

Australian Standard[®]

**Acoustics—Measurement of
airborne noise emitted by
earth-moving machinery and
agricultural tractors—Stationary
test condition**

**Part 1: Determination of
compliance with limits for
exterior noise**

This Australian Standard was prepared by Committee AV/6, Acoustics, Machinery Noise. It was approved on behalf of the Council of Standards Australia on 3 July 1990 and published on 17 September 1990.

The following interests are represented on Committee AV/6:

Australian and New Zealand Environment Council
Australian Coal Association
Australian Compressed Air and Mining Equipment Institute
Australian Federation of Construction Contractors
AUSTROADS
Confederation of Australian Industry
Master Builders Construction and Housing Association, Australia
Metal Trades Industry Association of Australia
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First published as part of AS 2012—1977.
AS 2012—1977 revised and redesignated in part as
AS 2012.1—1990.

PREFACE

This Standard was prepared by the Standards Australia Committee on Acoustics, Machinery Noise to supersede part of AS 2012—1977, *Method for measurement of airborne noise from agricultural tractors and earth-moving machinery*.

This Standard is a test for the earth-moving machinery and agricultural tractors in stationary test conditions.

Specific requirements in this test enable the sound power emission in a stationary test condition to be determined in a manner which is repeatable. Attachments (bucket, dozer, etc.) for the manufacturer's production version are to be fitted since this is the configuration most likely to exist when the machine is in actual use.

This Australian Standard may be used for determination of compliance with noise limits, and for evaluation purposes in noise reduction investigations, and for comparison between machines.

This Standard is one of the series which deals with noise emitted by earth-moving machinery and agricultural tractors, the series being arranged as follows:

Part 1: *Determination of compliance with limits for exterior noise (this Standard)*

Part 2: *Operator's position*

This Standard is technically equivalent to ISO 6393, *Acoustics — Measurement of airborne noise emitted by earthmoving machinery — Method for determining compliance with limits for exterior noise — Stationary test condition*.

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STANDARDS AUSTRALIA

Australian Standard

Acoustics—Measurement of airborne noise emitted by earth-moving machinery and agricultural tractors—Stationary test condition

Part 1: Determination of compliance with limits for exterior noise

1 SCOPE This Standard describes a method for determining the exterior noise emitted by earth-moving machinery and agricultural tractors in terms of the A-weighted sound power level while the machine is stationary. At six positions on a hemispherical surface, the equivalent continuous A-weighted sound pressure levels are measured. The A-weighted sound power level of the machinery is calculated from the measured values.

This Standard applies to the following types of machinery:

- (a) Agricultural tractors.
- (b) Crawlers and wheeled excavators.
- (c) Crawlers and wheeled loaders.
- (d) Crawlers and wheeled dozers.
- (e) Backhoe loaders.
- (f) Graders.
- (g) Compactor/rollers.
- (h) Four-wheel drive skid-steer machines.

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

AS

1217	Acoustics — Determination of sound power levels of noise sources
1217.2	Part 2: Precision methods for broad-band sources in reverberation rooms
1259	Acoustics — Sound level meters
1259.1	Part 1: Non-integrating
1259.2	Part 2: Integrating-averaging
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
2789	Internal combustion engines — Performance
2789.7	Part 7: Engines for road vehicle use — Test code, net power
2951	Earth-moving machinery — Nomenclature
2951.1	Part 1: Basic types

3 DEFINITIONS For the purpose of this Standard, the definitions given in AS 1633 and AS 2951.1 and those below apply.

3.1 Equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$) The value of the sound pressure level of a continuous steady sound that, within a specified time interval (T), has the same mean square sound pressure as a sound whose level varies with time and is defined as —

$$L_{Aeq,T} = 10 \log_{10} \left(\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} \frac{p_A^2(t)}{p_0^2} dt \right) \dots \dots \dots 1$$

where

- $L_{Aeq,T}$ = equivalent continuous A-weighted sound pressure level, determined over a time interval (T), in hours, starting at t_1 and ending at t_2 , in decibels(A)
- p_0 = reference sound pressure
= 20 μ Pa
- $p_{A(t)}$ = instantaneous A-weighted sound pressure of the sound signal, in micropascals.

NOTE: In certain circumstances $L_{Aeq,T}$ may be estimated by representative samples of less than the stated measurement time interval.