

SLOVENSKI STANDARD

SIST EN ISO 80000-2:2019

01-december-2019

Nadomešča:

SIST EN ISO 80000-2:2013

SIST ISO 80000-2:2013

Veličine in enote - 2. del: Matematika (ISO 80000-2:2019, popravljena verzija 2021-11)

Quantities and units - Part 2: Mathematics (ISO 80000-2:2019, Corrected version 2021-11)

Größen und Einheiten - Teil 2: Mathematik (ISO 80000-2:2019)

Grandeurs et unités - Partie 2: Mathématiques (ISO 80000-2:2019)

Ta slovenski standard je istoveten z: EN ISO 80000-2:2019

ICS:

01.060	Veličine in enote	Quantities and units
07.020	Matematika	Mathematics

SIST EN ISO 80000-2:2019

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 80000-2

October 2019

ICS 01.060; 01.075

Supersedes EN ISO 80000-2:2013

English Version

Quantities and units - Part 2: Mathematics (ISO 80000-2:2019, Corrected version 2021-11)

Grandeurs et unités - Partie 2: Mathématiques (ISO 80000-2:2019, Version corrigée 2021-11)

Größen und Einheiten - Teil 2: Mathematik (ISO 80000-2:2019, korrigierte Fassung 2021-11)

This European Standard was approved by CEN on 5 May 2019.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 8 December 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	3

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 80000-2:2019

<https://standards.iteh.ai/catalog/standards/sist/41dc1801-7d98-47c6-acaf-afe60e2e170c/sist-en-iso-80000-2-2019>

European foreword

This document (EN ISO 80000-2:2019) has been prepared by Technical Committee ISO/TC 12 "Quantities and units" in collaboration with Technical Committee CEN/SS F02 "Units and symbols" the secretariat of which is held by CCMC.

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 April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

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

This document supersedes EN ISO 80000-2:2013.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Endorsement notice

The text of ISO 80000-2:2019, Corrected version 2021-11 has been approved by CEN as EN ISO 80000-2:2019 without any modification.

[SIST EN ISO 80000-2:2019
https://standards.iteh.ai/catalog/standards/sist/41dc1801-7d98-47c6-acaf-afe60e2e170c/sist-en-iso-80000-2-2019](https://standards.iteh.ai/catalog/standards/sist/41dc1801-7d98-47c6-acaf-afe60e2e170c/sist-en-iso-80000-2-2019)

INTERNATIONAL STANDARD

**ISO
80000-2**

Second edition
2019-08

Corrected version
2021-11

Quantities and units —

Part 2: Mathematics

Grandeurs et unités —

Partie 2: Mathématiques

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 80000-2:2019

<https://standards.iteh.ai/catalog/standards/sist/41dc1801-7d98-47c6-acaf-afe60e2e170c/sist-en-iso-80000-2-2019>



Reference number
ISO 80000-2:2019(E)

© ISO 2019

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 80000-2:2019

<https://standards.iteh.ai/catalog/standards/sist/41dc1801-7d98-47c6-acaf-afe60e2e170c/sist-en-iso-80000-2-2019>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Variables, functions and operators.....	1
5 Mathematical logic.....	2
6 Sets.....	3
7 Standard number sets and intervals.....	4
8 Miscellaneous symbols.....	6
9 Elementary geometry.....	7
10 Operations.....	8
11 Combinatorics.....	10
12 Functions.....	11
13 Exponential and logarithmic functions.....	14
14 Circular and hyperbolic functions.....	15
15 Complex numbers.....	17
16 Matrices.....	18
17 Coordinate systems.....	19
18 Scalars, vectors and tensors.....	21
19 Transforms.....	25
20 Special functions.....	26
Bibliography.....	31
Alphabetical index.....	32

ISO 80000-2:2019(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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 80000-2:2009), which has been technically revised.

The main changes compared to the previous edition are as follows:

- [Clause 4](#) revised to add clarification about writing of font types; revised rule for splitting equations over two or more lines;
- [Clause 18](#) revised to include clarification on scalars, vectors and tensors;
- missing symbols and expressions added in the second column "Symbol, expression" of the tables, and additional clarifications given in the fourth column "Remarks and examples" when necessary;
- Annex A deleted.

NOTE Although missing symbols and expressions have been added in this second edition of ISO 80000-1, the document remains non exhaustive.

A list of all parts in the ISO 80000 and IEC 80000 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This corrected version of ISO 80000-2:2019 incorporates the following corrections:

- in 2-12.20, under "Remarks and examples", last line, f''' has been replaced with f'' ;
- in 2-13.1, under "Remarks and examples", the value 2,718 81 28 ... has been replaced with 2,718 281 828 ...;

- in 2-20.20, under "Remarks and examples", the first formula has been corrected to read $L_n^m(z) = (-1)^m \frac{d^m}{dz^m} L_{n+m}(z)$; i.e. addition of $+m$ in the subscript of L ;
- in 2-20.21, under "Remarks and examples", second line, the parenthesis has been corrected to read (for $n \in \mathbf{N}$, $|z| \leq 1$); i.e. addition of $|z| \leq 1$.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 80000-2:2019

<https://standards.iteh.ai/catalog/standards/sist/41dc1801-7d98-47c6-acaf-afe60e2e170c/sist-en-iso-80000-2-2019>

ISO 80000-2:2019(E)

Introduction

Arrangement of the tables

Each table of symbols and expressions (except [Table 13](#)) gives hints (in the third column) about the meaning or how the expression may be read for each item (numbered in the first column) of the symbol under consideration, usually in the context of a typical expression (second column). If more than one 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 purpose of the entries is identification of each concept and is not intended to be a complete mathematical definition. The fourth column “Remarks and examples” gives further information and is not normative.

[Table 13](#) has a different format. It gives the symbols of coordinates, as well as the position vectors and their differentials, for coordinate systems in three-dimensional spaces.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 80000-2:2019

<https://standards.iteh.ai/catalog/standards/sist/41dc1801-7d98-47c6-acaf-afe60e2e170c/sist-en-iso-80000-2-2019>

Quantities and units —

Part 2: Mathematics

1 Scope

This document specifies mathematical symbols, explains their meanings, and gives verbal equivalents and applications.

This document is intended mainly for use in the natural sciences and technology, but also applies to other areas where mathematics is used.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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, *Quantities and units — Part 1: General*

3 Terms and definitions

Tables 1 to 16 give the symbols and expressions used in the different fields of mathematics.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Variables, functions and operators

It is customary to use different sorts of letters for different sorts of entities, e.g. x, y, \dots for numbers or elements of some given set, f, g for functions, etc. This makes formulas more readable and helps in setting up an appropriate context.

Variables such as x, y , etc., and running numbers, such as i in $\sum_i x_i$ are printed in italic type. Parameters, such as a, b , etc., which may be considered as constant in a particular context, are printed in italic 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 upright type, e.g. \sin, \exp, \ln, Γ . Mathematical constants, the values of which never change, are printed in upright type, e.g. $e = 2,718\ 281\ 828 \dots$; $\pi = 3,141\ 592 \dots$; $i^2 = -1$. Well-defined operators are also printed in upright type, e.g. **div**, δ in δx and each d in df/dx . Some transforms use special capital letters (see [Clause 19](#), Transforms).

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

Binary operators, for example $+$, $-$, $/$, shall be preceded and followed by thin spaces. This rule does not apply in case of unary operators, as in $-17,3$.