

Australian Standard™

**Acoustics—Measurement of sound
absorption in a reverberation room**

STANDARDS
Australia



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PREFACE

This Standard was prepared by the Joint Standards Australian/Standards New Zealand Committee AV-004, Acoustics Architectural to supersede AS 1045—1988, *Acoustics—Measurement of sound absorption in a reverberation room*. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

This Standard is identical to ISO 354:2003, *Acoustics—Measurement of sound absorption in a reverberation room*.

The objective of this Standard is to specify a method of measuring the sound absorption coefficient of acoustical materials used as wall or ceiling treatments, or the equivalent sound absorption area of objects, such as furniture, persons or space absorbers, in a reverberation room.

As this Standard is reproduced from an international standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (b) In the source test ‘this International Standard’ should read ‘this Australian Standard’.
- (c) A full point substitutes for a comma when referring to a decimal mark.
- (d) For this Standard, the sound source should be chosen for minimum directivity.

For Australia only, this Standard provides for the use of the following Australian Standards in place of particular International Standards referenced herein:

<i>Reference to International Standard*</i>		<i>Australian or Australian/New Zealand Standard</i>	
IEC		AS/NZS	
61260	Electroacoustics—Octave-band and fractional-octave-band filters	4476	Acoustics—Octave-band and fractional-octave-band filters
ISO		AS	
266	Acoustics—Preferred frequencies	2533	Acoustics—Preferred frequencies and band centre frequencies

The term ‘normative’ has been used in this Standard to define the application of the annex to which it applies. A ‘normative’ annex is an integral part of a Standard.

* Only referenced International Standards that have been adopted as an Australian Standard have been listed.

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INTRODUCTION

When a sound source operates in an enclosed space, the level to which reverberant sound builds up, and the subsequent decay of reverberant sound when the source is stopped, are governed by the sound-absorbing characteristics of the boundary surfaces, the air filling the space, and objects within the space. In general, the fraction of the incident sound power absorbed at a surface depends upon the angle of incidence. In order to relate the reverberation time of an auditorium, office, workshop, etc., to the noise reduction that would be effected by an absorbing treatment, knowledge of the sound-absorbing characteristics of the surfaces, usually in the form of a suitable average over all angles of incidence, is required. Since the distribution of sound waves in typical enclosures includes a wide and largely unpredictable range of angles, a uniform distribution is taken as the basic condition for the purposes of standardization. If, in addition, the sound intensity is independent of the location within the space, the sound distribution is called a diffuse sound field, and the sounds reaching a room surface are said to be at random incidence.

The sound field in a properly designed reverberation room closely approximates a diffuse field. Hence, sound absorption measured in a reverberation room closely approximates the sound absorption that would be measured under the basic conditions assumed for standardization.

The purpose of this International Standard is to promote uniformity in the methods and conditions of measurement of sound absorption in reverberation rooms.

AUSTRALIAN STANDARD

Acoustics — Measurement of sound absorption in a reverberation room

1 Scope

This International Standard specifies a method of measuring the sound absorption coefficient of acoustical materials used as wall or ceiling treatments, or the equivalent sound absorption area of objects, such as furniture, persons or space absorbers, in a reverberation room. It is not intended to be used for measuring the absorption characteristics of weakly damped resonators.

The results obtained can be used for comparison purposes and for design calculation with respect to room acoustics and noise control.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 266, *Acoustics — Preferred frequencies*

ISO 9613-1, *Acoustics — Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere*

IEC 61260, *Electroacoustics — Octave-band and fractional-octave-band filters*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1

decay curve

graphical representation of the decay of the sound pressure level in a room as a function of time after the sound source has stopped

3.2

reverberation time

T
time, in seconds, that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped

NOTE 1 The definition of T with a decrease by 60 dB of the sound pressure level can be fulfilled by linear extrapolation of shorter evaluation ranges.

NOTE 2 This definition is based on the assumptions that, in the ideal case, there is a linear relationship between the sound pressure level and time, and that the background noise level is sufficiently low.