AS 2221, Part 1—1979

Australian Standard®

METHODS FOR MEASUREMENT OF AIRBORNE SOUND EMITTED BY COMPRESSOR UNITS INCLUDING PRIMEMOVERS AND BY PNEUMATIC TOOLS AND MACHINES

PART 1—ENGINEERING METHOD FOR MEASUREMENT OF AIRBORNE SOUND EMITTED BY COMPRESSOR/PRIMEMOVER UNITS INTENDED FOR OUTDOOR USE

The following scientific, industrial and governmental organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Acoustical Society

Australian Compressed Air Institute

Confederation of Australian Industry

CSIRO, Division of Building Research

Department of Environment, South Australia

Environment Protection Authority of Victoria

Institution of Engineers, Australia

National Association of Australian State Road Authorities

Society of Automotive Engineers—Australasia

Sydney City Council

This standard, prepared by Committee AK/9, Noise from Pneumatic Tools and Machines, was approved on behalf of the Council of the Standards Association of Australia on 31 October 1978, and was published on 1 February 1979.

This Standard was issued in draft form for comment as DR 77097.

Australian Standard®

METHODS FOR MEASUREMENT OF AIRBORNE SOUND EMITTED BY COMPRESSOR UNITS INCLUDING PRIMEMOVERS AND BY PNEUMATIC TOOLS AND MACHINES

PART 1—ENGINEERING METHOD FOR MEASUREMENT OF AIRBORNE SOUND EMITTED BY COMPRESSOR/PRIMEMOVER UNITS INTENDED FOR OUTDOOR USE

First published 1979

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 1579 1

PREFACE

This standard was prepared by the Association's Committee on Noise from Pneumatic Tools and Machines as the first Part of a series of standard methods for measurement of airborne sound emitted by compressor units including primemovers, and by pneumatic tools and machines. It describes a method for determining the mean sound level and mean band pressure level of airborne sound emitted by compressor/prime–mover units intended for outdoor use, and is based on ISO 2151, Measurement of Airborne Noise Emitted by Compressor/Primemover Units Intended for Outdoor Use.

Other Parts in this series will deal with similar determinations for other types of compressors and pneumatic tools and machines, and with the determination of sound power levels of compressors and pneumatic tools and machines.

This standard is intended to show how information on the acoustic properties of compressor/primemover units for outdoor use should be measured and presented. This information is obtained from measurements made over a reflecting plane and in an area where free–field conditions usually exist. A form of test report for presentation of results is given in an appendix.

This standard requires reference to the following Australian standards:

AS 1055	Code of Practice for Noise Assessment in Residential Areas
AS 1259	Sound Level Meters Part 2—Type 2, Precision
AS 1269	SAA Hearing Conservation Code
AS 1270	Hearing Protection Devices
AS 1633	Glossary of Acoustic Terms
AS Z33	Preferred Frequencies and Band Centres for Acoustical Measurements
AS Z41	Octave, Half Octave and One–third Octave Band Pass Filters Intended for the Analysis of Sound and Vibrations

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR MEASUREMENT OF AIRBORNE SOUND EMITTED BY COMPRESSOR UNITS INCLUDING PRIMEMOVERS AND BY PNEUMATIC TOOLS AND MACHINES

PART 1—ENGINEERING METHOD FOR MEASUREMENT OF AIRBORNE SOUND EMITTED BY COMPRESSOR/PRIMEMOVER UNITS INTENDED FOR OUTDOOR USE

1 SCOPE. This standard describes a method for determining the mean sound level and mean band pressure level of the airborne sound emitted by compressor/primemover units intended for outdoor use. This is an engineering method in which care is required to establish a controlled environment in order to achieve repeatable results.

2 APPLICATION. This standard is intended to apply to—

(a) a comparison of the acoustic properties of machines tested according to the procedures described in this standard, and the subsequent rating of these machines;

(b) a prediction of noise annoyance in adjoining areas from machines operating outdoors, for example on a construction site (see AS 1055 for assessment of noise annoyance in residential areas); and

(c) an assessment of the noise exposure of persons who are occupationally exposed to noise from such machines (see AS 1269 and AS 1270).

3 DEFINITION. For the purpose of this standard, the following definition applies:

Reference surface of the machine under test—the smallest possible imaginary parallelipiped (box) that will just enclose the machine under test.

NOTES:

1. Small elements such as handles, drawbars, handrails and wheels protruding from the source which are unlikely to be major radiators or sound may be disregarded, but mufflers, air receivers and air cleaners are regarded as noise sources.
2. For definitions of acoustic terms, see AS 1633.

4 INSTRUMENTATION.

4.1 Sound Level Meter. The sound level meter shall comply with AS 1259, Part 2. Care shall be taken to avoid the influence of wind gusts on meter readings. A microphone windscreen shall be used and the appropriate correction shall be applied.

4.2 Alternative Systems. Alternative measuring systems may be used provided that their overall electro-acoustic performance complies with the relevant requirements of AS 1259, Part 2. All parts of such a system, including cables shall be subjected to calibration.

4.3 Spectrum Analysis. Where measurements of the sound frequency spectrum are required, a frequency analyser fitted with filters complying with AS Z41 shall be used, and the selected band shall be in accordance with AS Z33.

4.4 Calibration. All equipment shall be calibrated at intervals of not more than 2 years. In addition, an operational check of the measuring system shall be made at least before and after each measuring session using an acoustic calibrator appropriate to the sound level meter. Multi-frequency calibrating devices are recommended for this purpose.

If lengthy measurement procedures are undertaken, instrument performance checks shall be carried out at least every 2 h. If the system registers a discrepancy greater than ±1 dB from the level of the calibrator between consecutive checks, any measurements in the interval between the two checks shall be considered invalid.

5 OPERATING CONDITIONS.

5.1 Condition of Machine. Prior to measurement, the machine under test shall have been warmed up and shall be operating in a stable condition as for continuous service and at its normal rated working pressure.

5.2 Measurement Conditions. The measurements shall be made in the full speed on-load condition and in the idling condition, as follows:

(a) *Full speed on-load condition.* The machine shall be running at the design full speed with the compressor on load, delivering its rated output and pressure. The discharge shall be piped clear of the test area or fed into an effective silencer.

NOTE: Care should be taken to ensure that radiation from the silencing system does not affect the test readings.

(b) *Idling condition.* The machine shall be running in the idling condition with the discharge valves from the receiver closed.

6 TEST ENVIRONMENT.

(a) The test site shall be in the open air and shall be of such dimensions that all microphone positions are within its perimeter. The ground within the test site shall be substantially level and covered with concrete, asphalt or other similar hard material providing acoustic reflection.

(b) Account shall be taken of any sound generated by the test environment from induced vibration. Isolation in the form of a break between the machine mounting pad and the reflecting plane may be necessary in some cases.

(c) No large objects, such as building or machines, shall be within a radius of 12 m from the machine on test.

(d) Operating personnel shall be kept clear of the machine and the microphone while readings are being taken, so as not to prejudice the validity of the measurements. The acoustic measuring system, unless specifically designed to minimize acoustic field distortion, and its observer shall both be