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Australian Standard 2240—1979

METHODS OF MEASUREMENT OF THE

SOUND EMITTED BY MOTOR VEHICLES

STANDARDS ASSOCIATION OF AUSTRALIA
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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 and New Zealand Pulp and Paper Industry Technical Association
Australian Institute of Health Surveyors
Australian Planning Institute
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Council of the City of Sydney
CSIRO, Division of Building Research
CSIRO, Division of Mathematics and Statistics
Department of Defence
Department of Environment, South Australia
Electricity Supply Association of Australia
Experimental Building Station
Metal Trades Industry Association of Australia
National Acoustic Laboratories
National Association of Australian State Road Authorities
Public Works Department, W.A.
Royal Australian Institute of Architects
Society of Automotive Engineers—Australasia
State Departments of Public Health
Universities
Victoria Police

This standard was prepared by Committee AK/5, Community Noise, was approved on behalf of the Council of the Standards Association of Australia on 5 February 1979, and was published on 1 May 1979.

To keep abreast of progress in industry, Australian standards are regularly reviewed. Suggestions for improvements to published standards, addressed to the head office of the Association, are welcomed.

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AUSTRALIAN STANDARD

METHODS OF MEASUREMENT OF THE SOUND EMITTED BY MOTOR VEHICLES

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PREFACE

This standard was prepared by the Association's Committee on Community Noise.

Road traffic is the chief community noise source at the majority of urban sites and it is necessary to restrict the noise emission of each individual vehicle if the noise of the traffic stream is to be controlled. This standard is intended for reference by manufacturers, users, and regulatory authorities concerned with the motor vehicle industry, in relation to long-term guidelines for the control of noise.

The general method of assessment described involves the measurement of the sound level in dB(A), which from experience gives a good correlation with annoyance.

The test methods described in this standard are designed to determine the sound emission potential of a vehicle in typical urban traffic situations. It has been found from experience that the rank ordering of the measured sound levels emitted by different vehicles varies according to the vehicle operating condition specified in the test method; thus the standard describes the test procedure for six different operating conditions, as follows:

(a) Moving vehicle acceleration test.

(b) Stationary vehicle test.

(c) Acceleration from a standing start test.

(d) Low speed drive-by test.

(e) High speed drive-by test.

(f) Body noise test.

It should be noted that certain of the tests prescribed herein are similar to but not identical with tests prescribed by various regulatory authorities. Thus it is emphasized that most regulatory authorities do not intend to adopt the SAA tests in regulations although the possibility of some government authorities using them in a regulatory or quasi-regulatory way cannot be ruled out. The SAA tests will not replace those noise tests required of vehicle manufacturers to demonstrate compliance with Australian Design Rules. They are intended primarily as a means of acquiring data for the possible future development of comprehensive motor vehicle test methods. Thus the methods are all to be considered as baseline data acquisition tools.

It is therefore requested that data obtained using these test methods be submitted to the Standards Association of Australia for examination by the relevant subcommittee of Committee AK/5, Community Noise. Such data will be used in the preparation of a revised edition of this standard.

This standard does not deal with the measurement of noise within motor vehicles. Preparation of a standard method of measurement of noise inside vehicles is under consideration.

The standard requires reference to the following documents:

AS 125[illegible] Sound Level Meters
Part 2—Type 2, Precision

AS 1[illegible]33 Glossary of Acoustic Terms

SAA MP.. The Use of Sound Measuring Equipment
Part 1—Portable Sound Level Meters*

*In course of preparation.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS OF MEASUREMENT OF THE SOUND EMITTED BY MOTOR VEHICLES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard describes the following test methods for measuring sound levels emitted by motor vehicles:

(a) Moving vehicle acceleration test.

(b) Stationary vehicle test.

(c) Acceleration from a standing start test.

(d) Low speed drive-by test.

(e) High speed drive-by test.

(f) Body noise test.

The sound levels are expressed in decibels, using the A-weighting network in accordance with AS 1259, Part 2.

1.2 APPLICATION.

1.2.1 General. This standard applies to the measurement of sound levels emitted by—

(a) new vehicles, and

(b) in-service vehicles,

except that certain of the tests are not recommended for motor cycles (see Clause 1.2.2).

Measurements of the sound emitted by a moving vehicle generally require the use of a large quiet site. Measurements of the sound emitted by a stationary vehicle are restricted to the sound emitted by the engine and exhaust system; the site requirements are less stringent and thus these test methods are more suitable for testing in-service vehicles.

NOTE: In order that correlation between the moving and stationary test methods can be assessed, it is desirable that the tests prescribed for stationary vehicles are also carried out on vehicles which are subjected to the test prescribed for moving vehicles.

1.2.2 Base-line data tests. For the purpose of collecting base-line data to assist in the further development of this standard, the following tests are recommended:

(a) *Moving vehicle acceleration test* (See Section 2). In this test, the sound emitted by a vehicle when accelerating from a moving start is measured.

NOTE: This test is not recommended for motor cycles.*

(b) *Stationary vehicle test* (See Section 3). In this test, data relating to sound emitted from a vehicle's exhaust and engine is measured.

(c) *Acceleration from a standing start test* (See Section 4). In this test, the maximum sound emission from a vehicle's engine and transmission system is measured.

NOTE: This test is not recommended for motor cycles.*

(d) *Low speed drive-by test* (See Section 5). In this test, the sound emitted by a vehicle under conditions of low-speed cruising is measured.

(e) *High speed drive-by test* (See Section 6). In this test, the sound emitted by a vehicle under conditions of high-speed cruising in urban areas is measured.

(f) *Body noise test* (See Section 7). This test is applicable to motor trucks, vans, buses and similar commercial vehicles. In this test, the sound emitted by a vehicle when it is driven over a bump is measured.

1.3 DEFINITIONS.

1.3.1 General. For the purpose of this standard, the definitions given in Clauses 1.3.2 to 1.3.7 apply.

NOTE: For definitions of acoustic terms see AS 1633.

1.3.2 Motor vehicle—any self-propelled vehicle with or without trailer or other vehicle attached thereto, being a motor car or derivative thereof, a motor truck or derivative thereof, a motor omnibus or derivative thereof, a motor cycle or derivative thereof, registered for use on public roads, and referred to hereafter as a 'vehicle'.

1.3.3 Vehicle family—one group of vehicles of the same type, the vehicles being identical with respect to—

(a) basic engine configuration and performance parameters;

(b) method of ignition;

(c) exhaust system;

(d) engine air cleaner;

(e) engine cooling fan; and

(f) engine compartment construction; and

the test vehicle, when compared with other vehicles of the same family type, having—

(i) an engine of no less cubic capacity and if of the same cubic capacity, no lower nominal compression ratio;

(ii) transmission and drive axle combination giving no less engine speed at the conditions appropriate for the start of the test;

(iii) no greater degree of sound attenuation in the engine compartment; and

(iv) if a goods vehicle, no greater unladen mass.

1.3.4 Net engine power (NEP)—the maximum output at the flywheel, when referred to standard conditions of barometric pressure and temperature, of an engine representing a standard version, and fitted, where applicable, with the following engine parts, representative of those used on the engine in service:

(a) Intake and exhaust system (including supercharger and exhaust brake system).

(b) Engine cooling fan.

(c) Water pump or cooler blower.

(d) Fuel pump and/or injection pump.

(e) Generator (under no load).

*A method of test for the determination of the sound emitted by new models of motor cycles is in course of preparation.