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ACOUSTICS—METHODS FOR MEASUREMENT OF AIRBORNE NOISE EMITTED BY POWERED LAWNMOWERS, EDGE AND BRUSH CUTTERS AND STRING TRIMMERS

This Australian Standard was prepared by Committee AV/6, Acoustics, Machinery Noise. It was approved on behalf of the Council of the Standards Association of Australia on 5 December 1987 and published on 5 April 1988.

The following interests are represented on Committee AV/6:

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Australian Compressed Air Institute
Australian Environment Council
Australian Federation of Construction Contractors
Confederation of Australian Industry
Construction Equipment, Importers and Manufacturers of Australia
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PREFACE

This Standard was prepared by the Association's Committee on noise from machinery. It is based on ISO/DIS 5395/5.2, *Power lawn mowers, lawn tractors, and lawn and garden tractors with mowing attachments—Safety requirements and test procedures—Part 5: Test code for the measurement of airborne noise emission*.

This Standard describes a method for measuring the airborne noise emitted by powered grass-cutting machines, edge and brush cutters, and string trimmers, i.e. for determining the acoustic characteristic of a machine in terms of the A-weighted sound power level. The values obtained are the fundamental quantities for characterizing the sound output of the machine under test. The A-weighted sound power level of the machine is calculated from measured values of the A-weighted sound pressure level at several microphone positions located on a hypothetical hemispherical surface which envelops the machine.

The Standard includes a method for the measurement of occupational noise levels for each of the machines. Levels are expressed as A-weighted sound pressure levels at the user's ear.

This Standard also provides, in an appendix, a method for the prediction of noise at the bystander position, i.e. 7.5 m away from the machine being tested.

CONTENTS

		Page
1	SCOPE	3
2	APPLICATION	3
3	REFERENCED DOCUMENTS	3
4	DEFINITIONS	3
5	MEASURING EQUIPMENT	3
6	QUANTITIES TO BE MEASURED	3
7	TEST ENVIRONMENT	4
8	LOCATION AND ORIENTATION OF MICROPHONE	4
9	SOUND MEASUREMENTS	4
10	OPERATION CONDITIONS FOR MACHINES	5
11	CALCULATIONS	7
12	INFORMATION TO BE RECORDED	7
APPENDICES		
A	TEST LOAD AND CONSTRUCTION MATERIALS	9
B	PREDICTION OF NOISE AT THE BYSTANDER'S POSITION	11

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1 SCOPE. This Standard describes the method for the measurement of the sound level of noise emitted by powered lawnmowers, including ride-on lawnmowers, and by edge and brush cutters and string trimmers, and of the noise heard at the operator's position and at a specified bystander's position. It applies to machines powered by electricity, including batteries, and by internal combustion engine.

The Standard includes the method of calculation of sound power level.

NOTE: A lawnmower, edge or brush cutter, or string trimmer may be referred to herein as a machine.

2 APPLICATION. This Standard applies to the measurement of noise from machines for annoyance and for hearing conservation purposes. It applies to all such machines designed for private and commercial use in upkeeping areas under grass for domestic, decorative, or recreational purposes, but does not apply to towed machines nor to agricultural and forestry machines for grass-cutting and grass-harvesting.

NOTE: This Standard applies to machines basically operating unloaded. In some circumstances, for hearing conservation purposes, the load will make a significant difference.

3 REFERENCED DOCUMENTS. The following Standards are referred to in this Standard:

AS
1259 Sound level meters
1269 Hearing conservation
1633 Acoustics—Glossary of terms and related symbols
2400 SAA Packaging Code
Part 1: Glossary of packaging terms (AS 2400.1)
2657 Powered rotary lawnmowers
2659 Guide to the use of sound measuring equipment
Part 2: Portable equipment for integration of sound signals (AS 2659.2)
3156 Approval and Test Specification—Electric lawnmowers
Z41 Octave, half octave and one-third octave band pass filters intended for the analysis of sound and vibrations

4 DEFINITIONS. For the purpose of this Standard, the definitions given in AS 1633, AS 2657, and AS 3156 apply.

5 MEASURING EQUIPMENT.

5.1 Sound level meter. A sound level meter having accuracy at least equal to that of a Type 2 meter complying with AS 1259 shall be used. It shall be calibrated in accordance with AS 1259 at intervals of not more than 2 years. In addition, an operational check of the sound level meter shall be made at least before and after each measuring session, using a portable checking device. If lengthy measurement procedures are undertaken, instrument performance checks shall be carried out at least every 2 h. If the sound level meter registers a change in sensitivity greater than ±1 dB from the level of the portable checking device between consecutive checks, any measurements carried out in the interval between the two checks shall be considered invalid.

Multifrequency calibrating devices, where used as operational checks, shall be calibrated at intervals of not more than 2 years.

NOTE: The use of multifrequency calibrating devices as operational checks is recommended.

A windscreen attachment to the microphone shall normally be used, but in any case shall be used if recommended by the microphone manufacturer.

5.2 Spectrum analysis. Where measurements of the sound frequency spectrum are required, they shall be carried out using a frequency analyser fitted with filters complying with AS Z41.

Measurements may be made either in octave bands or in one-third octave bands, over the range of centre frequencies from 125 Hz to 4000 Hz at least for octave bands, or from 100 Hz to 5000 Hz at least for one-third octave bands.

Such equipment shall be calibrated at intervals of not more than 2 years.

If, to comply with the requirements of this Standard, it is necessary to connect the microphone by means of a cable to the measuring instrument, appropriate correction shall be made so that there is no degradation of meter performance under such a condition.

6 QUANTITIES TO BE MEASURED.

6.1 General. The microphone locations shall be as specified in Clause 8. The number of measurements at each location shall be determined according to Clause 9. The machine shall be operated as specified in Clause 10; or for the purpose of measuring background sound pressure levels, it shall be stopped.

6.2 Spectral analysis. For the purpose of spectral analysis, where required, the values to be measured shall be sound pressure levels in decibels.

6.3 Noise exposure at operator's position. Noise exposure may be measured at the operator's position with—

(a) an integrating sound level meter in terms of an equivalent continuous A-weighted sound pressure level (L_{Aeq}) during the period of measurement (see AS 2659.2); or

(b) if the noise is considered to be steady at each measurement location, a sound level meter.