.

NOTE — See figure 1 c) and annex E, reference [34].

3.1.4 envelope: Two idealized smooth lines which effectively join the successive positive or negative peaks of the instantaneous sound pressure.

NOTE - See figure 1 d).

3.1.5 impulse noise: A single short burst or series of short bursts of sound pressure.

NOTE — The pressure-time history of a single burst of impulsive noise includes a rise to a peak pressure, followed by a decay of the pressure envelope.

3.1.6 instantaneous sound pressure: Total instantaneous pressure, in pascals, at a point in the presence of a sound wave minus the atmospheric pressure at that point.

NOTE — Instantaneous pressure relates to the pressure as measured by the microphone prior to any signal processing.

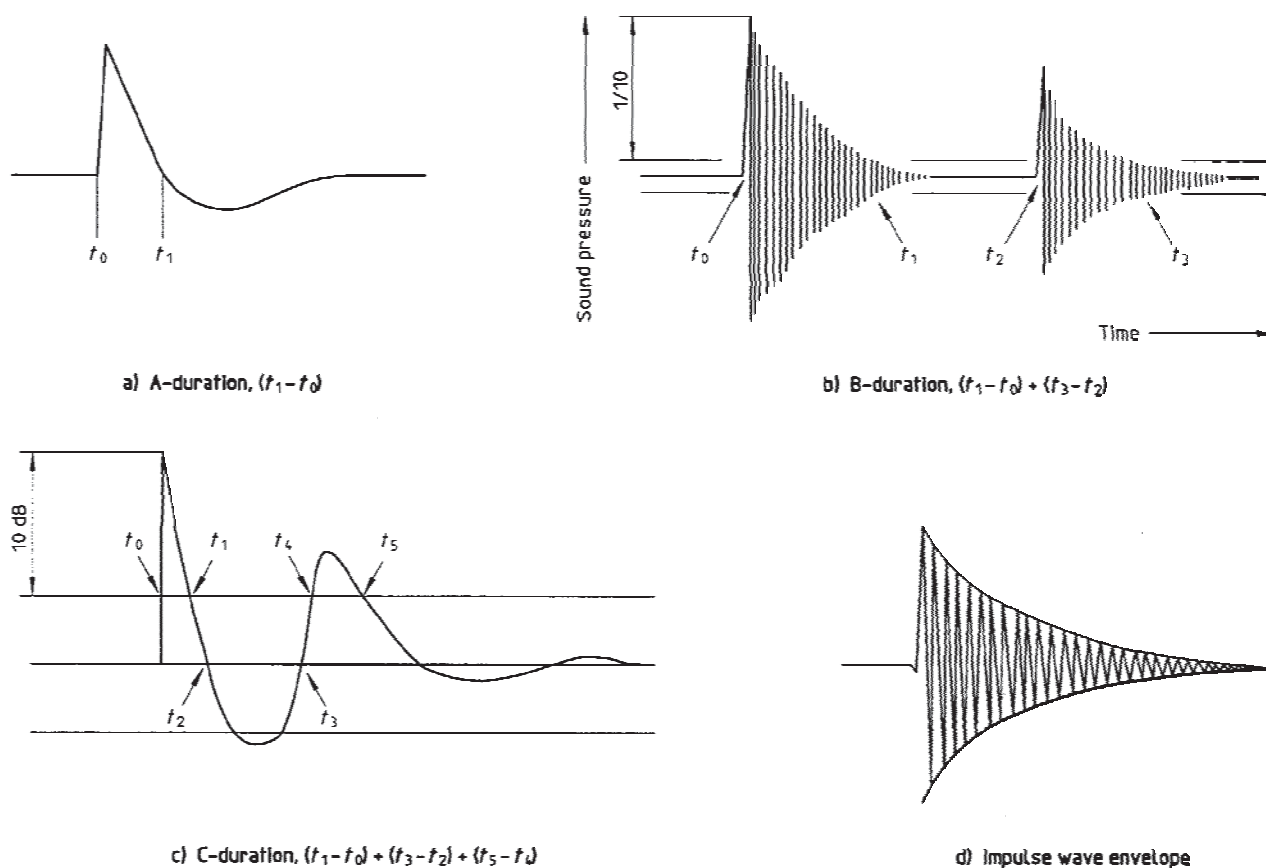


Figure 1 — Impulse noise characteristics

3.1.7 instantaneous sound pressure level: Ten times the common logarithm of the square of the ratio of the frequency-weighted instantaneous sound pressure to the reference sound pressure, expressed in decibels.

NOTES

- 1 In air the reference sound pressure is $20 \mu\text{Pa}$.
- 2 The frequency weighting is to be specified.

3.1.8 peak sound pressure: For any specified time interval, the maximum absolute value of the instantaneous sound pressure, in pascals, that occurs during a specified time interval.

3.1.9 peak sound pressure level: Ten times the common logarithm of the square of the ratio of peak frequency-weighted sound pressure to the reference sound pressure, expressed in decibels.

NOTES

- 1 In air, the reference pressure is $20 \mu\text{Pa}$.
- 2 The frequency weighting is to be specified.

3.1.10 signal rise time: Time, in seconds, a signal takes to rise from 10 % to 90 % of its maximum absolute value of the sound pressure.

3.1.11 sound energy: Time and spatial integral of the sound intensity normal to an imaginary closed surface, where sound intensity is the real part of the product of instantaneous sound pressure and particle velocity (at the same point in space), expressed in joules.