



Edition 3.0 2014-10 REDLINE VERSION

# INTERNATIONAL STANDARD



Preparation of documents used in electrotechnology –

Part 1: Rules

(https://standards.iteh.ai)
Document Preview

IEC 61082-1:2014

01182-1-2014/https://standards.iteh.ai/catalog/standards/iec/129a81b3-4c7b-4bd9-92c1-2e90td482ca2/iec





### THIS PUBLICATION IS COPYRIGHT PROTECTED Copyright © 2014 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office Tel.: +41 22 919 02 11 3, rue de Varembé Fax: +41 22 919 03 00

CH-1211 Geneva 20 info@iec.ch Switzerland www.iec.ch

#### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

#### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

### IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad

#### IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

### IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - std.iec.ch/glossary

More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

### IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

EC 61082-1:2014

https://standards.iteh.ai/catalog/standards/iec/129a81b3-4c7b-4bd9-92c1-2e90fd482ca2/iec-61082-1-2014





Edition 3.0 2014-10 REDLINE VERSION

## INTERNATIONAL STANDARD



Preparation of documents used in electrotechnology – Part 1: Rules

# https://standards.iteh.ai) Document Preview

IEC 61082-1:2014

https://standards.iteh.ai/catalog/standards/iec/129a81b3-4c7b-4bd9-92c1-2e90fd482ca2/iec-61082-1-2014

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 01.110; 29.020 ISBN 978-2-8322-1911-9

Warning! Make sure that you obtained this publication from an authorized distributor.

### CONTENTS

	FC	DREWC	)RD	8
	IN	TRODU	JCTION	10
	1	Scop	pe	11
	2	Norn	native references	11
	3	Term	ns and definitions	13
		3.1	Basic terms	13
		3.2	Terms related to the forms of presentation of information	15
l		3.3	Terms related to basic document kinds	
1		3.3	Terms related to specific document kinds	16
	4	Docu	umentation principles	
		4.1	General considerations	17
		4.2	Structure of documentation	17
		4.3	Presentation of information	17
		4.4	Document identification and designation	
	5	Rule	s for presentation of information	
		5.1	Legibility	
		5.2	Text orientation	
		5.3	Colours, shading and patterns	
		5.4	Paper page sizes	
		5.5	Paper page reproduction	
		5.6	Page identification	
		5.7	Page layout	
		5.7.1		
		5.7.2		
		_	8 s.itel Content area.dards/iec/129a81b3.4c7b-4bd9-92c1-2a90fd482ca2/iec-610	
		5.8	Cross-references	
		5.9	Hyperlinks	
		5.10	Line widths	
		5.11	Text fonts	
		5.12	Symbols	
		5.12	•	
		5.12		
		5.12		
		5.13	Scales	
		5.14	Pictorial presentation	
		5.15	Quantities, units, values and colour codes	
		5.16	Presentation of ranges and set of elements	
		5.17	Dimension lines	
		5.18	Leader lines and reference lines	
		5.19	Explanatory notes and markings	
		5.20	Designation of objects	
		5.20	,	
		5.20		
		5.20	_	
		5.20	• •	
		5.21	Terminal designations	

	5.22	Signal designations	
6		ıment kinds	
7	Diag	rams	36
	7.1	General	36
	7.1.1	Flow of energy, signal, etc	36
	7.1.2	-,	
	7.1.3	3	
	7.1.4	- F	
	7.1.5		
	7.1.6	3	
	7.1.7	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
	7.1.8	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
	7.1.9	·	
	7.1.1	1 3	
	7.2	Overview diagrams	
	7.3	Function diagrams	
	7.3.1		
	7.3.2	1	
	7.3.3	3	
	7.4	Circuit diagrams	
	7.4.1		
	7.4.2	Thirting //ctohdords itoh oil	
	7.4.3		
	7.4.4		
	7.4.5	1 11 7	
	7.4.6	, ,	
	7.4.7 5.4.8		
	7.5	Connection diagrams	
	7.5 7.5.1	•	
	7.5.1		73
	7.5.2	·	
	7.5.4	•	
	7.5.5	•	
	7.5.6		
8		rings	
	8.1	General	
	8.2	Requirements on base documents	
	8.3	Arrangement drawings	
9		98	
J	9.1	General	
	9.1		
	9.2	Presentation of reference designations	
10		ts, graphsts	
10			
	10.1	General	
	10.2	Function charts	
11	10.3	Sequence charts and time sequence charts	
I i	เ อแนต	tured documentation	00

11.1 General		86
11.2 Presentation of	occurrences of an object type in diagrams	87
<u>-</u>	nstance diagram	
•	ngle symbol	
•		
	adata	
	quirements	91
	nstruction of a symbol for an object which does not have a	93
A.1 General rules		93
A.2 Example – Min	iature circuit-breaker	93
A.3 Example – min	iature circuit-breaker with an RCD (Residual Current Device)	96
A.4 Example – RCI	O (residual current device) / RCM (residual monitoring device).	97
A.5 Example – PLC	· · · · · · · · · · · · · · · · · · ·	98
Annex B (informative) Do	ocument management information and title blocks	100
B.1 Presentation of	document management information	100
	layout of a title block	
B.3 Examples of th	e location of identification areas	102
Annex C (informative) Do	ocument kind designations and content of information	103
Bibliography	Hen Standards	108
(h)		
	andards related to the presentation of information in	
documents	Dogramani Dirantiani	10
Figure 2 – Documents ge	nerated from information stored in a database	18
Figure 3 – Documents pre	epared and stored in a database	18
Figure 4 – Viewing direct	ons of a document	20
	ocuments with document and page identifications	
Figure 6 – Example of do	cuments with multiple document identifiers	21
Figure 7 – Examples of p	ages with defined identification areas	22
Figure 8 – Example of a r	eference grid <del>(Page A3 landscape, module size 2,5 mm,</del>	
		25
Figure 9 – Examples of the	ne application of cross-references	27
Figure 10 – Example of the	ne use of symbols for fibre optics	28
Figure 11 – Example of re	eplacing a symbol with a general symbol	29
Figure 12 – Example of e	nlarging a symbol	29
Figure 13 – Turning and/o	or mirroring of symbol S00055 in IEC 60617	30
Figure 14 – Terminators	of dimension lines (from ISO 129)	32
Figure 15 – Examples of	leader lines (from ISO 128-22)	32
Figure 16 – Example of the	ne use of leader lines to connecting lines	32
Figure 17 – Example of a	n explanatory note	33
Figure 18 – Presentation	of reference designations and sets of reference designations	34
_	initial portion of reference designations	
_	cable core designations	
•	unctional grouping and signal flow directions; a control	
		36

Figure 22 – Example of symbols and different location of connections37	
Figure 23 – Simplified presentation	
Figure 24 – Simplified presentation of parallel connected identical objects38	
Figure 25 – Simplified presentation of serial connected identical objects	
Figure 26 – Example of cross-references related to detached presentations39	
Figure 27 – Example for technical data associated with a symbol39	
Figure 28 – Example of technical data shown inside a symbol39	
Figure 29 – Symbols representing joining of connecting lines40	
Figure 30 – Symbol representing the interconnection of crossing connecting lines40	
Figure 31 – Examples of the joining of connecting lines	
Figure 32 – Example of the joining of connecting lines with indication of where the physical wire goes41	
Figure 33 – Example of the joining of connecting lines where the connecting lines represent bundles of wires41	
Figure 34 – Different presentation methods for wireless interconnections	
Figure 35 – Example of presentations of mechanical links	1
Figure 36 – Example for avoiding bends and cross-overs43	
Figure 37 – Spacing of lines43	
Figure 38 – Examples for technical data associated with connecting lines44	
Figure 39 – Presentation of bundles	
Figure 40 – Indication of sequence within bundles45	
Figure 41 – Illustration of the terms "states" and "levels"	
Figure 42 – Detail of a circuit diagram using positive logic convention47	
Figure 43 – Detail of a circuit diagram using direct logic polarity convention47	
Figure 44 – Boundary frame with a reference to another document	
Figure 45 – Location of reference designations at a symbol	
Figure 46 – Examples of reference designations associated with connecting lines49	
Figure 47 – Presentation of reference designations at a boundary frame50	
Figure 48 – Presentation of reference designations including different aspect51	
Figure 49 – Presentation of reference designation sets at a boundary frame51	
Figure 50 – Presentation of reference designation	
Figure 51 – Presentation of reference designations excluded from concatenation52	
Figure 52 – Examples for the presentation of terminal designations53	
Figure 53 – Examples of signal designations associated with connecting lines53	
Figure 54 – Examples of reference and signal designations ass. with connecting lines54	
Figure 55 – Presentation of signal designations54	
Figure 56 – Example for a multi-phase circuit55	
Figure 57 – Overview diagram for a material handling plant (Example taken from IEC 61346-1)	
Figure 58 – Overview diagram for one conveyer belt function (Example taken from IEC 61346 1)	
Figure 59 – Overview diagram process plant	1
Figure 60 – Overview diagram of an electrical plant59	
Figure 61 – Signal flow in a function diagram60	

	Figure 62 – Example of an equivalent-circuit diagram	60
	Figure 63 – Minimized use of logic negations	61
	Figure 64 – Lining-up of symbols	62
	Figure 65 – Grouping of symbols for functionally related components	62
	Figure 66 – Attached presentation of symbols	63
	Figure 67 – Detached presentation of symbols	64
	Figure 68 – Example of the use of inset tables	65
	Figure 69 – Example of presentation of internal connection	66
	Figure 70 – Repeated presentation of a symbol for a quadruple multiplexer	
	Figure 71 – Simplified repeated presentation of a symbol for a quadruple multiplexer	67
	Figure 72 – Symbol of a five-position switch supplemented with a graph	68
ı	Figure 73 – Examples of pilot switch	68
	Figure 74 – Symbol of a pilot switch supplemented with a note	68
	Figure 75 – Orientation of contact symbols	69
	Figure 76 – Representation of a.c. supply circuits	69
	Figure 77 – Representation of d.c. supply circuits	70
	Figure 78 – Examples of use of logic polarity indication	70
	Figure 79 – Examples of mismatched polarity indications	70
	Figure 80 – Example of a split presentation of a symbol	71
	Figure 81 – Example of a connection diagram	73
	Figure 82 – Example of presentation of termination of a multi-core cable	
	Figure 83 – Example of cable connections	75
	Figure 84 – Example of connection diagram for a sub-rack	76
	Figure 85 – Example of simplified presentation of a connection diagram	77
	Figure 86 – Example of the use of a base document	18279 014
	Figure 87 – Presentation of technical data	79
	Figure 88 – Examples of the use of symbols for indication mounting methods	80
	Figure 89 – An arrangement drawing the mounting panel of a cubicle	81
	Figure 90 – An arrangement drawing of an industrial plant	82
	Figure 91 – Example setting the common initial portion in the table header	83
	Figure 92 – Example omitting the common initial portion on successive lines	83
	Figure 93 – Example of a terminal-oriented connection table	84
	Figure 94 – Example of a connection table with remote end designations	84
	Figure 95 – Example of a connection-oriented connection table	85
	Figure 96 – Example of a time sequence chart	86
	Figure 97 – Example of an instance diagram of a motor starter	87
	Figure 98 – A symbol for a motor starter	87
	Figure 99 – Example of a document in table form describing the relations between external terminals of a motor starter to the internal terminals of its components	88
	Figure 100 – A symbol for the motor starter, for single-line presentations	88
	Figure 101 – Example of a document in table form describing the relations between external terminals of a motor starter to the internal terminals of its components	89
	Figure 102 – Referencing in accordance with IEC 62023	90
	Figure 103 – Direct referencing	91

Figure A.1 – The general symbols for an object in IEC 60617-DB	.93
Figure A.2 – Miniature circuit-breaker shown with the symbol for a circuit-breaker	.94
Figure A.3 – Miniature circuit-breaker shown with the general symbol for a switch qualified with the symbol for automatic tripping	.94
Figure A.4 – Miniature circuit-breaker shown with the symbol for a circuit-breaker qualified with the symbol for automatic tripping	.95
Figure A.5 – Miniature circuit-breaker shown with the general symbol for a switch qualified with the symbols for thermal and electromagnetic effects	.95
Figure A.6 – Miniature circuit-breaker shown with the symbol for a circuit-breaker qualified with the symbol for thermal and electromagnetic effects	.95
Figure A.7 – Symbol for a miniature circuit-breaker with an RCD, version 1	.96
Figure A.8 – Symbol for a miniature circuit-breaker with an RCD, version 2	.96
Figure A.9 – Symbol for a miniature circuit-breaker with an RCD, version 3	.97
Figure A.10 – Example of a symbol for an RCD	.97
Figure A.11 – Example of a symbol for an RCM	.98
Figure A.12 – Symbols for a PLC	.98
Figure A.13 – A circuit diagram with a symbol of a PLC	.99
Figure B.1 – Example of the arrangement of information in a title block1	101
Figure B.2 – Example of a filled-in title block1	101
Figure B.3 – Examples of locations of identification areas and possible title blocks1	
Table 1 – Possible distributed logic connections	100 104

### INTERNATIONAL ELECTROTECHNICAL COMMISSION

### PREPARATION OF DOCUMENTS USED IN ELECTROTECHNOLOGY –

Part 1: Rules

### **FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication. 29 2e 9e 4 88 icc-6c 1 0 28 0.
  - 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
  - 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
  - 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 61082-1 has been prepared by IEC technical committee 3: Information structures, documentation and graphical symbols.

It has the status of a horizontal standard in accordance with IEC Guide 108.

This third edition cancels and replaces the second edition published in 2006. This edition constitutes a technical revision and includes the following main technical changes:

- a) inclusion of presentation rules for wireless interconnections
- b) description of exceptional cases for the application of rules for positioning of reference designations in diagrams
- c) correction of errors and update of the normative references
- d) harmonization of definitions with respect to referenced publications.

The text of this standard is based on the following documents:

FDIS	Report on voting
3/1189/FDIS	3/1196/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

A list of all the parts in the IEC 61082 series, under the general title *Preparation of documents used in electrotechnology*, can be found on the IEC website.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- https://streconfirmed.i/catalog/standards/iec/129a81b3-4c7b-4bd9-92c1-2e90fd482ca2/iec-61082-1-2014
  - withdrawn,
  - replaced by a revised edition, or
  - amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

### INTRODUCTION

IEC 61082-1 deals with the presentation of information in documents. Part of this information is described in other International Standards. Figure 1 – Overview of standards related to the presentation of information in documents provides an overview on the interrelation between some of these standards.

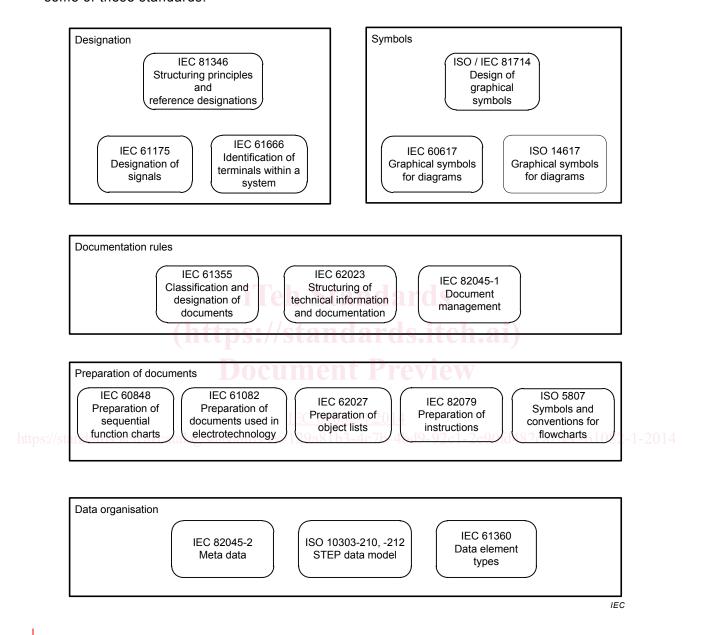


Figure 1 – Overview of standards related to the presentation of information in documents

Examples in this part of IEC 61082 are intended to illustrate a given rule and are not necessarily representative of complete documents.

### PREPARATION OF DOCUMENTS USED IN ELECTROTECHNOLOGY –

Part 1: Rules

### 1 Scope

This part of IEC 61082-provides establishes general rules and guidelines for the presentation of information in documents, and specific rules for diagrams, drawings and tables used in electrotechnology.

Excluded from this part of IEC 61082 are rules and guidelines for all kind of audio or video or tactile presentations.

This horizontal standard is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 108.

One of the responsibilities of a technical committee is, wherever applicable, to make use of horizontal standards in the preparation of its publications. The contents of this horizontal standard will not apply unless specifically referred to or included in the relevant publications.

### 2 Normative references standards.itch.ai

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

IEC 60027 (all parts), Letter symbols to be used in electrical technology

IEC 60375:2003, Conventions concerning electric and magnetic circuits

IEC 60757:1983, Code for designation of colours

IEC 60617<del>-DB: 2001</del>, Graphical symbols for diagrams. Available from: <a href="http://std.iec.ch/iec60617">http://std.iec.ch/iec60617</a>>

IEC 60848:2002, GRAFCET specification language for sequential function charts

IEC 61175<del>:2005</del>, Industrial systems, installations and equipment and industrial products-Designation of signals

IEC 61286:2001, Information technology – Coded graphic character set for use in the preparation of documents used in electrotechnology and for information interchange

IEC 61293<del>:1994</del>, Marking of electrical equipment with ratings related to electrical supply – Safety requirements

IEC 61355:1997, Classification and designation of documents for plants, systems and equipment

IEC 61355-1:2008, Classification and designation of documents for plants, systems and equipment – Part 1: Rules and classification tables

IEC 61666:1997, Industrial systems, installations and equipment and industrial products – Identification of terminals within a system

IEC 61804-1:2003, Function blocks (FB) for process and control – Part 1: Overview of system aspects

IEC 61804-2:2004, Function blocks (FB) for process and control – Part 2: Specification of FB concept and Electronic Device Description Language (EDDL)

IEC 62023:2000, Structuring of technical information and documentation

IEC 62027:2000, Preparation of object lists, including parts lists

IEC 62079:2001, Preparation of instructions - Structuring, content and presentation

IEC 62491, Industrial systems, installations and equipment and industrial products – Labelling of cables and cores

IEC 61346-1:1996 IEC 81346-1, Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules

IEC 81714-2:1998 2006, Design of graphical symbols for use in the technical documentation of products – Part 2: Specification for graphical symbols in a computer-sensible form including graphical symbols for a reference library, and requirements for their interchange

IEC 82045-1:2001, Document management - Part 1: Principles and methods

IEC 82045-2<del>:2004</del>, Document management – Part 2: Metadata elements and information reference model

IEC 82079-1, Preparation of instructions for use – Structuring, content and presentation – Part 1: General principles and detailed requirements

ISO 31 (all parts), Quantities and units 1

ISO 128-22<del>:1999</del>, Technical drawings – General principles of presentation – Part 22: Basic conventions and applications for leader lines and reference lines

ISO 128-30<del>:2001</del>, Technical drawings – General principles of presentation – Part 30: Basic conventions for views

ISO 2594<del>:1972</del>, Building drawings – Projection methods

ISO 3098-5<del>:1997</del>, Technical product documentation – Lettering – Part 5: CAD- lettering of the Latin alphabet, numerals and marks

ISO 5807:1985, Information processing – Documentation symbols and conventions for data, program and system flowcharts, program network charts and system resources charts

ISO 5455<del>:1979</del>, Technical drawings – Scales

<sup>&</sup>lt;sup>1</sup> Published as a compilation in ISO Standards Handbook, Quantities and units.