

Australian Standard[®]

Rotating electrical machines

Part 9: Noise limits



This Australian Standard® was prepared by Committee EL-009, Rotating Electrical Machinery. It was approved on behalf of the Council of Standards Australia on 11 June 2009. This Standard was published on 15 July 2009.

The following are represented on Committee EL-009:

- Airconditioning and Refrigeration Equipment Manufacturers Association of Australia
 - Australian Chamber of Commerce and Industry
 - Australian Electrical and Electronic Manufacturers Association
 - Australian Greenhouse Office, Department of the Environment and Water Resources
 - Australian Industry Group
 - Bureau of Steel Manufacturers of Australia
 - Department of Defence (Australia)
 - Electrical Apparatus Service Association
 - Energy Efficiency and Conservation Authority of New Zealand
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 - Ministry of Economic Development (New Zealand)
 - Registered Master Builders
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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Rotating electrical machines

Part 9: Noise limits

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-009, Rotating Electrical Machinery to supersede AS 1359.109—1998, *Rotating electrical machines—General requirements—Noise limits* on publication.

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee EL-009. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to specify sound levels for cage induction machines in accordance with AS 60034.1, AS 60034.5 and AS 60034.6.

This Standard is identical with, and has been reproduced from IEC 60034-9, Ed. 4.1 (2007), *Rotating electrical machines – Part 9: Noise limits*.

This Standard is Part 9 of a Series dealing with rotating electrical machinery. Additional parts will be added from time to time. This Series when complete will consist of the following parts:

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|------------|---|
| 1359.102.2 | Rotating electrical machines—Methods for determining losses and efficiency of rotating electrical machinery from tests—Measurement of losses by the calorimetric method |
| 60034 | Rotating electrical machines |
| 60034.1 | Part 1: Rating and performance |
| 60034.2.1 | Part 2.1: Methods for determining losses and efficiency from tests (excluding machines for traction vehicles) |
| 60034.3 | Part 3: Specific requirements for synchronous generators driven by steam turbines or combustion gas turbines |
| 60034.4 | Part 4: Methods for determining synchronous machine quantities from tests |
| 60034.5 | Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code)—Classification |
| 60034.6 | Part 6: Method of cooling (IC code) |
| 60034.7 | Part 7: Classification of types of construction, mounting arrangements and terminal box position (IM code) |
| 60034.8 | Part 8: Terminal markings and direction of rotation |
| 60034.9 | Part 9: Noise limits (this Standard) |
| 60034.11 | Part 11: Thermal protection |
| 60034.12 | Part 12: Starting performance of single-speed three-phase cage induction motors |
| 60034.14 | Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher—Measurement, evaluation and limits of vibration severity |
| 60034.15 | Part 15: Impulse voltage withstand levels of rotating a.c. machines with form-wound stator coils |
| 60034.16 | Part 16: Excitation systems for synchronous machines (all parts) |
| 60034.17 | Part 17: Cage induction motors when fed from converters—Application guide |
| 60034.18 | Part 18: Functional evaluation of insulation systems (all parts) |
| 60034.19 | Part 19: Specific test methods for d.c. machines on conventional and rectifier-fed supplies |
| 60034.20.1 | Part 20.1: Control motors—Stepping motors |
| 60034.22 | Part 22: AC generators for reciprocating internal combustion (RIC) engine driven generating sets |
| 60034.23 | Part 23: Specification for the refurbishing of rotating electrical machines |
| 60034.25 | Part 25: Guidance for the design and performance of a.c. motors specifically designed for converter supply |

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60034.26	Part 26: Effects of unbalanced voltages on the performance of three-phase cage induction motors
60034.27	Part 27: Off-line partial discharge measurements on the stator winding insulation of rotating electrical machines
60034.28	Part 28: Test methods for determining quantities of equivalent circuit diagrams for the three-phase low voltage cage induction motors
60034.29	Part 29: Equivalent loading and superposition techniques—Indirect testing to determine temperature rise.

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 page.
- (b) In the source text 'IEC 60034-9' should read 'AS 60034.9'.
- (c) A full point should be substituted for a comma when referring to a decimal marker.

CONTENTS

	<i>Page</i>
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	3
4 Methods of measurement	3
5 Test conditions	3
5.1 Machine mounting	3
5.2 Test operating conditions	4
6 Sound power level limits	4
7 Determination of noise increments caused by converter supply	5
8 Determination of sound pressure level	7
9 Declaration and verification of sound power values	7

INTRODUCTION

Acoustic quantities can be expressed in sound pressure terms or sound power terms. The use of a sound power level, which can be specified independently of the measurement surface and environmental conditions, avoids the complications associated with sound pressure levels, which require additional data to be specified. Sound power levels provide a measure of radiated energy and have advantages in acoustic analysis and design.

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Australian Standard
**Rotating electrical machines
Part 9: Noise limits**

1 Scope

This part of IEC 60034:

- specifies test methods for the determination of sound power level of rotating electrical machines;
- specifies maximum A-weighted sound power levels for factory acceptance testing of network-supplied, rotating electrical machines in accordance with IEC 60034-1, having methods of cooling according to IEC 60034-6 and degrees of protection according to IEC 60034-5, and having the following characteristics:
 - standard design, either a.c. or d.c., without additional special electrical, mechanical, or acoustical modifications intended to reduce the sound power level;
 - rated output from 1 kW (or kVA) up to and including 5 500 kW (or kVA);
 - rated speed not greater than 3 750 min⁻¹.
- provides guidance for the determination of noise levels for a.c. cage induction motors supplied by converters.

Excluded are a.c. motors supplied by converter. For these conditions see IEC 60034-17 for guidance.

The object of this standard is to determine maximum A-weighted sound power levels, L_{WA} in decibels, dB, for airborne noise emitted by rotating electrical machines of standard design, as a function of power, speed and load, and to specify the method of measurement and the test conditions appropriate for the determination of the sound power level of the machines to provide a standardized evaluation of machine noise up to the maximum specified sound power levels. This standard does not provide correction for the existence of tonal characteristics.

Sound pressure levels at a distance from the machine may be required in some applications, such as hearing protection programs. Information is provided on such a procedure in Clause 8 based on a standardized test environment.

NOTE 1 This standard recognizes the economic reason for the availability of standard noise-level machines for use in non-critical areas or for use with supplementary means of noise attenuation.

NOTE 2 Where sound power levels lower than those specified in Tables 1 or 2 are required, these should be agreed between the manufacturer and the purchaser, as special electrical, mechanical, or acoustical design may involve additional measures.

Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.