AS 2374.6—1994
IEC 551:1987
(Incorporating Amendment No. 1)

Australian Standard™

Power transformers

Part 6: Determination of transformer and reactor sound levels

Standards Australia

This Australian Standard was prepared by Committee EL/8, Power Transformers. It was approved on behalf of the Council of Standards Australia on 16 May 1994 and published on 11 July 1994.

The following interests are represented on Committee EL/8:

Australian Chamber of Commerce and Industry

Australian Electrical and Electronic Manufacturers Association

Australian Institute of Petroleum

Electricity Supply Association of Australia

Electricity Supply Engineers Association of New South Wales

Institution of Engineers, Australia

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PREFACE

This Standard was prepared by the Standards Australia Committee EL/8 on Power Transformers to supersede AS 2374.6—1982, *Power transformers*, Part 6: *Sound levels*.

This Standard incorporates Amendment No. 1 (June 2000). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure, or part thereof affected.

It is identical with and has been reproduced from IEC 551—1987, *Determination of transformer and reactor sound levels*, with the exception that Appendix AA has been added.

This Standard is Part 6 of a series, including:

AS	
2374	Power transformers
2374.1	Part 1: General requirements
2374.2	Part 2: Temperature rise
2374.3	Part 3: Insulation levels and dielectric tests
2374.3.0	Part 3.0: General requirements
2374.3.1	Part 3.1: External clearances in air
2374.4	Part 4: Tappings and connections
2374.5	Part 5: Ability to withstand short-circuit

The principal difference between this Standard and the previous edition is that sound levels will now be expressed as sound power, not sound pressure. This is in line with current practice.

It is emphasized that care should be taken when comparing sound power levels determined from this Standard with sound pressure levels determined from the previous edition. The user is reminded that, for a given sound level, the numerical value of sound power will be significantly higher than the sound pressure reading, and that both quantities are represented in decibels (dB).

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

As this Standard is reproduced from an international Standard, the following applies:

(a) Its number does not appear on each page of text and its identity is shown only on the cover and title pages.

(b) In the source text, ‘this International Standard’ should read ‘this Australian Standard’.

(c) A full point substitutes for a comma when referring to a decimal marker.

References to international Standards should be replaced by equivalent Australian Standards, as follows:

Reference to International Standards		*Australian Standard*	
IEC		AS	
76	Power transformers	2374	Power transformers
76-1	Part 1: General	2374.1	Part 1: General requirements
289	Reactors	1028	Power reactors and earthing transformers
651	Sound level meters	1259	Acoustics—Sound level meters
		1259.1	Part 1: Non-integrating
726	Dry-type power transformers	2735	Dry-type power transformers
A1 1043	Electroacoustics—Instruments for the measurement of sound intensity—Measurements with pairs of pressure sensing microphones	A1 4241	Acoustics—Instruments for the measurement of sound intensity—Measurement with pairs of pressure sensing microphones
ISO		—	
3746	Acoustics—Determination of sound power levels of noise sources—Survey method		
A1 9614-1	Acoustics—Determination of sound power levels of noise sources using sound intensity—Part 1: Measurement at discrete points		

A1 Appendices A, B and C form an integral part of this standard.

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NOTES

STANDARDS AUSTRALIA

Australian Standard

Power transformers

Part 6: Determination of transformer and reactor sound levels

1. Scope

This standard defines the methods by which the sound levels of transformers, reactors and their associated cooling equipment shall be determined so that compliance with any specification requirements may be confirmed and the characteristics of the noise emitted in service determined.

This standard is intended to apply to measurements made in the manufacturer's works since conditions may be very different when measurements are made on site because of the proximity of other objects, background extraneous noises, etc. Nevertheless, the same general rules as are given herein may be followed when on-site measurements are made.

A1 Standard measurements use the A-weighted sound pressure level as a measured variable. In case of difficult measuring conditions, sound intensity measurements are advantageous. This application is described in Appendix B.

According to this standard, measurements on transformers are made under no-load. If a transformer has a very low no-load noise, the noise due to load current can also influence the sound level. Appendix C specifies the measurement conditions for the determination of the noise due to load current.

In those cases where sufficient power is available in the factory to permit full energization of reactors, the methods to be followed are the same as for transformers. Such measurements shall be made by agreement between the manufacturer and the purchaser. Alternatively, measurements may be made on site where conditions are suitable.

The methods are applicable to transformers and reactors covered by IEC Publications 76, 726 and 289, without further limitation as regards size or voltage and when fitted with their normal auxiliary equipment, inasmuch as it may influence the measurement result.

Although the following text refers only to transformers, it is equally applicable to reactors provided that it is recognized that the current taken by a reactor is dependent on the voltage applied and, consequently, that a reactor cannot be tested at no-load.

This standard provides a basis for calculation of sound power levels.

The methods of measurement and the environmental qualification procedure given in Appendix A are in accordance with ISO Standard 3746. Measurements made in conformity with this IEC standard tend to result in standard deviations which are equal to or less than 3 dB.

2. Definitions

For the purpose of this standard, the following definitions apply.

2.1 *Sound pressure level,* L_p

The value in decibels equal to twenty times the logarithm to the base of 10 of the ratio of the sound pressure to the reference sound pressure.

Note. — For the purposes of this standard, A-weighted values of L_p are used. i.e., L_{pA} = A-weighted sound pressure level, and the reference sound pressure is 20 µPa.

2.2 *A-weighted surface sound pressure level,* $\overline{L_{pA}}$

The A-weighted sound pressure level in decibels averaged over the measurement surface as required in Clause 6.

