SLOVENSKI STANDARD
SIST EN ISO 80000-2:2013

01-junij-2013

Nadomešča:
SIST ISO 31-11:1995
SIST ISO 31-11:1995

Veličine in enote - 2. del: Matematični znaki in simboli za uporabo v naravoslovnih vedah in tehniki (ISO 80000-2:2009)

Quantities and units - Part 2: Mathematical signs and symbols to be used in the natural sciences and technology (ISO 80000-2:2009)

Größen und Einheiten - Teil 2: Mathematische Zeichen für Naturwissenschaft und Technik (ISO 80000-2:2009)

Grandeurs et unités - Partie 2: Signes et symboles mathématiques à employer dans les sciences de la nature et dans la technique (ISO 80000-2:2009)

Ta slovenski standard je istoveten z: **EN ISO 80000-2:2013**

ICS:

01.060	Veličine in enote	Quantities and units
01.075	Simboli za znake	Character symbols
07.020	Matematika	Mathematics

SIST EN ISO 80000-2:2013   **en**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 80000-2

April 2013

ICS 01.060

English Version

Quantities and units - Part 2: Mathematical signs and symbols to be used in the natural sciences and technology (ISO 80000-2:2009)

Grandeurs et unités - Partie 2: Signes et symboles
mathématiques à employer dans les sciences de la nature
et dans la technique (ISO 80000-2:2009)

Größen und Einheiten - Teil 2: Mathematische Zeichen für
Naturwissenschaft und Technik (ISO 80000-2:2009)

This European Standard was approved by CEN on 14 March 2013.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 80000-2:2013: E

EN ISO 80000-2:2013 (E)

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Foreword

The text of ISO 80000-2:2009 has been prepared by Technical Committee ISO/TC 12 "Quantities and units" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 80000-2:2013.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2013, and conflicting national standards shall be withdrawn at the latest by October 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 80000-2:2009 has been approved by CEN as EN ISO 80000-2:2013 without any modification.

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INTERNATIONAL STANDARD

ISO 80000-2

First edition
2009-12-01

Quantities and units —

Part 2:
Mathematical signs and symbols to be used in the natural sciences and technology

Grandeurs et unités —

Partie 2: Signes et symboles mathématiques à employer dans les sciences de la nature et dans la technique

Reference number
ISO 80000-2:2009(E)

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ISO 80000-2:2009(E)

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2aff9787724e9/sist-en-iso-80000-2-2013

ISO 80000-2:2009(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 80000-2 was prepared by Technical Committee ISO/TC 12, *Quantities and units*, in collaboration with IEC/TC 25, *Quantities and units*.

This first edition cancels and replaces ISO 31-11:1992, which has been technically revised. The major technical changes from the previous standard are the following:

— Four clauses have been added, i.e. "Standard number sets and intervals", "Elementary geometry", "Combinatorics" and "Transforms".

ISO 80000 consists of the following parts, under the general title *Quantities and units*:

— *Part 1: General*

— *Part 2: Mathematical signs and symbols to be used in the natural sciences and technology*[1]

— *Part 3: Space and time*

— *Part 4: Mechanics*

— *Part 5: Thermodynamics*

— *Part 7: Light*

— *Part 8: Acoustics*

— *Part 9: Physical chemistry and molecular physics*

— *Part 10: Atomic and nuclear physics*

— *Part 11: Characteristic numbers*

— *Part 12: Solid state physics*

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[1] Title to be shortened to read "Mathematics" in the second edition of ISO 80000-2.

IEC 80000 consists of the following parts, under the general title *Quantities and units*:

— *Part 6: Electromagnetism*

— *Part 13: Information science and technology*

— *Part 14: Telebiometrics related to human physiology*

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ISO 80000-2:2009(E)

Introduction

Arrangement of the tables

The first column "Item No." of the tables contains the number of the item, followed by either the number of the corresponding item in ISO 31-11 in parentheses, or a dash when the item in question did not appear in ISO 31-11.

The second column "Sign, symbol, expression" gives the sign or symbol under consideration, usually in the context of a typical expression. If more than one sign, symbol or expression is given for the same item, they are on an equal footing. In some cases, e.g. for exponentiation, there is only a typical expression and no symbol.

The third column "Meaning, verbal equivalent" gives a hint on the meaning or how the expression may be read. This is for the identification of the concept and is not intended to be a complete mathematical definition.

The fourth column "Remarks and examples" gives further information. Definitions are given if they are short enough to fit into the column. Definitions need not be mathematically complete.

The arrangement of the table in Clause 16 "Coordinate systems" is somewhat different.

INTERNATIONAL STANDARD   **ISO 80000-2:2009(E)**

Quantities and units —

Part 2:
Mathematical signs and symbols to be used in the natural sciences and technology

1 Scope

ISO 80000-2 gives general information about mathematical signs and symbols, their meanings, verbal equivalents and applications.

The recommendations in ISO 80000-2 are intended mainly for use in the natural sciences and technology, but also apply to other areas where mathematics is used.

2 Normative references

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

ISO 80000-1:—[2], *Quantities and units — Part 1: General*

3 Variables, functions and operators

Variables such as x, y, etc., and running numbers, such as i in $\Sigma_i \, x_i$ are printed in italic (sloping) type. Parameters, such as a, b, etc., which may be considered as constant in a particular context, are printed in italic (sloping) type. The same applies to functions in general, e.g. f, g.

An explicitly defined function not depending on the context is, however, printed in Roman (upright) type, e.g. sin, exp, ln, Γ. Mathematical constants, the values of which never change, are printed in Roman (upright) type, e.g. $e = 2{,}718\ 218\ 8\ldots$; $\pi = 3{,}141\ 592\ldots$; $i^2 = -1$. Well-defined operators are also printed in Roman (upright) style, e.g. div, δ in δx and each d in df/dx.

Numbers expressed in the form of digits are always printed in Roman (upright) style, e.g. 351 204; 1,32; 7/8.

The argument of a function is written in parentheses after the symbol for the function, without a space between the symbol for the function and the first parenthesis, e.g. $f(x)$, $\cos(\omega t + \varphi)$. If the symbol for the function consists of two or more letters and the argument contains no operation symbol, such as $+$, $-$, $\times$, $\cdot$ or $/$, the parentheses around the argument may be omitted. In these cases, there should be a thin space between the symbol for the function and the argument, e.g. int 2,4; sin $n\pi$; arcosh $2A$; Ei x.

If there is any risk of confusion, parentheses should always be inserted. For example, write $\cos(x) + y$; do not write $\cos x + y$, which could be mistaken for $\cos(x + y)$.

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2) To be published. (Revision of ISO 31-0:1992)

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A comma, semicolon or other appropriate symbol can be used as a separator between numbers or expressions. The comma is generally preferred, except when numbers with a decimal comma are used.

If an expression or equation must be split into two or more lines, one of the following methods shall be used.

a) Place the line breaks immediately after one of the symbols $=$, $+$, $-$, $\pm$ or $\mp$, or, if necessary, immediately after one of the symbols $\times$, $\cdot$, or /. In this case, the symbol indicates that the expression continues on the next line or next page.

b) Place the line breaks immediately before one of the symbols $=$, $+$, $-$, $\pm$ or $\mp$, or, if necessary, immediately before one of the symbols $\times$, $\cdot$, or /. In this case, the symbol indicates that the expression is a continuation of the previous line or page.

The symbol shall not be given twice around the line break; two minus signs could for example give rise to sign errors. Only one of these methods should be used in one document. If possible, the line break should not be inside of an expression in parentheses.

It is customary to use different sorts of letters for different sorts of entities. This makes formulas more readable and helps in setting up an appropriate context. There are no strict rules for the use of letter fonts which should, however, be explained if necessary.

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4   Mathematical logic

Item No.	Sign, symbol, expression	Meaning, verbal equivalent	Remarks and examples
2-4.1 (*11-3.1*)	$p \wedge q$	conjunction of p and q, p and q	
2-4.2 (*11-3.2*)	$p \vee q$	disjunction of p and q, p or q	This "or" is inclusive, i.e. $p \vee q$ is true, if either p or q, or both are true.
2-4.3 (*11-3.3*)	$\neg p$	negation of p, not p	
2-4.4 (*11-3.4*)	$p \Rightarrow q$	p implies q, if p, then q	$q \Leftarrow p$ has the same meaning as $p \Rightarrow q$. $\Rightarrow$ is the implication symbol.
2-4.5 (*11-3.5*)	$p \Leftrightarrow q$	p is equivalent to q	$(p \Rightarrow q) \wedge (q \Rightarrow p)$ has the same meaning as $p \Leftrightarrow q$. $\Leftrightarrow$ is the equivalence symbol.
2-4.6 (*11-3.6*)	$\forall x \in A \quad p(x)$	for every x belonging to A, the proposition $p(x)$ is true	If it is clear from the context which set A is being considered, the notation $\forall x\, p(x)$ can be used. $\forall$ is the universal quantifier. For $x \in A$, see 2-5.1.
2-4.7 (*11-3.7*)	$\exists x \in A \quad p(x)$	there exists an x belonging to A for which $p(x)$ is true	If it is clear from the context which set A is being considered, the notation $\exists x\, p(x)$ can be used. $\exists$ is the existential quantifier. For $x \in A$, see 2-5.1. $\exists^1 x\, p(x)$ is used to indicate that there is exactly one element for which $p(x)$ is true. $\exists!$ is also used for $\exists^1$.