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AS IEC 62308—2008

Australian Standard®

# Equipment reliability—Reliability assessment methods

This Australian Standard® was prepared by Committee QR-005, Dependability. It was approved on behalf of the Council of Standards Australia on 16 June 2008.
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The following are represented on Committee QR-005:

- AirServices Australia
- Australian Chamber of Commerce and Industry
- Australian Electrical and Electronic Manufacturers Association
- Australian Industry Group
- Australian Nuclear Science & Technology Organisation
- Australian Organisation for Quality
- Certification Interests (Australia)
- Department of Defence (Australia)
- Energy Networks Association
- Engineers Australia
- The University of New South Wales

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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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Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at **mail@standards.org.au**, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

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STANDARDS AUSTRALIA

# RECONFIRMATION

# OF
# AS IEC 62308–2008
# Equipment reliability–Reliability assessment methods

## RECONFIRMATION NOTICE

Technical Committee QR-005 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 23 July 2018.

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Australian Standard®

# Equipment reliability—Reliability assessment methods

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# PREFACE

This Standard was prepared by the Standards Australia Committee QR-005, Dependability.

The objective of this Standard is to describe methods for early reliability assessment of items based on field data and test data for components and modules and applicable to mission, safety and business critical high integrity and complex items. It includes guidance on related activities, management of the reliability assessment process, and reliability programme planning and monitoring.

This Standard is identical with, and has been reproduced from IEC 62308 Ed.1.0 (2006), *Equipment reliability—Reliability assessment methods*, which is part of a suite of Standards developed by the IEC Technical Committee IEC/TC 56, Dependability, and is suitable for use in conjunction with the AS IEC 60300 series of dependability management Standards.

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

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The terms 'normative' and 'informative' are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

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# INTRODUCTION

This International Standard describes procedures that are intended for use in assessing the reliability of items based on data from: the market of similar items; and field data and test data from suppliers of components and modules. The results of such assessments are intended for use as inputs to early equipment design decisions such as system architecture selection as well as business decisions such as estimating the cost of warranties or maintenance cost guarantees. Furthermore the results can be used as the initial estimate for input to safety analysis, for example FTA analysis. Modern electronic components and items are so reliable that estimating or verifying their reliability by testing is very difficult, therefore data from the field for previous similar items are often the only way to get an initial estimate of the reliability. Component manufacturers have used this method for years under the name of the “similarity principle”. By emphasising the use of data from previously marketed similar products, and requiring similarity to be documented, the method is a modern alternative to the classical but now obsolete handbook prediction.

Reliability assessment results should be viewed as an early estimate of the probability that the product reliability targets and goals can be satisfied using the chosen architecture, modules, components and maintenance policy. As such, they may be used, for example, to authorize advancement to the next step in product development, or to authorize progress payments, or to proceed with delivery and acceptance of products. Reliability assessment results should never be used to support a claim that the reliability targets, goals, or expectations have been satisfied. The only certain measure of reliability requirement having been met is from service/field performance. This standard describes the uses for reliability assessment results as well as providing a list of IEC standards that require such results as input.

The approach to reliability assessment in this International Standard

– encourages the equipment manufacturer to consider all relevant information regarding equipment reliability which may include the effects of design and manufacturing processes as well as component selection issues. This is in contrast to more traditional methods that focus on component reliability as the most significant contributor to the equipment reliability;
– encourages the equipment manufacturer to define and use the processes that are most effective for the manufacturer's own equipment;
– describes a continuous procedure in which a reliability assessment can be updated as more information becomes available during the life cycle of the equipment. This information may be used to improve both the reliability of the equipment and the effectiveness of the assessment process.

This International Standard describes the application of three approaches to reliability assessment, namely: similarity analysis, durability analysis, and handbook predictions. This standard does not, however, provide information on assessing the reliability of software systems but can be used for assessing the reliability of hardware systems containing embedded software.

STANDARDS AUSTRALIA

# Australian Standard

# Equipment reliability—Reliability assessment methods

## 1 Scope

This International Standard describes early reliability assessment methods for items based on field data and test data for components and modules. It is applicable to mission, safety and business critical, high integrity and complex items. It contains information on why early reliability estimates are required and how and where the assessment would be used. Finally, it details methods for reliability assessment and the data required to support the assessment. To estimate durability (life time or wear-out), the physics-of-failure method is used.

Three types of assessment are discussed in detail:

– the similarity approach;
– models for durability analysis;
– handbook methods.

Clause 6 provides an introduction to reliability assessment and Clause 7 the management of the process. Clause 8 describes the data needs, sources and types for assessments and Clause 9 provides details of the assessment methods.

Annexes A and B provide additional information to aid understanding of the similarity analysis and durability analysis.

This standard is applicable to making reliability estimates for specifications, design, design modification and support engineering.

## 2 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.

References to international standards that are struck through in this clause are replaced by references to Australian or Australian/New Zealand Standards that are listed immediately thereafter and identified by shading. Any Australian or Australian/New Zealand Standard that is identical to the International Standard it replaces is identified as such.

IEC 60050-191:1990, *International Electrotechnical Vocabulary – Chapter 191: Dependability and quality of service*

~~IEC 60300-1, *Dependability management – Part 1: Dependability management systems*~~

AS IEC 60300.1, *Dependability management— Dependability management systems*

~~IEC 60300-3-1:2003, *Dependability management – Part 3-1: Application guide – Analysis techniques for dependability – Guide on methodology*~~

AS IEC 60300.3.1, Dependability management—Application guide—Analysis techniques for dependability—Guide on methodology