IEC 61082-1

Edition 3.0 2014-10

REDLINE VERSION

colour inside

Preparation of documents used in electrotechnology – Part 1: Rules



IEC 61082-1:2014-10 RLV(en)



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
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
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 It also gives information on projects, replaced and withdrawn publications.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.

IEC 61082-1

Edition 3.0 2014-10

REDLINE VERSION

colour inside

Preparation of documents used in electrotechnology – Part 1: Rules

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRICE CODE RQ

ICS 01.110; 29.020

ISBN 978-2-8322-1911-9

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

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD....8
INTRODUCTION....10
1 Scope....11
2 Normative references....11
3 Terms and definitions....13
3.1 Basic terms....13
3.2 Terms related to the forms of presentation of information....15
~~3.3 Terms related to basic document kinds....~~
3.3 Terms related to specific document kinds....16
4 Documentation principles....17
4.1 General considerations....17
4.2 Structure of documentation....17
4.3 Presentation of information....17
4.4 Document identification and designation....18
5 Rules for presentation of information....19
5.1 Legibility....19
5.2 Text orientation....19
5.3 Colours, shading and patterns....20
5.4 Paper page sizes....20
5.5 Paper page reproduction....20
5.6 Page identification....20
5.7 Page layout....22
5.7.1 General....22
5.7.2 Identification area....22
5.7.3 Content area....23
5.8 Cross-references....26
5.9 Hyperlinks....27
5.10 Line widths....27
5.11 Text fonts....28
5.12 Symbols....28
5.12.1 Choice of symbols....28
5.12.2 Symbol size....29
5.12.3 Orientation of symbols....29
5.13 Scales....30
5.14 Pictorial presentation....30
5.15 Quantities, units, values and colour codes....30
5.16 Presentation of ranges and set of elements....30
5.17 Dimension lines....32
5.18 Leader lines and reference lines....32
5.19 Explanatory notes and markings....33
5.20 Designation of objects....33
5.20.1 General....33
5.20.2 Reference designations....33
5.20.3 Simplified presentation....34
5.20.4 Cable core designations....35
5.21 Terminal designations....35

5.22 Signal designations 35
6 Document kinds 35
7 Diagrams 36
7.1 General 36
7.1.1 Flow of energy, signal, etc 36
7.1.2 Symbols 36
7.1.3 Connecting lines 39
7.1.4 Representation of binary logic circuits 45
7.1.5 Boundary frames 48
7.1.6 Presentation of reference designations 48
7.1.7 Presentation of terminal designations 53
7.1.8 Presentation of signal designations 53
7.1.9 Method of presentation of multi-phase circuits 54
7.1.10 Emphasizing of circuits 55
7.2 Overview diagrams 55
7.3 Function diagrams 60
7.3.1 General 60
7.3.2 Equivalent-circuit diagrams 60
7.3.3 Logic-function diagram 60
7.4 Circuit diagrams 61
7.4.1 General 61
7.4.2 Layout 61
7.4.3 Methods for representation of components 62
7.4.4 Representation of components with movable parts 67
7.4.5 Representation of supply circuits 69
7.4.6 Representation of binary logic elements 70
7.4.7 Symbols with a large number of terminals 71
7.4.8 Wired functions (wired-AND, wired-OR) 71
7.5 Connection diagrams 72
7.5.1 General 72
7.5.2 Representation of devices, units or assemblies 73
7.5.3 Representation of terminals 74
7.5.4 Representation of cables and its constituent cores 74
7.5.5 Representation of conductors 74
7.5.6 Simplified presentation 76
8 Drawings 77
8.1 General 77
8.2 Requirements on base documents 77
8.3 Arrangement drawings 79
9 Tables 82
9.1 General 82
9.2 Presentation of reference designations 82
9.3 Connection tables 83
10 Charts, graphs 85
10.1 General 85
10.2 Function charts 85
10.3 Sequence charts and time sequence charts 85
11 Structured documentation 86

11.1 General 86
11.2 Presentation of occurrences of an object type in diagrams 87
11.2.1 General 87
11.2.2 Using an instance diagram 87
11.2.3 Using a single symbol 87
11.3 Referencing 89
11.4 Document metadata 91
12 CAx conformance requirements 91
Annex A (normative) Construction of a symbol for an object which does not have a symbol in IEC 60617 93
A.1 General rules 93
A.2 Example – Miniature circuit-breaker 93
A.3 Example – miniature circuit-breaker with an RCD (Residual Current Device) 96
A.4 Example – RCD (residual current device) / RCM (residual monitoring device) 97
A.5 Example – PLC 98
Annex B (informative) Document management information and title blocks 100
B.1 Presentation of document management information 100
B.2 Example of the layout of a title block 101
B.3 Examples of the location of identification areas 102
Annex C (informative) Document kind designations and content of information 103
Bibliography 108

Figure 1 – Overview of standards related to the presentation of information in documents 10
Figure 2 – Documents generated from information stored in a database 18
Figure 3 – Documents prepared and stored in a database 18
Figure 4 – Viewing directions of a document 20
Figure 5 – Examples of documents with document and page identifications 21
Figure 6 – Example of documents with multiple document identifiers 21
Figure 7 – Examples of pages with defined identification areas 22
Figure 8 – Example of a reference grid ~~(Page A3 landscape, module size 2,5 mm, reference grid 16 M)~~ 25
Figure 9 – Examples of the application of cross-references 27
Figure 10 – Example of the use of symbols for fibre optics 28
Figure 11 – Example of replacing a symbol with a general symbol 29
Figure 12 – Example of enlarging a symbol 29
Figure 13 – Turning and/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 use of leader lines to connecting lines 32
Figure 17 – Example of an explanatory note 33
Figure 18 – Presentation of reference designations and sets of reference designations 34
Figure 19 – The common initial portion of reference designations 34
Figure 20 – Examples of cable core designations 35
Figure 21 – Example of functional grouping and signal flow directions; a control system 36

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

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 66
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
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 74
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 79
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 block 101
Figure B.2 – Example of a filled-in title block 101
Figure B.3 – Examples of locations of identification areas and possible title blocks 102

Table 1 – Possible distributed logic connections 72
Table B.1 – Metadata element names 100
Table C.1 – Recommended document kind designations 104
Table C.2 – Current document kind designations and replacements 106

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.
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.

DISCLAIMER
This Redline version is not an official IEC Standard and is intended only to provide the user with an indication of what changes have been made to the previous version. Only the current version of the standard is to be considered the official document.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions and deletions are displayed in red, with deletions being struck through.

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

- reconfirmed,
- 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.

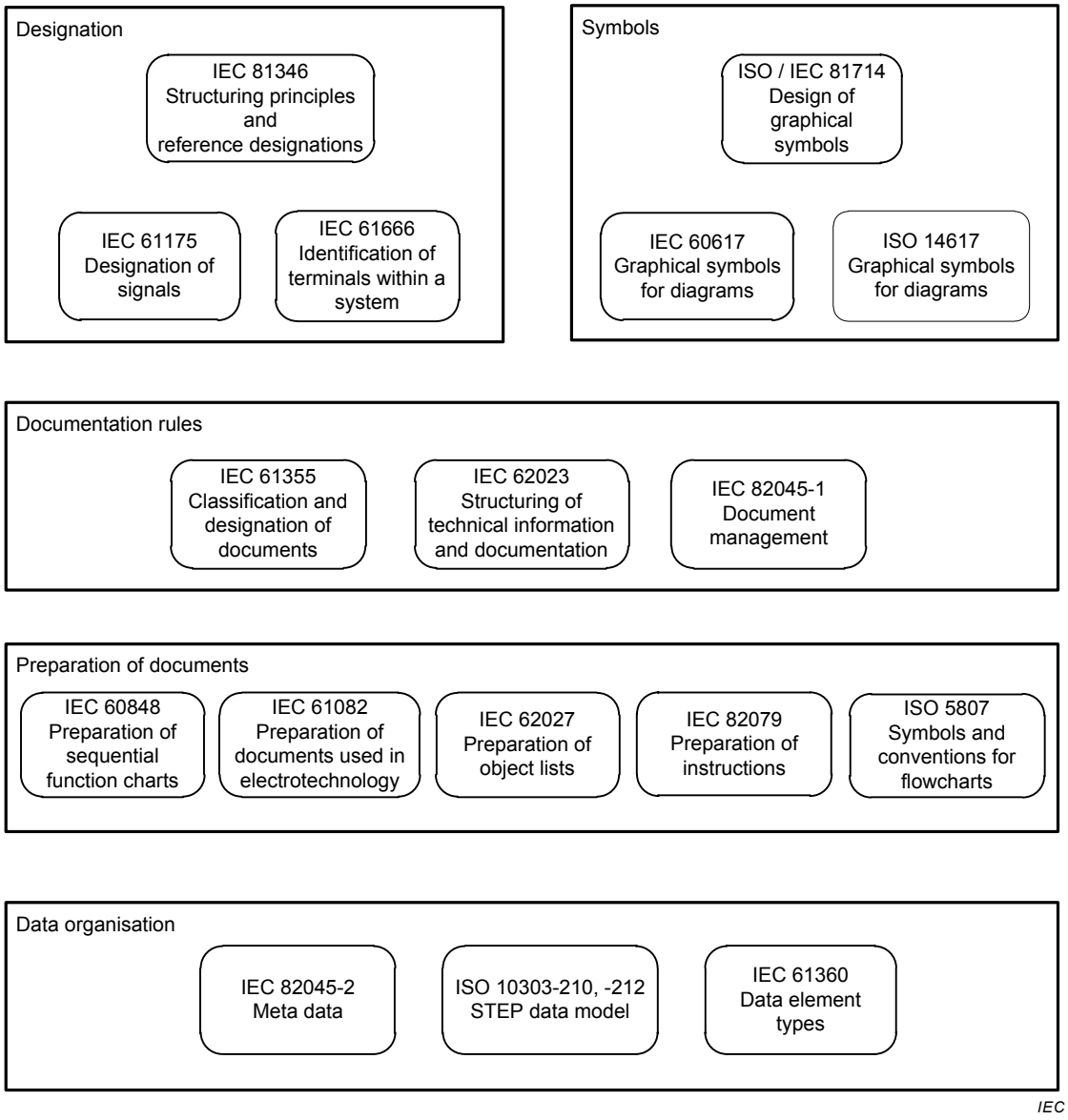


Figure 1 – Overview of standards related to the presentation of information in documents

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

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~~-DB: 2001~~, *Graphical symbols for diagrams.* Available from: <http://std.iec.ch/iec60617>

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

IEC 61175~~:2005~~, *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~~:1994~~, *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~~:2004~~, *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~~:1999~~, *Technical drawings – General principles of presentation – Part 22: Basic conventions and applications for leader lines and reference lines*

ISO 128-30~~:2001~~, *Technical drawings – General principles of presentation – Part 30: Basic conventions for views*

ISO 2594~~:1972~~, *Building drawings – Projection methods*

ISO 3098-5~~:1997~~, *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~~:1979~~, *Technical drawings – Scales*

~~[1] Published as a compilation in ISO Standards Handbook, Quantities and units.~~

ISO 5456-2:1996, *Technical drawings – Projection methods – Part 2: Orthographic representations*

ISO 5457:1999, *Technical product documentation – Sizes and layout of technical drawing sheets*

~~ISO 10209-1:1992, *Technical product ducumentation – Vocabulary – Part 1: Terms relating to technical drawings: general and types of drawings*~~

~~ISO 10628:1997, *Flow diagrams for process plants – General rules*~~

~~ISO 14617 (all parts), *Graphical symbols for diagrams*~~

ISO 80000 (all parts), *Quantities and units*

ISO 81714-1:1999, *Design of graphical symbols for use in the technical documentation of products – Part 1: Basic rules*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

~~NOTE 1 In the definitions, terms that are defined elsewhere within this clause are shown in *italics*.~~

NOTE 0 provides further information on different document kinds.

3.1 Basic terms

~~**3.1.1**~~
~~**data medium**~~
~~material on which data can be recorded and from which data can be retrieved~~

~~[ISO/IEC 2382-1, definition 01.01.51]~~

3.1.1
document
fixed and structured amount of information intended for human perception that can be managed and interchanged as a unit between users and systems

Note 1 to entry: The term document is not restricted to its meaning in a legal sense.

Note 2 to entry: A document can be designated in accordance with the type of information and the form of presentation, for example overview diagram, connection table, function chart.

[SOURCE: ISO/IEC 8613-1:1994, 3.58, modified – Notes 1 and 2 to entry have been added.]

3.1.2
document kind
type of document defined with respect to its specified content of information and form of presentation

Note 1 to entry: Sometimes the term document type is used for the same concept.

[SOURCE: IEC 61355-1:2008, 3.~~56~~]

3.1.3
documentation
collection of documents related to a given subject

Note 1 to entry: This may include technical, commercial and/or other documents.

IEC 61082-1

Edition 3.0 2014-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Preparation of documents used in electrotechnology – Part 1: Rules

Établissement des documents utilisés en électrotechnique – Partie 1: Règles



IEC 61082-1:2014-10(en-fr)

CONTENTS

FOREWORD 8
INTRODUCTION 10
1 Scope 11
2 Normative references 11
3 Terms and definitions 12
3.1 Basic terms 13
3.2 Terms related to the forms of presentation of information 14
3.3 Terms related to specific document kinds 15
4 Documentation principles 16
4.1 General considerations 16
4.2 Structure of documentation 16
4.3 Presentation of information 17
4.4 Document identification and designation 18
5 Rules for presentation of information 18
5.1 Legibility 18
5.2 Text orientation 19
5.3 Colours, shading and patterns 19
5.4 Paper page sizes 19
5.5 Paper page reproduction 20
5.6 Page identification 20
5.7 Page layout 21
5.7.1 General 21
5.7.2 Identification area 22
5.7.3 Content area 22
5.8 Cross-references 25
5.9 Hyperlinks 26
5.10 Line widths 26
5.11 Text fonts 27
5.12 Symbols 27
5.12.1 Choice of symbols 27
5.12.2 Symbol size 28
5.12.3 Orientation of symbols 29
5.13 Scales 29
5.14 Pictorial presentation 29
5.15 Quantities, units, values and colour codes 29
5.16 Presentation of ranges and set of elements 29
5.17 Dimension lines 31
5.18 Leader lines and reference lines 31
5.19 Explanatory notes and markings 32
5.20 Designation of objects 32
5.20.1 General 32
5.20.2 Reference designations 32
5.20.3 Simplified presentation 33
5.20.4 Cable core designations 34
5.21 Terminal designations 34
5.22 Signal designations 34

6 Document kinds 34
7 Diagrams 35
7.1 General 35
7.1.1 Flow of energy, signal, etc. 35
7.1.2 Symbols 35
7.1.3 Connecting lines 38
7.1.4 Representation of binary logic circuits 44
7.1.5 Boundary frames 47
7.1.6 Presentation of reference designations 47
7.1.7 Presentation of terminal designations 52
7.1.8 Presentation of signal designations 52
7.1.9 Method of presentation of multi-phase circuits 53
7.1.10 Emphasizing of circuits 54
7.2 Overview diagrams 54
7.3 Function diagrams 58
7.3.1 General 58
7.3.2 Equivalent-circuit diagrams 58
7.3.3 Logic-function diagram 58
7.4 Circuit diagrams 59
7.4.1 General 59
7.4.2 Layout 59
7.4.3 Methods for representation of components 60
7.4.4 Representation of components with movable parts 65
7.4.5 Representation of supply circuits 67
7.4.6 Representation of binary logic elements 68
7.4.7 Symbols with a large number of terminals 69
7.4.8 Wired functions (wired-AND, wired-OR) 69
7.5 Connection diagrams 70
7.5.1 General 70
7.5.2 Representation of devices, units or assemblies 71
7.5.3 Representation of terminals 72
7.5.4 Representation of cables and its constituent cores 72
7.5.5 Representation of conductors 72
7.5.6 Simplified presentation 74
8 Drawings 75
8.1 General 75
8.2 Requirements on base documents 75
8.3 Arrangement drawings 77
9 Tables 80
9.1 General 80
9.2 Presentation of reference designations 80
9.3 Connection tables 81
10 Charts, graphs 83
10.1 General 83
10.2 Function charts 83
10.3 Sequence charts and time sequence charts 83
11 Structured documentation 84
11.1 General 84

11.2 Presentation of occurrences of an object type in diagrams 85
11.2.1 General 85
11.2.2 Using an instance diagram 85
11.2.3 Using a single symbol 85
11.3 Referencing 87
11.4 Document metadata 89
12 CAx conformance requirements 89
Annex A (normative) Construction of a symbol for an object which does not have a symbol in IEC 60617 91
A.1 General rules 91
A.2 Example – Miniature circuit-breaker 91
A.3 Example – miniature circuit-breaker with an RCD (Residual Current Device) 94
A.4 Example – RCD (residual current device) / RCM (residual monitoring device) 95
A.5 Example – PLC 96
Annex B (informative) Document management information and title blocks 98
B.1 Presentation of document management information 98
B.2 Example of the layout of a title block 99
B.3 Examples of the location of identification areas 100
Annex C (informative) Document kind designations and content of information 101
Bibliography 106

Figure 1 – Overview of standards related to the presentation of information in documents 10
Figure 2 – Documents generated from information stored in a database 17
Figure 3 – Documents prepared and stored in a database 18
Figure 4 – Viewing directions of a document 19
Figure 5 – Examples of documents with document and page identifications 20
Figure 6 – Example of documents with multiple document identifiers 21
Figure 7 – Examples of pages with defined identification areas 22
Figure 8 – Example of a reference grid 24
Figure 9 – Examples of the application of cross-references 26
Figure 10 – Example of the use of symbols for fibre optics 27
Figure 11 – Example of replacing a symbol with a general symbol 28
Figure 12 – Example of enlarging a symbol 28
Figure 13 – Turning and/or mirroring of symbol S00055 in IEC 60617 29
Figure 14 – Terminators of dimension lines (from ISO 129) 31
Figure 15 – Examples of leader lines (from ISO 128-22) 31
Figure 16 – Example of the use of leader lines to connecting lines 31
Figure 17 – Example of an explanatory note 32
Figure 18 – Presentation of reference designations and sets of reference designations 33
Figure 19 – The common initial portion of reference designations 33
Figure 20 – Examples of cable core designations 34
Figure 21 – Example of functional grouping and signal flow directions; a control system 35
Figure 22 – Example of symbols and different location of connections 36
Figure 23 – Simplified presentation 36

Figure 24 – Simplified presentation of parallel connected identical objects 37
Figure 25 – Simplified presentation of serial connected identical objects 37
Figure 26 – Example of cross-references related to detached presentations 38
Figure 27 – Example for technical data associated with a symbol 38
Figure 28 – Example of technical data shown inside a symbol 38
Figure 29 – Symbols representing joining of connecting lines 39
Figure 30 – Symbol representing the interconnection of crossing connecting lines 39
Figure 31 – Examples of the joining of connecting lines 39
Figure 32 – Example of the joining of connecting lines with indication of where the physical wire goes 40
Figure 33 – Example of the joining of connecting lines where the connecting lines represent bundles of wires 40
Figure 34 –Different presentation methods for wireless interconnections 41
Figure 35 – Example of presentations of mechanical links 41
Figure 36 – Example for avoiding bends and cross-overs 42
Figure 37 – Spacing of lines 42
Figure 38 – Examples for technical data associated with connecting lines 43
Figure 39 – Presentation of bundles 44
Figure 40 – Indication of sequence within bundles 44
Figure 41 – Illustration of the terms “states” and “levels” 45
Figure 42 – Detail of a circuit diagram using positive logic convention 46
Figure 43 – Detail of a circuit diagram using direct logic polarity convention 46
Figure 44 – Boundary frame with a reference to another document 47
Figure 45 – Location of reference designations at a symbol 48
Figure 46 – Examples of reference designations associated with connecting lines 48
Figure 47 – Presentation of reference designations at a boundary frame 49
Figure 48 – Presentation of reference designations including different aspect 50
Figure 49 – Presentation of reference designation sets at a boundary frame 50
Figure 50 – Presentation of reference designation 51
Figure 51 – Presentation of reference designations excluded from concatenation 51
Figure 52 – Examples for the presentation of terminal designations 52
Figure 53 – Examples of signal designations associated with connecting lines 52
Figure 54 – Examples of reference and signal designations ass. with connecting lines 53
Figure 55 – Presentation of signal designations 53
Figure 56 – Example for a multi-phase circuit 54
Figure 57 – Overview diagram for a material handling plant 55
Figure 58 – Overview diagram for one conveyer belt function 56
Figure 59 – Overview diagram process plant 56
Figure 60 – Overview diagram of an electrical plant 57
Figure 61 – Signal flow in a function diagram 58
Figure 62 – Example of an equivalent-circuit diagram 58
Figure 63 – Minimized use of logic negations 59
Figure 64 – Lining-up of symbols 60
Figure 65 – Grouping of symbols for functionally related components 60

Figure 66 – Attached presentation of symbols 61
Figure 67 – Detached presentation of symbols 62
Figure 68 – Example of the use of inset tables 63
Figure 69 – Example of presentation of internal connection 64
Figure 70 – Repeated presentation of a symbol for a quadruple multiplexer 64
Figure 71 – Simplified repeated presentation of a symbol for a quadruple multiplexer 65
Figure 72 – Symbol of a five-position switch supplemented with a graph 66
Figure 73 – Examples of pilot switch 66
Figure 74 – Symbol of a pilot switch supplemented with a note 66
Figure 75 – Orientation of contact symbols 67
Figure 76 – Representation of a.c. supply circuits 67
Figure 77 – Representation of d.c. supply circuits 68
Figure 78 – Examples of use of logic polarity indication 68
Figure 79 – Examples of mismatched polarity indications 68
Figure 80 – Example of a split presentation of a symbol 69
Figure 81 – Example of a connection diagram 71
Figure 82 – Example of presentation of termination of a multi-core cable 72
Figure 83 – Example of cable connections 73
Figure 84 – Example of connection diagram for a sub-rack 74
Figure 85 – Example of simplified presentation of a connection diagram 75
Figure 86 – Example of the use of a base document 77
Figure 87 – Presentation of technical data 77
Figure 88 – Examples of the use of symbols for indication mounting methods 78
Figure 89 – An arrangement drawing the mounting panel of a cubicle 79
Figure 90 – An arrangement drawing of an industrial plant 80
Figure 91 – Example setting the common initial portion in the table header 81
Figure 92 – Example omitting the common initial portion on successive lines 81
Figure 93 – Example of a terminal-oriented connection table 82
Figure 94 – Example of a connection table with remote end designations 82
Figure 95 – Example of a connection-oriented connection table 83
Figure 96 – Example of a time sequence chart 84
Figure 97 – Example of an instance diagram of a motor starter 85
Figure 98 – A symbol for a motor starter 85
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 86
Figure 100 – A symbol for the motor starter, for single-line presentations 86
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 87
Figure 102 – Referencing in accordance with IEC 62023 88
Figure 103 – Direct referencing 89
Figure A.1 – The general symbols for an object in IEC 60617 91
Figure A.2 – Miniature circuit-breaker shown with the symbol for a circuit-breaker 92
Figure A.3 – Miniature circuit-breaker shown with the general symbol for a switch qualified with the symbol for automatic tripping 92

Figure A.4 – Miniature circuit-breaker shown with the symbol for a circuit-breaker qualified with the symbol for automatic tripping 93
Figure A.5 – Miniature circuit-breaker shown with the general symbol for a switch qualified with the symbols for thermal and electromagnetic effects 93
Figure A.6 – Miniature circuit-breaker shown with the symbol for a circuit-breaker qualified with the symbol for thermal and electromagnetic effects 93
Figure A.7 – Symbol for a miniature circuit-breaker with an RCD, version 1 94
Figure A.8 – Symbol for a miniature circuit-breaker with an RCD, version 2 94
Figure A.9 – Symbol for a miniature circuit-breaker with an RCD, version 3 95
Figure A.10 – Example of a symbol for an RCD 95
Figure A.11 – Example of a symbol for an RCM 95
Figure A.12 – Symbols for a PLC 96
Figure A.13 – A circuit diagram with a symbol of a PLC 97
Figure B.1 – Example of the arrangement of information in a title block 99
Figure B.2 – Example of a filled-in title block 99
Figure B.3 – Examples of locations of identification areas and possible title blocks 100

Table 1 – Possible distributed logic connections 70
Table B.1 – Metadata element names 98
Table C.1 – Recommended document kind designations 102
Table C.2 – Current document kind designations and replacements 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.
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.

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

- reconfirmed,
- 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 provides an overview on the interrelation between some of these standards.

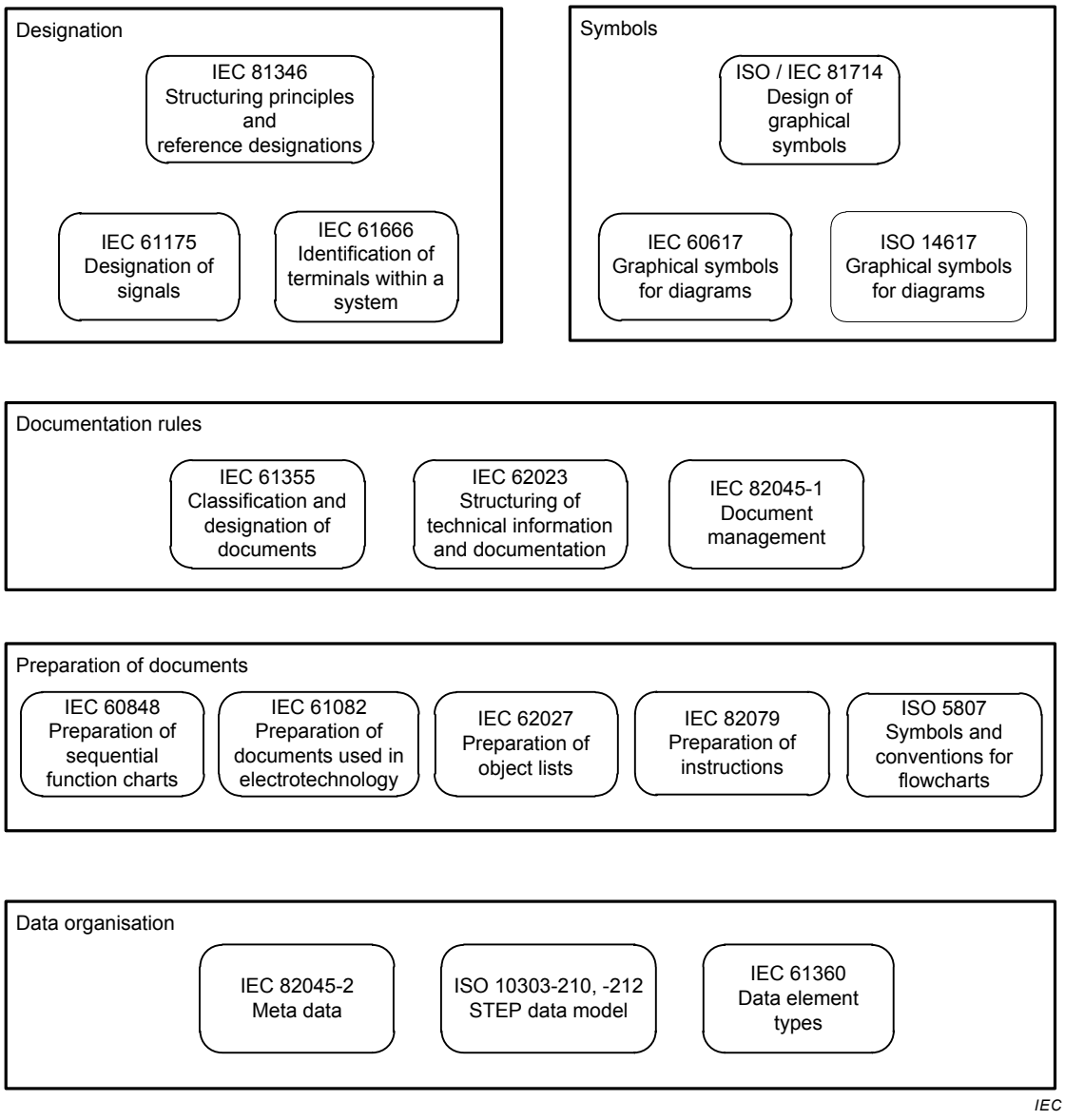


Figure 1 – Overview of standards related to the presentation of information in documents

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 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

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, *Conventions concerning electric and magnetic circuits*

IEC 60757, *Code for designation of colours*

IEC 60617, *Graphical symbols for diagrams.* Available from: <http://std.iec.ch/iec60617>

IEC 60848, *GRAFCET specification language for sequential function charts*

IEC 61175, *Industrial systems, installations and equipment and industrial products- Designation of signals*

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

IEC 61293, *Marking of electrical equipment with ratings related to electrical supply – Safety requirements*

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

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

IEC 62023, *Structuring of technical information and documentation*

IEC 62027, *Preparation of object lists, including parts lists*

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

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

IEC 81714-2:2006, *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, *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 128-22, *Technical drawings – General principles of presentation – Part 22: Basic conventions and applications for leader lines and reference lines*

ISO 128-30, *Technical drawings – General principles of presentation – Part 30: Basic conventions for views*

ISO 2594, *Building drawings – Projection methods*

ISO 3098-5, *Technical product documentation – Lettering – Part 5: CAD- lettering of the Latin alphabet, numerals and marks*

ISO 5455, *Technical drawings – Scales*

ISO 5456-2, *Technical drawings – Projection methods – Part 2: Orthographic representations*

ISO 5457:1999, *Technical product documentation – Sizes and layout of technical drawing sheets*

ISO 80000 (all parts), *Quantities and units*

ISO 81714-1, *Design of graphical symbols for use in the technical documentation of products – Part 1: Basic rules*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE Annex C provides further information on different document kinds.

SOMMAIRE

AVANT-PROPOS 114
INTRODUCTION 116
1 Domaine d'application 118
2 Références normatives 118
3 Termes et définitions 120
3.1 Termes fondamentaux 120
3.2 Termes liés aux formes de présentation des informations 122
3.3 Termes liés aux sortes de documents particulières 122
4 Principes de documentation 123
4.1 Considérations générales 123
4.2 Structure de la documentation 123
4.3 Présentation des informations 124
4.4 Identification et désignation de document 126
5 Règles de présentation des informations 127
5.1 Lisibilité 127
5.2 Orientation du texte 127
5.3 Couleurs, ombrage et motifs 128
5.4 Formats des pages sur papier 128
5.5 Reproduction des pages sur papier 129
5.6 Identification des pages 129
5.7 Disposition des pages 130
5.7.1 Généralités 130
5.7.2 Zone d'identification 131
5.7.3 Zone de contenu 132
5.8 Correspondances 135
5.9 Liens hypertextes 136
5.10 Largeur des traits 136
5.11 Polices de caractères 137
5.12 Symboles 137
5.12.1 Choix des symboles 137
5.12.2 Taille du symbole 138
5.12.3 Orientation des symboles 139
5.13 Échelles 139
5.14 Présentation imagée 139
5.15 Grandeurs, unités, valeurs et codes de couleur 140
5.16 Présentation de gammes et d'un ensemble d'éléments 140
5.17 Lignes de cote 141
5.18 Lignes de repère et lignes de référence 141
5.19 Notes et inscriptions explicatives 142
5.20 Désignation des objets 142
5.20.1 Généralités 142
5.20.2 Désignations de référence 143
5.20.3 Présentation simplifiée 144
5.20.4 Désignations des conducteurs des câbles 145
5.21 Désignations des bornes 145
5.22 Désignations des signaux 145

6 Sortes de documents 145
7 Schémas 146
7.1 Généralités 146
7.1.1 Flux d'énergie, signal, etc. 146
7.1.2 Symboles 146
7.1.3 Tracés de connexion 149
7.1.4 Représentation des circuits logiques binaires 155
7.1.5 Encadrements de séparation 158
7.1.6 Présentation des désignations de référence 159
7.1.7 Présentation des désignations de bornes 165
7.1.8 Présentation des désignations de signaux 166
7.1.9 Méthode de présentation des circuits polyphasés 168
7.1.10 Mise en valeur des circuits 168
7.2 Schémas d'ensemble 169
7.3 Schémas fonctionnels 173
7.3.1 Généralités 173
7.3.2 Schéma d'équivalence des circuits 173
7.3.3 Schéma fonctionnel logique 174
7.4 Schémas des circuits 174
7.4.1 Généralités 174
7.4.2 Présentation 175
7.4.3 Méthodes pour la représentation des composants 175
7.4.4 Représentation des composants avec des parties mobiles 180
7.4.5 Représentation des circuits d'alimentation 182
7.4.6 Représentation des opérateurs logiques binaires 183
7.4.7 Symboles avec un grand nombre de bornes 184
7.4.8 Fonctions câblées (câblée-ET, câblée-OU) 185
7.5 Schémas des connexions 186
7.5.1 Généralités 186
7.5.2 Représentation des dispositifs, des unités ou des ensembles 188
7.5.3 Représentation des bornes 188
7.5.4 Représentation des câbles et des conducteurs qui les constituent 188
7.5.5 Représentation des conducteurs 188
7.5.6 Présentation simplifiée 190
8 Dessins 191
8.1 Généralités 191
8.2 Exigences concernant les documents de base 191
8.3 Dessins d'installation 193
9 Tableaux 198
9.1 Généralités 198
9.2 Présentation des désignations de référence 198
9.3 Tableaux de connexions 199
10 Diagrammes, graphiques 200
10.1 Généralités 200
10.2 Diagrammes fonctionnels 201
10.3 Diagrammes de séquence et diagrammes de séquence-temps 201
11 Documentation structurée 202
11.1 Généralités 202

11.2 Présentation des occurrences d'un type d'objet dans les schémas 202
11.2.1 Généralités 202
11.2.2 Utilisation d'un schéma d'exemple 202
11.2.3 Utilisation d'un symbole individuel 203
11.3 Référencement 205
11.4 Métadonnées de document 207
12 Exigences de conformité xAO 208
Annexe A (normative) Construction d'un symbole pour un objet qui n'a pas de symbole dans l'IEC 60617 209
A.1 Règles générales 209
A.2 Exemple – Disjoncteur miniature 210
A.3 Exemple – disjoncteur miniature avec DDR (Dispositif Différentiel Résiduel) 212
A.4 Exemple – DDR (dispositif différentiel résiduel) / RCM (dispositif de surveillance résiduel – residual monitoring device) 213
A.5 Exemple – PLC 214
Annexe B (informative) Informations de gestion des documents et cartouches d'inscriptions 218
B.1 Présentation des informations de gestion des documents 218
B.2 Exemple de disposition d'un cartouche d'inscriptions 219
B.3 Exemples d'emplacement des zones d'identification 220
Annexe C (informative) Désignations de sortes de document et contenu des informations 222
Bibliographie 227

Figure 1 – Vue d'ensemble des normes relatives à la présentation des informations dans les documents 117
Figure 2 – Documents générés à partir des informations stockées dans une base de données 125
Figure 3 – Documents établis et stockés dans une base de données 126
Figure 4 – Sens de lecture d'un document 128
Figure 5 – Exemples de documents avec identifications de document et de page 129
Figure 6 – Exemple de documents avec des identificateurs de documents multiples 130
Figure 7 – Exemples de pages avec des zones d'identification définies 131
Figure 8 – Exemple d'un système de coordonnées 134
Figure 9 – Exemples de l'application des correspondances 136
Figure 10 – Exemple de l'utilisation de symboles pour les fibres optiques 137
Figure 11 – Exemple de remplacement d'un symbole par un symbole général 138
Figure 12 – Exemple d'agrandissement d'un symbole 139
Figure 13 – Rotation et/ou transposition par symétrie du symbole S00055 de l'IEC 60617 139
Figure 14 – Extrémités des lignes de cote (tiré de l'ISO 129) 141
Figure 15 – Exemples de lignes de repère (tiré de l'ISO 128-22) 141
Figure 16 – Exemple d'utilisation de lignes de repère se terminant sur des lignes de connexion 142
Figure 17 – Exemple de note explicative 142
Figure 18 – Présentation de désignations de référence et d'ensembles de désignations de référence 144

Figure 19 – Portion initiale commune des désignations de référence 144
Figure 20 – Exemples de désignations de conducteurs des câbles 145
Figure 21 – Exemple de regroupement fonctionnel et de directions de flux de signaux; système de commande 146
Figure 22 – Exemple de symboles et emplacement différent de connexions 147
Figure 23 – Présentation simplifiée 147
Figure 24 – Présentation simplifiée des objets identiques connectés en parallèle 148
Figure 25 – Présentation simplifiée des objets identiques connectés en série 148
Figure 26 – Exemple de correspondances liées aux présentations développées 149
Figure 27 – Exemple de données techniques associées à un symbole 149
Figure 28 – Exemple de données techniques représentées à l'intérieur d'un symbole 149
Figure 29 – Symboles représentant la jonction de tracés de connexion 150
Figure 30 – Symbole représentant l'interconnexion du croisement des tracés de connexion 150
Figure 31 – Exemples de jonction de tracés de connexion 150
Figure 32 – Exemple de jonction de tracés de connexion avec indication de l'endroit où va le fil physique 151
Figure 33 – Exemple de jonction de tracés de connexion à un endroit où les tracés de connexion représentent des faisceaux de fils 151
Figure 34 – Différentes méthodes de présentation des interconnexions sans fil 152
Figure 35 – Exemple de présentations de liaisons mécaniques 152
Figure 36 – Exemple pour éviter les coudes et les croisements 153
Figure 37 – Espacement des tracés 153
Figure 38 – Exemples de données techniques associées aux tracés de connexion 154
Figure 39 – Présentation des faisceaux 155
Figure 40 – Indication de séquence à l'intérieur de faisceaux 155
Figure 41 – Illustration des termes "états" et "niveaux" 156
Figure 42 – Détail d'un schéma de circuit utilisant la convention de logique positive 157
Figure 43 – Détail d'un schéma de circuit utilisant la convention directe de polarité logique 158
Figure 44 – Encadrement de séparation avec référence à un autre document 159
Figure 45 – Emplacement des désignations de référence au niveau d'un symbole 160
Figure 46 – Exemples de désignations de référence associées aux tracés de connexion 160
Figure 47 – Présentation des désignations de référence près de l'encadrement de séparation 161
Figure 48 – Présentation des désignations de référence incluant différents aspects 162
Figure 49 – Présentation des ensembles de désignations de référence près d'un encadrement de séparation 163
Figure 50 – Présentation de la désignation de référence 164
Figure 51 – Présentation de désignations de référence exclues de la concaténation 165
Figure 52 – Exemples pour la présentation des désignations de bornes 165
Figure 53 – Exemples de désignations de signaux associées aux tracés de connexion 166
Figure 54 – Exemples de désignations de référence et de signaux associées aux tracés de connexion 167
Figure 55 – Présentation des désignations de signaux 168

Figure 56 – Exemple de circuit polyphasé 168
Figure 57 – Schéma d'ensemble d'une installation de traitement de matériau 170
Figure 58 – Schéma d'ensemble d'une fonction de courroie de transmission 171
Figure 59 – Schéma d'ensemble d'une installation de traitement 171
Figure 60 – Schéma d'ensemble d'une centrale électrique 173
Figure 61 – Flux de signal dans un schéma fonctionnel 173
Figure 62 – Exemple de schéma d'équivalence des circuits 174
Figure 63 – Utilisation réduite des négations logiques 174
Figure 64 – Alignement des symboles 175
Figure 65 – Regroupement des symboles pour les composants fonctionnels liés 175
Figure 66 – Représentation assemblée de symboles 176
Figure 67 – Représentation développée de symboles 177
Figure 68 – Exemple d'utilisation de tableaux en cartouche 178
Figure 69 – Exemple de présentation de connexion interne 179
Figure 70 – Représentation répétée d'un symbole pour un multiplexeur quadruple 179
Figure 71 – Représentation répétée simplifiée du symbole d'un multiplexeur quadruple 180
Figure 72 – Symbole d'un interrupteur à cinq positions complété par un graphique 181
Figure 73 – Exemples d'auxiliaire automatique de commande 181
Figure 74 – Symbole d'un auxiliaire automatique de commande complété par une note 182
Figure 75 – Orientation des symboles de contact 182
Figure 76 – Représentation de circuits d'alimentation en courant alternatif 183
Figure 77 – Représentation de circuits d'alimentation en courant continu 183
Figure 78 – Exemples d'utilisation de l'indication de polarité logique 184
Figure 79 – Exemples d'indications de polarité inadéquate 184
Figure 80 – Exemple de présentation éclatée d'un symbole 185
Figure 81 – Exemple d'un schéma de connexion 187
Figure 82 – Exemple de présentation de terminaison d'un câble multiconducteur 188
Figure 83 – Exemple de connexions de câble 189
Figure 84 – Exemple de schéma de connexion pour un bac à cartes 190
Figure 85 – Exemple de présentation simplifiée d'un schéma de connexion 191
Figure 86 – Exemple d'utilisation d'un document de base 193
Figure 87 – Présentation des données techniques 194
Figure 88 – Exemples d'utilisation des symboles pour indiquer les méthodes de montage 195
Figure 89 – Dessin d'installation du panneau de montage d'une armoire 196
Figure 90 – Dessin d'installation d'une installation industrielle 197
Figure 91 – Exemple avec portion initiale commune dans l'en-tête du tableau 198
Figure 92 – Exemple omettant la portion initiale commune sur des lignes successives 198
Figure 93 – Exemple de tableau de connexions adapté aux bornes 199
Figure 94 – Exemple d'un tableau de connexions avec désignations d'extrémité éloignée 200
Figure 95 – Exemple de tableau de connexions adapté aux connexions 200
Figure 96 – Exemple de diagramme de séquence-temps 202
Figure 97 – Exemple de schéma d'exemple d'un démarreur 203

Figure 98 – Symbole pour un démarreur 203
Figure 99 – Exemple de document sous forme de tableau décrivant les relations entre les bornes externes du démarreur d'un moteur et les bornes internes de ses composants 204
Figure 100 – Symbole pour démarreur, pour présentations unifilaires 204
Figure 101 – Exemple de document sous forme de tableau décrivant les relations entre les bornes externes du démarreur d'un moteur et les bornes internes de ses composants 205
Figure 102 – Référencement conformément à l'IEC 62023 206
Figure 103 – Référencement direct 207
Figure A.1 – Symboles généraux pour un objet dans l'IEC 60617 209
Figure A.2 – Disjoncteur miniature représenté avec le symbole des disjoncteurs 210
Figure A.3 – Disjoncteur miniature représenté avec le symbole général pour un interrupteur qualifié avec le symbole pour le déclenchement automatique 210
Figure A.4 – Disjoncteur miniature représenté avec le symbole des disjoncteurs qualifié avec le symbole pour le déclenchement automatique 211
Figure A.5 – Disjoncteur miniature représenté avec le symbole général pour un interrupteur qualifié avec les symboles pour les effets thermique et électromagnétique 211
Figure A.6 – Disjoncteur miniature représenté avec le symbole pour un disjoncteur qualifié avec le symbole pour les effets thermique et électromagnétique 211
Figure A.7 – Symbole pour un disjoncteur miniature avec DDR, version 1 212
Figure A.8 – Symbole pour un disjoncteur miniature avec DDR, version 2 212
Figure A.9 – Symbole pour un disjoncteur miniature avec DDR, version 3 213
Figure A.10 – Exemple de symbole pour DDR 213
Figure A.11 – Exemple de symbole pour RCM 214
Figure A.12 – Symboles pour un PLC 215
Figure A.13 – Schéma de circuit avec un symbole d'un PLC 217
Figure B.1 – Exemple de disposition des informations dans un cartouche d'inscriptions 219
Figure B.2 – Exemple de cartouche d'inscriptions renseigné 220
Figure B.3 – Exemples d'emplacements de zones d'identification et de cartouches d'inscriptions possibles 221

Tableau 1 – Connexions logiques réparties possibles 186
Tableau B.1 – Noms des éléments de métadonnées 218
Tableau C.1 – Désignations recommandées de sortes de documents 223
Tableau C.2 – Désignations courantes de sortes de document et remplacements 225

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

_____

ÉTABLISSEMENT DES DOCUMENTS UTILISÉS EN ÉLECTROTECHNIQUE –

Partie 1: Règles

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 61082-1 a été établie par le comité d'études 3 de l'IEC: Structures d'information, documentation et symboles graphiques.

Elle a le statut d'une norme horizontale conformément au Guide 108 de l'IEC.

Cette troisième édition annule et remplace la deuxième édition parue en 2006. Cette édition constitue une révision technique et inclut les principales modifications techniques suivantes:

a) inclusion de règles de présentation pour les interconnexions sans fil
b) description de cas exceptionnels pour l'application de règles pour le positionnement des désignations de référence dans les schémas
c) correction d'erreurs et mise à jour des références normatives

d) harmonisation des définitions par rapport aux publications référencées.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
3/1189/FDIS	3/1196/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Une liste de toutes les parties de la série IEC 61082, publiées sous le titre général *Établissement des documents utilisés en électrotechnique*, peut être consultée sur le site web de l'IEC.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

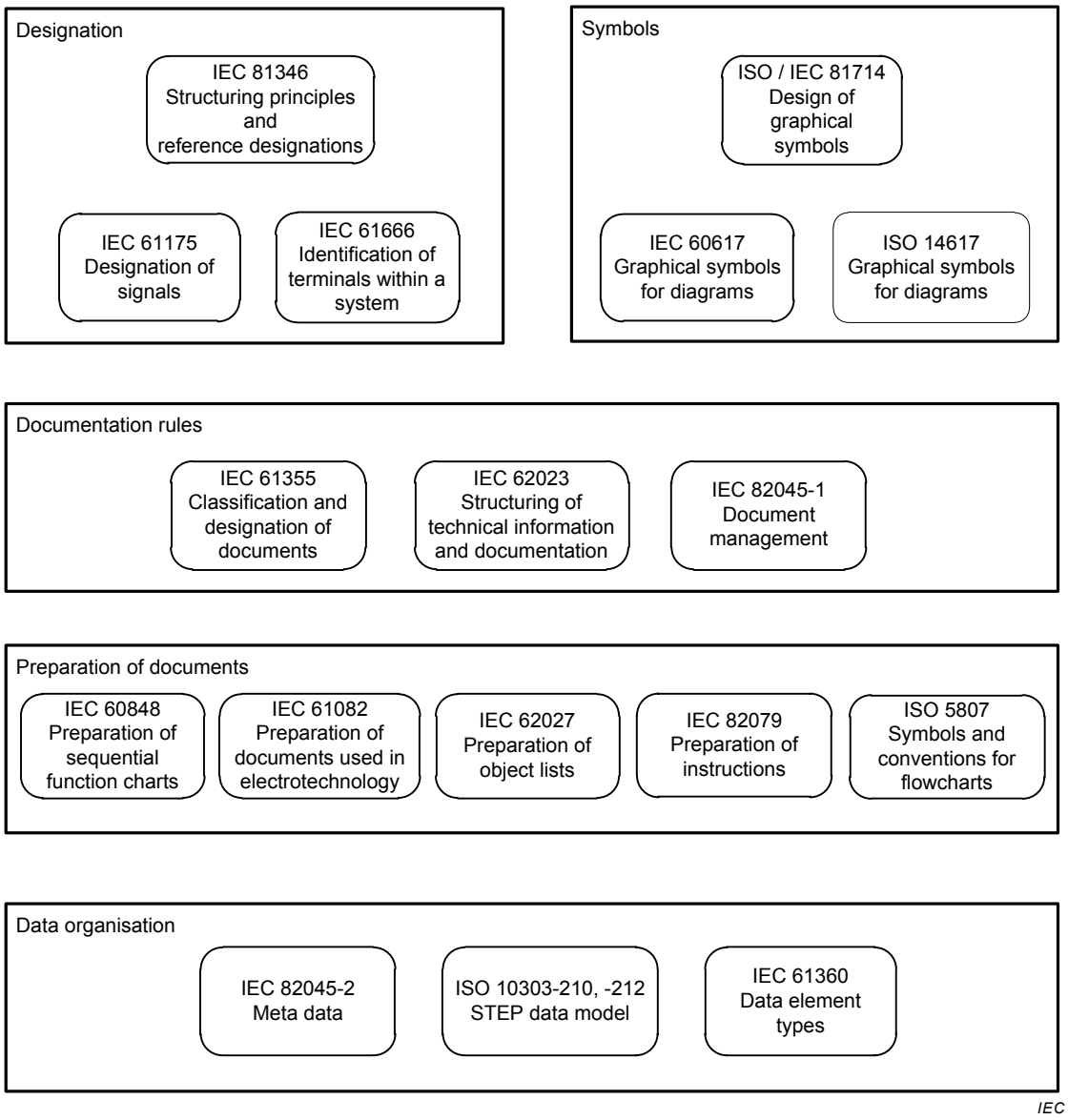
Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. A cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

IMPORTANT – Le logo *"colour inside"* qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

INTRODUCTION

L'IEC 61082-1 traite de la présentation des informations dans les documents. Une partie de ces informations est décrite dans d'autres normes internationales. La Figure 1 donne une vue d'ensemble des relations qui existent entre certaines de ces normes.



Légende

Anglais	Français
Designation	Désignation
IEC 81346 Structuring principles and reference designations	IEC 81346 Principes de structuration et désignations de référence
IEC 61175 Designation of signals	IEC 61175 Désignation des signaux
IEC 61666 Identification of terminals within a system	IEC 61666 Identification des bornes dans le cadre d'un système
Symbols	Symboles
ISO/IEC 81714 Design of graphical symbols	ISO/IEC 81714 Création de symboles graphiques utilisables
IEC 60617 Graphical symbols for diagrams	IEC 60617 Symboles graphiques pour schémas

Anglais	Français
IEC 14617 Graphical symbols for diagrams	IEC 14617 Symboles graphiques pour schémas
Documentation rules	Règles de documentation
IEC 61355 Classification and designation of documents	IEC 61355 Classification et désignation des documents
IEC 62023 Structuring of technical information and documentation	IEC 62023 Structuration des informations et de la documentation techniques
IEC 82045-1 Document management	IEC 82045-1 Gestion de documents
Preparation of documents	Préparation de documents
IEC 60848 Preparation of sequential function charts	IEC 60848 Établissement des diagrammes fonctionnels en séquence
IEC 61082 Preparation of documents used in electrotechnology	IEC 61082-1 Etablissement des documents utilisés en électrotechnique
IEC 62027 Preparation of object lists	IEC 62027 Établissement des listes d'objets
IEC 82079 Preparation of instructions	IEC 82079 Établissement des instructions d'utilisation
ISO 5807 Symbols and conventions for flowcharts	ISO 5807 Symboles et conventions applicables aux organigrammes d'analyse
Data organisation	Organisation des données
IEC 82045-2 Meta data	IEC 82045-2 Métadonnées
ISO 10303-210, -212 STEP data model	ISO 10303-210, -212 Modèle de données STEP
IEC 61360 Data element types	IEC 61360 Types d'éléments de données

Figure 1 – Vue d'ensemble des normes relatives à la présentation des informations dans les documents

Les exemples donnés dans la présente partie de l'IEC 61082 sont destinés à illustrer une règle donnée et ne sont pas nécessairement représentatifs de documents complets.

ÉTABLISSEMENT DES DOCUMENTS UTILISÉS EN ÉLECTROTECHNIQUE –

Partie 1: Règles

1 Domaine d'application

La présente partie de l'IEC 61082 définit des règles générales et sert de guide pour la présentation des informations dans les documents et définit des règles particulières pour les schémas, les dessins et les tableaux utilisés en électrotechnique.

Les règles et les lignes directrices pour tous les types de présentations audio, vidéo ou tactile sont exclues de la présente partie de l'IEC 61082.

Cette norme horizontale est essentiellement destinée à l'usage des comités d'études dans la préparation des normes, conformément aux principes établis dans le Guide 108 de la CEI.

Une des responsabilités d'un comité d'études est, partout où cela est possible, de se servir des normes horizontales lors de la préparation de ses publications. Le contenu de cette norme horizontale ne s'appliquera pas, à moins qu'il ne soit spécifiquement désigné ou inclus dans les publications concernées.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60027 (toutes les parties), *Symboles littéraux à utiliser en électrotechnique*

IEC 60375, *Conventions concernant les circuits électriques et magnétiques*

IEC 60757, *Code de désignation de couleurs*

IEC 60617, *Symboles graphiques pour schémas.* Disponible à l'adresse: <http://std.iec.ch/iec60617>

IEC 60848, *Langage de spécification GRAFCET pour diagrammes fonctionnels en séquence*

IEC 61175, *Systèmes, installations, appareils et produits industriels – Désignation des signaux*

IEC 61286, *Technologie de l'information – Jeu de caractères graphiques codés pour emploi dans l'établissement de documents utilisés en électrotechnique et pour échange de l'information*

IEC 61293, *Marquage des matériels électriques avec des caractéristiques assignées relatives à l'alimentation électrique – Prescriptions de sécurité*

IEC 61355-1:2008, *Classification et désignation des documents pour installations industrielles, systèmes et matériels – Partie 1: Règles et tableaux de classification*

IEC 61666, *Systèmes industriels, installations et appareils, et produits industriels – Identification des bornes dans le cadre d'un système*

IEC 62023, *Structuration des informations et de la documentation techniques*

IEC 62027*, Établissement des listes d'objets, y compris les nomenclatures de composants*

IEC 62491, *Systèmes industriels, installations et appareils et produits industriels - Étiquetage des câbles et des conducteurs isolés*

IEC 81346-1, *Systèmes industriels, installations et appareils, et produits industriels – Principes de structuration et désignations de référence – Partie 1: Règles de base*

IEC 81714-2:2006, *Création de symboles graphiques utilisables dans la documentation technique de produits – Partie 2: Spécification pour symboles graphiques sous forme adaptée à l'ordinateur, y compris les symboles pour bibliothèque de références, et exigences relatives à leur échange*

IEC 82045-1:2001, *Gestion de documents – Partie 1: Principes et méthodes*

IEC 82045-2, *Gestion de documents – Partie 2: Éléments de métadonnées et modèle d'information de référence*

IEC 82079-1, *Établissement des instructions d'utilisation – Structure, contenu et présentation – Partie 1: Principes généraux et exigences détaillées*

ISO 128-22, *Dessins techniques – Principes généraux de représentation – Partie 22: Conventions de base et applications pour les traits de rappel de cote et traits de référence*

ISO 128-30, *Dessins techniques – Principes généraux de représentation – Partie 30: Conventions de base pour les vues*

ISO 2594, *Dessin de bâtiment – Méthodes de projection*

ISO 3098-5, *Documentation technique de produits – Écriture – Partie 5: Écriture en conception assistée par ordinateur de l'alphabet latin, des chiffres et des signes*

ISO 5455, *Dessins techniques – Échelles*

ISO 5456-2, *Dessins techniques – Méthodes de projection – Partie 2: Représentations orthographiques*

ISO 5457:1999, *Documentation technique de produits – Formats et présentation des éléments graphiques des feuilles de dessin*

ISO 80000 (toutes les parties), *Grandeurs et unités*

ISO 81714-1, *Création de symboles graphiques à utiliser dans la documentation technique de produits – Partie 1: Règles fondamentales*