

Australian/New Zealand Standard™

Safety of machinery

**Part 1904: Displays, controls, actuators
and signals—Indication, marking and
actuation—Requirements for visual,
auditory and tactile signals**



AS/NZS 4024.1904:2014

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-041, General Principles for the Guarding of Machinery. It was approved on behalf of the Council of Standards Australia on 5 June 2014 and on behalf of the Council of Standards New Zealand on 24 April 2014. This Standard was published on 30 June 2014.

The following are represented on Committee SF-041:

Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Manufacturing Workers Union
Department of Mines and Petroleum, WA
Department of the Premier and Cabinet, SA
Engineers Australia
Federal Chamber of Automotive Industries
Human Factors and Ergonomics Society of Australia
Institute of Instrumentation, Control and Automation
National Safety Council of Australia
New Zealand Electrical Institute
NSW Department of Trade and Investment, Regional Infrastructure and Services
Safety Institute of Australia
University of Melbourne
Winery Engineering Association
WorkCover New South Wales
WorkSafe NZ
WorkSafe Victoria

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 Standards may also be withdrawn.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 joint Australian/New Zealand Standards can be found by visiting the Standards Australia Web Site at www.standards.org.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS 4024.1904.

Australian/New Zealand Standard™

Safety of machinery

Part 1904: Displays, controls, actuators and signals—Indication, marking and actuation—Requirements for visual, auditory and tactile signals

Originated in Australia as part of AS 4024.1(Int)—1992.
Previous edition AS 4024.1904—2006.
Jointly revised and designated as AS/NZS 4024.1904:2014.

COPYRIGHT

© Standards Australia Limited/Standards New Zealand

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, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-041, General Principles for the Guarding of Machinery, to supersede AS 4024.1904—2006.

It is emphasized that this Standard is part of the AS(/NZS) 4024.1 series and it is imperative that it is used in conjunction with other applicable parts of the series. A complete listing of all current parts of the AS(/NZS) 4024.1 series can be found at the Standards Australia website <www.standards.org.au> and in AS/NZS 4024.1100, *Safety of machinery*, Part 1100: *Application Guide*.

The objective of this Standard is to specify the requirements for visual, acoustic and tactile methods of indicating safety-related information, at the human-machine interface and to exposed persons.

It specifies a system of colours, safety signs, markings and other warnings intended for use in the indication of hazardous situations and health hazards and for meeting certain emergencies. It also specifies ways of coding visual, acoustic and tactile signals for indicators and actuators to facilitate the safe use and monitoring of the machinery.

This Standard is identical with, and has been reproduced from IEC 61310-1, Ed. 2.0 (2007), *Safety of machinery—Indication, marking and actuation*, Part 1: *Requirements for visual, acoustic and tactile signals*.

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

- (a) In the source text ‘this part of IEC 61310’ should read ‘this Australian/New Zealand Standard’.
- (b) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

<i>Reference to International Standard</i>	<i>Australian/New Zealand Standard</i>
ISO	AS/NZS
13850 Safety of machinery—Emergency stop—Principles for design	4024 Safety of machinery 4024.1604 Part 1604: Design of controls, interlocks and guarding—Emergency stop—Principles for design
IEC	AS
60204 Safety of machinery—Electrical equipment of machines	60204 Safety of machinery—Electrical equipment of machines
60204-1 Part 1: General requirements	60204.1 Part 1: General requirements (IEC 60204-1, Ed. 5 (FDIS) MOD)

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

1	Scope	5
2	Normative references	5
3	Terms and definitions	6
4	Presentation of safety-related information	8
4.1	General	8
4.2	Visual signals	10
4.3	Acoustic signals	12
4.4	Tactile signals	13
5	Information coding	13
5.1	General	13
5.2	Coding of visual signals	13
5.3	Coding of acoustic signals	14
5.4	Coding of tactile signals	15
	Annex A (informative) Graphical symbols related to the operation of actuators	17
	Bibliography	21
	Figure 1 – Open-loop control, action and information systems	4
	Figure 2 – Zones of vertical field of vision	11
	Figure 3 – Zones of horizontal field of vision	11
	Figure 4 – Examples of shapes that can be discriminated by touch alone	16
	Table 1 – Examples of signals	10
	Table 2 – Meaning of colours for coding – General principles	14
	Table 3 – Coding by supplementary means to colour (visual codes)	14
	Table 4 – Acoustic signals	15
	Table 5 – Means of coding (acoustic codes)	15
	Table 6 – Means of coding (tactile codes)	16
	Table A.1 – Graphical symbols related to the operation of actuators	17

INTRODUCTION

This standard should be used by suppliers of machines for which no product family or dedicated product standard exists. The requirements of this standard should also be used, for example, as a reference standard by ISO and IEC technical committees which prepare product family or dedicated product standards for machines. Where a product family or dedicated product standard exists, its requirements take precedence.

At human-machine interfaces, warning and danger signals need to convey safety-related meanings for the safe use and monitoring of machinery for exposed persons and operators.

It is via the human-machine interface that the operator interacts with the machinery or process in an open-loop system (see Figure 1). This interface consists of actuators, by means of which the operator initiates actions, and indicating devices, through which the operator receives information. In many applications, the information is represented by a signal which is encoded by a distinct set of rules and the operator has then to interpret the signal according to these rules. Different types of coding such as colour, shape or time are used as appropriate to the demands of the task of the operator.

The reasons for using codes are:

- to permit the spatial separation of the machinery from centralized control stations;
- to increase the perceptible amount of information given by an indicating device, for example, per display area unit, per unit of time;
- to decrease the mental work-load of an operator and/or exposed persons.

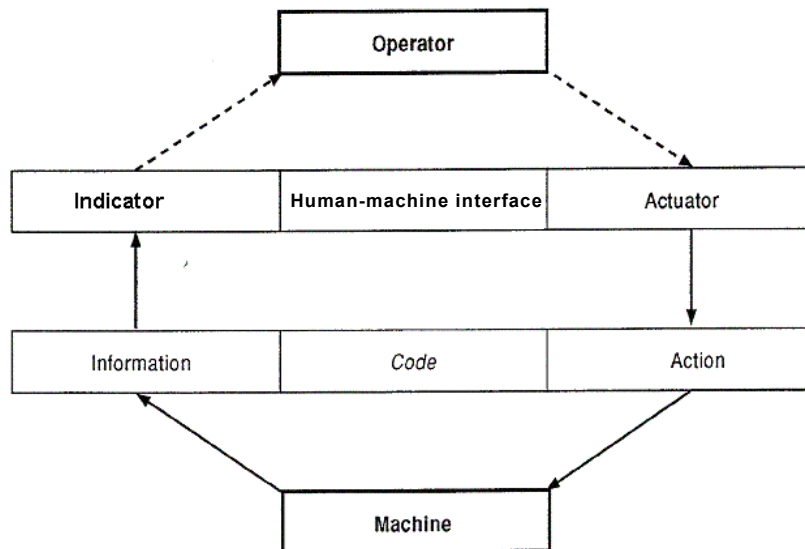


Figure 1 – Open-loop control, action and information systems

AUSTRALIAN/NEW ZEALAND STANDARD

Safety of machinery

Part 1904:

Displays, controls, actuators and signals—Indication, marking and actuation—Requirements for visual, auditory and tactile signals

1 Scope

This part of IEC 61310 specifies requirements for visual, acoustic and tactile methods of indicating safety-related information, at the human-machine interface and to exposed persons.

It specifies a system of colours, safety signs, markings and other warnings, intended for use in the indication of hazardous situations and health hazards and for meeting certain emergencies. It also specifies ways of coding visual, acoustic and tactile signals for indicators and actuators to facilitate the safe use and monitoring of the machinery.

This standard is based on IEC 60073 with regard to coding by colour and alternative means, but is not limited to electrotechnical aspects.

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.

IEC 60073:2002, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60204-1:2005, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60417, *Graphical symbols for use on equipment*

ISO 3864-1:2002, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs in workplaces and public areas*

ISO 7000:2004, *Graphical symbols for use on equipment – Index and synopsis*

ISO 7010:2003, *Graphical symbols – Safety colours and safety signs – Safety signs used in workplaces and public areas*

ISO 7731:2003, *Ergonomics – Danger signals for public and work areas – Auditory danger signals*

ISO 13850, *Safety of machinery – Emergency stop – Principles for design*