Australian Standard®

# Acoustics—Description and measurement of environmental noise

## Part 1: General procedures

This Australian Standard was prepared by Committee AV/5, Acoustics, Community Noise. It was approved on behalf of the Council of Standards Australia on 20 June 1997 and published on 5 August 1997.

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The following interests are represented on Committee AV/5:

AirServices Australia

The Association of Consulting Engineers, Australia

Australian Acoustical Society

Australian and New Zealand Environment and Conservation Council

AUSTROADS

Bureau of Steel Manufacturers of Australia

Council of The City of Sydney

CSIRO—Division of Building, Construction & Engineering

Department of Defence

Ministry of Health, New Zealand

National Acoustic Laboratories

Royal Australian Institute of Architects

Royal Australian Planning Institute

The Institute of Marine Engineers Australia/New Zealand Division

University of Sydney

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# Part 1: General procedures

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# PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AV/5 on Acoustics, Community Noise, to supersede AS 1055.1—1989, *Acoustics—Description and measurement of environmental noise*, Part 1: *General procedures*. This Standard is based on ISO 1996-1:1982, *Acoustic—Description and measurement of environmental noise*—Part 1: *Basic quantities and procedures.* This Standard is a result of a consensus among representatives on the Joint Committee to produce it as an Australian Standard. New Zealand has proceeded with a separate review of its environmental noise Standard NZS 6802:1991.

It is Part 1 in a series of Standards on the measurement and assessment of environmental noise. The objective of this Part is to serve as a general guide for the evaluation of environmental noise in order to meet the needs of public bodies and persons interested in its control. It applies primarily to noise emitted from industrial, commercial and residential premises, and is intended for use in the evaluation of existing problems, as well as for planning purposes. It may be used for noises which include impulsive components, but it is not suitable for noise which consists solely of discrete impulses, e.g. shooting, blasting.

The objective of this revision is to reflect the rapid technological advances in acoustical measurement techniques. Although a sound level meter set on A-weighting and 'F' response may be used to make a quick assessment of a possible community noise problem, more sophisticated instrumentation is now readily available and should be used for the purposes of the AS 1055 series. A choice may be made between the time average A-weighted sound pressure level or other descriptor(s) such as the percent exceedance A-weighted sound pressure level as the basic quantity, or other quantities as specified by the relevant regulatory authority.

This Standard is not a regulatory document and users should ascertain, from the relevant regulatory authority, details of specific requirements laid down in each State or Territory.

Extensive research concerning the way in which human beings are affected by noise from a single kind of source such as rail or road vehicles, aircraft or industrial plants, has led to a variety of descriptors for assessment of different kinds of noise, many of which are in common use. Conversion from one descriptor to another is often beset with significant uncertainty.

If an acoustical environment were always dominated by a single kind of noise, the confusion caused by the existence of different descriptors would not be so serious. But often environmental noise is a composite of sounds from many sources, and the distribution of the different kinds of noise is likely to change from moment to moment. The methods and procedures described in this Standard are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site. For certain types of sources more detailed procedures may be used, e.g. reference is made to AS 1269, *Acoustics—Hearing conservation*, for situations where the noise may cause hearing impairment. Specific measurements for road traffic, aircraft and ship noise are dealt with in AS 2702 *Acoustics—Methods for the measurement of road traffic noise*, AS 2021 *Acoustics—Aircraft noise intrusion—Building siting and construction* and AS 1949 *Acoustics—Measurement of airborne noise emitted by vessels in waterways, ports and harbours* respectively.

This Standard aims at providing authorities with material for the description of noise in community environments. Based on the principles described in this Standard, acceptable limits of noise can be specified and compliance with these limits can be controlled.

It has been assumed that the user of this Standard is adequately trained in the science of acoustics and thoroughly experienced in noise measurement and assessment, but to familiarize the user with some of the special terms introduced in this Standard, an example of its application is included (see Appendix A). For further information see also AS 2659 *Guide to the use of sound measuring equipment*, Parts 1 and 2.

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

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# Australian Standard

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**1 SCOPE** This Standard sets out general procedures for the description and measurement of environmental noise including repetitive impulsive noise. This Standard does not apply to the measurement or assessment of en route air, rail or water transportation or road transportation on public roads. It also does not apply to noise which consists solely of discrete impulses such as those encountered in shooting and blasting. This Standard defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

It excludes the setting of environmental noise criteria. Such levels are set by regulations or organizational policy, not by Standards Australia.

In this Standard all sound pressure level descriptors are A-weighted.

**2 REFERENCED DOCUMENTS** The following documents are referred to in this Standard:

AS
1055 Acoustics—Description and measurement of environmental noise
1055.2 Part 2: Application to specific situations
1055.3 Part 3: Acquisition of data pertinent to land use

1259 Acoustics—Sound level meters
1259.1 Part 1: Non-integrating
1259.2 Part 2: Integrating—Averaging

1269 Acoustics—Hearing conservation

1633 Acoustics—Glossary of terms and related symbols

2659 Guide to the use of sound measuring equipment
2659.1 Part 1: Portable sound level meters
2659.2 Part 2: Portable equipment for integration of sound signals

2680 Acoustics—Performance for tape recording equipment for use in acoustical measurement systems

IEC
942 Sound calibrators

**3 DEFINITIONS** For the purpose of this Standard, the definitions given in AS 1633 and those below apply.

**3.1 A-weighted sound pressure ($p_A$)**—the root-mean-square (r.m.s.) sound pressure determined by use of frequency-weighting network 'A' (see AS 1259.1).

**3.2 Sound pressure level ($L_p$)**—the level of the root-mean-square (r.m.s.) sound pressure in decibels given by—

$$L_p = 10 \log_{10}(p/p_o)^2 \quad \ldots (1)$$

where $p$ is the r.m.s. sound pressure in pascals. The reference sound pressure $p_o$ is 20 μPa and does not need to be stated.