

Australian Standard™

**Functional safety of
electrical/electronic/programmable
electronic safety-related systems**

**Part 7: Overview of techniques and
measures**

This Australian Standard was prepared by Committee IT-006, Information Technology for Industrial Automation and Integration. It was approved on behalf of the Council of Standards Australia on 18 April 2001 and published on 19 June 2001.

The following interests are represented on Committee IT-006:

Australian Electrical and Electronic Manufacturers Association
CSIRO Centre for Planning and Design
CSIRO Manufacturing Science and Technology
Industrial Instrument Industry Association of Australia
Institution of Engineers, Australia
Monash University
RMIT University
The Association of Consulting Engineers, Australia
The Royal Australian Institute of Architects
The University of Melbourne

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about Standards can be found by visiting the Standards Australia web site at www.standards.com.au and looking up the relevant Standard in the on-line catalogue.

Alternatively, the printed Catalogue provides information current at 1 January each year, and the monthly magazine, *The Australian Standard*, has a full listing of revisions and amendments published each month.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.com.au, or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

AS 61508.7—2001

Australian Standard™

**Functional safety of
electrical/electronic/programmable
electronic safety-related systems**

**Part 7: Overview of techniques and
measures**

First published as AS 61508.7—2001.

COPYRIGHT

© Standards Australia International

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 3898 2

PREFACE

This Standard was prepared by the Standards Australia Committee IT-006, Information Technology for Industrial Automation and Integration.

The objective of this Standard is to provide designers of safety lifecycle activities in systems comprised of electrical/electronic/programmable electronic devices with an overview of various safety techniques and measures as outlined in Part 2 and in Part 3 of this Standard.

This Standard is identical with and has been reproduced from IEC 61508-7:2000, *Functional safety of electrical/electronic/programmable electronic safety-related systems—Part 7: Overview of techniques and measures*.

A reference to an International Standard identified in the Normative References Clause by strikethrough (~~example~~) is replaced by a reference to the Australian or Australian/New Zealand Standard(s) listed immediately thereafter and identified by shading (**example**). Where the struck-through referenced document and the referenced Australian or Australian/New Zealand Standard are identical, this is indicated in parenthesis after the title of the latter.

In this Standard, the following print types are used:

- requirements proper: in arial type;
- *test specifications: in italic type*;
- explanatory matter: in smaller arial type.

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 ‘this standard’ should read ‘this Australian Standard’.
- (c) A full point should be substituted for a comma when referring to a decimal marker.

The term ‘informative’ has been used in this Standard to define the application of the annex to which it applies. An ‘informative’ annex is only for information and guidance.

CONTENTS

	<i>Page</i>
1 Scope.....	1
2 Normative references	3
3 Definitions and abbreviations	4

ANNEXES

Annex A (informative) Overview of techniques and measures for E/E/PES: control of random hardware failures (see IEC 61508-2)	5
A.1 Electrical	5
A.1.1 Failure detection by on-line monitoring	5
A.1.2 Monitoring of relay contacts	5
A.1.3 Comparator	5
A.1.4 Majority voter.....	6
A.1.5 Idle current principle (de-energised to trip)	6
A.2 Electronic	6
A.2.1 Tests by redundant hardware	6
A.2.2 Dynamic principles	7
A.2.3 Standard test access port and boundary-scan architecture	7
A.2.4 Fail-safe hardware.....	7
A.2.5 Monitored redundancy	8
A.2.6 Electrical/electronic components with automatic check	8
A.2.7 Analogue signal monitoring.....	8
A.2.8 De-rating	9
A.3 Processing units.....	9
A.3.1 Self-test by software: limited number of patterns (one-channel)	9
A.3.2 Self-test by software: walking bit (one-channel)	9
A.3.3 Self-test supported by hardware (one-channel).....	9
A.3.4 Coded processing (one-channel)	10
A.3.5 Reciprocal comparison by software	10
A.4 Invariable memory ranges	10
A.4.1 Word-saving multi-bit redundancy (for example ROM monitoring with a modified Hamming code)	10
A.4.2 Modified checksum	11
A.4.3 Signature of one word (8-bit)	11
A.4.4 Signature of a double word (16-bit).....	11
A.4.5 Block replication (for example double ROM with hardware or software comparison)	12
A.5 Variable memory ranges	12
A.5.1 RAM test "checkerboard" or "march".....	12
A.5.2 RAM test "walkpath"	13
A.5.3 RAM test "galpat" or "transparent galpat".....	13
A.5.4 RAM test "Abraham"	14
A.5.5 One-bit redundancy (for example RAM monitoring with a parity bit)	14

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-