



SLOVENSKI STANDARD
SIST EN ISO 4759-1:2002
01-julij-2002

Tolerance za vezne elemente - 1. del: Vijaki in matice - Razredi izdelave A, B in C (ISO 4759-1:2000)

Tolerances for fasteners - Part 1: Bolts, screws, studs and nuts - Product grades A, B and C (ISO 4759-1:2000)

Toleranzen für Verbindungselemente - Teil 1: Schrauben und Muttern - Produktklassen A, B und C (ISO 4759-1:2000)

Tolérances des éléments de fixation - Partie 1: Vis, goujons et écrous - Grades A, B et C (ISO 4759-1:2000)

Ta slovenski standard je istoveten z: EN ISO 4759-1:2000

ICS:

21.060.10	Sorniki, vijaki, stebelni vijaki	Bolts, screws, studs
21.060.20	Matice	Nuts

SIST EN ISO 4759-1:2002 en

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 4759-1

November 2000

ICS 02.006.10

English version

Tolerances for fasteners - Part 1: Bolts, screws, studs and nuts -
Product grades A, B and C (ISO 4759-1:2000)

Tolérances des éléments de fixation - Partie 1: Vis, goujons
et écrous - Grades A, B et C (ISO 4759-1:2000)

Toleranzen für Verbindungselemente - Teil 1: Schrauben
und Muttern - Produktklassen A, B und C (ISO 4759-
1:2000)

This European Standard was approved by CEN on 7 October 2000.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of the International Standard ISO 4759-1:2000 has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 "Threaded and non-threaded mechanical fasteners and accessories", the secretariat of which is held by DIN.

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 May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

NOTE FROM CEN/CS: The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

Endorsement notice

The text of the International Standard ISO 4759-1:2000 was approved by CEN as a European Standard without any modification.

INTERNATIONAL
STANDARD

ISO
4759-1

Second edition
2000-11-15

Tolerances for fasteners —

Part 1:

**Bolts, screws, studs and nuts — Product
grades A, B and C**

Tolérances des éléments de fixation —

Partie 1: Vis, goujons et écrous — Grades A, B et C



Reference number
ISO 4759-1:2000(E)

© ISO 2000

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2000

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 ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

Page

Foreword.....	iv
1 Scope	1
2 Normative references	2
3 Tolerances for metric bolts, screws and studs	3
4 Tolerances for metric nuts.....	25
5 Tolerances for tapping screws.....	36
Annex A (informative) Tolerances	44
Annex B (informative) Examples of dimensioned and toleranced fasteners.....	46
Annex C (informative) Examples of gauges and other measuring devices	49

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 3.

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 part of ISO 4759 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4759-1 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 7, *Reference Standards for fasteners (mainly covering terminology, dimensioning, sizes and tolerancing)*.

This second edition cancels and replaces the first edition (ISO 4759-1:1978), which has been technically revised.

ISO 4759 consists of the following parts, under the general title *Tolerances for fasteners*:

- *Part 1: Bolts, screws, studs and nuts — Product grades A, B and C*
- *Part 3: Plain washers for bolts, screws and nuts — Product grades A and C*

Annexes A to C of this part of ISO 4759 are for information only.

Tolerances for fasteners —

Part 1:

Bolts, screws, studs and nuts — Product grades A, B and C

1 Scope

This part of ISO 4759 specifies a selection of tolerances for bolts, screws, studs and nuts with ISO metric threads and with product grades A, B and C and for tapping screws with product grade A.

NOTE The product grades refer to the size of the tolerances where grade A is the most precise and grade C is the least precise.

The tolerances, except tolerances for threads, are selected from the system of limits and fits specified in ISO 286-1 and ISO 286-2. The tolerances for metric threads are taken from the series of tolerance classes specified in ISO 965-3. The tolerances for tapping screw threads are covered in ISO 1478.

The tolerances of form and position are specified and indicated in accordance with ISO 1101, ISO 8015 and ISO 2692.

The tolerances specified in this part of ISO 4759 apply to fasteners prior to coating unless otherwise specified. See also ISO 4042.

Deviations from the tolerances specified in this part of ISO 4759 are only permitted in product standards where there are valid technical reasons. In cases where there is a difference between the tolerance requirements in this part of ISO 4759 and the product standard, the product standard takes precedence.

It is recommended that these tolerances also be used for non-standard fasteners.

Dimensions and tolerances given in this part of ISO 4759 are in millimetres.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 4759. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 4759 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 225:1983, *Fasteners — Bolts, screws, studs and nuts — Symbols and designation of dimensions.*

ISO 286-1:1988, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits.*

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts.*

ISO 885:2000, *General purpose bolts and screws — Metric series — Radii under the head.*

ISO 965-3:1998, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads.*

ISO 1101:2000, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out.*

ISO 1478:1999, *Tapping screws thread.*

ISO 1479:1983, *Hexagon head tapping screws.*

ISO 2692:1988, *Technical drawings — Geometrical tolerancing — Maximum material principle.*

ISO 4032:1999, *Hexagon nuts, style 1 — Product grades A and B.*

ISO 4042:1999, *Fasteners — Electroplated coatings.*

ISO 4757:1983, *Cross recesses for screws.*

ISO 7053:1992, *Hexagon washer head tapping screws.*

ISO 7721:1983, *Countersunk head screws — Head configuration and gauging.*

ISO 8015:1985, *Technical drawings — Fundamental tolerancing principle.*

ISO 10509:1992, *Hexagon flange head tapping screws.*

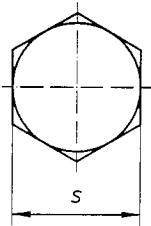
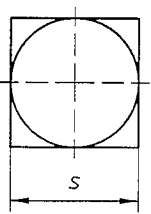
ISO 10642:1997, *Hexagon socket countersunk head screws.*

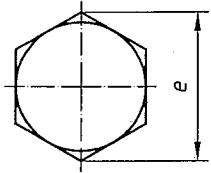
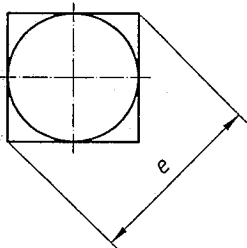
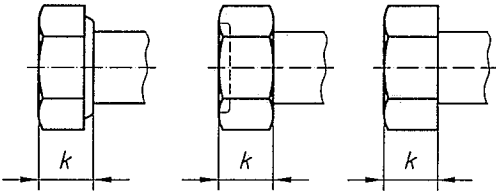
ISO 10664:1999, *Hexalobular internal driving feature for bolts and screws.*

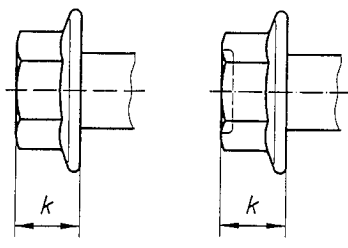
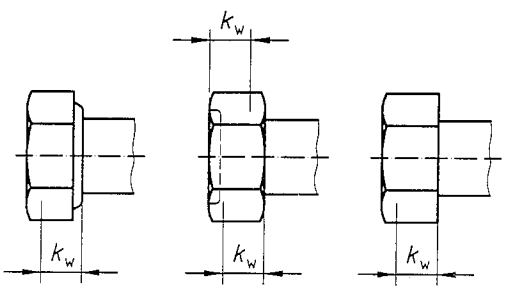
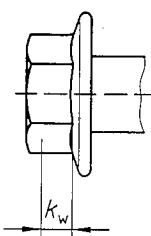
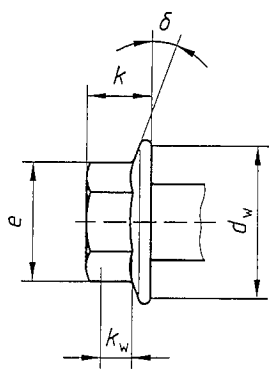
3 Tolerances for metric bolts, screws and studs

3.1 Dimensional tolerances

Symbols and designations of dimensions are specified in ISO 225.

Feature	Tolerance for product grades				Notes
	A	B	C		
3.1.1 Tolerance level					
Shank and bearing surface	close	close	wide		
Other features	close	wide	wide		
3.1.2 External thread	6g	6g	8g (but 6g for property class 8.8 and higher)		For certain products and coatings, other tolerance classes for threads may be specified in the relevant product and coating standards.
3.1.3 Driving features					
3.1.3.1 External	<i>s</i>	Tolerance	<i>s</i>	Tolerance	
3.1.3.1.1 Width across flats	≤ 30	h13	≤ 18	h14	
	> 30	h14	$> 18 \leq 60$	h15	
			$> 60 \leq 180$	h16	
			> 180	h17	
 <p>Figure 1</p>  <p>Figure 2</p>					

Feature	Tolerance for product grades			Notes
	A	B	C	
<p>3.1.3.1.2 Width across corners</p>  <p>Figure 3</p>	$e_{\min} = 1,13 s_{\min}$ $e_{\min} = 1,12 s_{\min}$ for bolts and screws with flange and other cold forged heads without trimming operation			
 <p>Figure 4</p>	$e_{\min} = 1,3 s_{\min}$			
<p>3.1.3.1.3 Height of head</p>  <p>Figure 5</p>	js14	js15	<i>k</i>	Tolerance
			< 10	js16

Feature	Tolerance for product grades			Notes
	A	B	C	
 <p>Figure 6</p>	<p>For hexagon bolts and screws with flange, k is defined only as a maximum</p>			
<p>3.1.3.1.4 Wrenching height</p>  <p>Figure 7</p>	$k_w^a \min = 0,7 k_{\min}$			<p>k_w defines the length over which e_{\min} applies but excluding any chamfer, washer face or radius specified in the appropriate product standard.</p> <p>The formulae for $k_{w \min}$ only apply to the products illustrated.</p> <p>^a The symbol k_w replaces the previously used k'.</p>
 <p>Figure 8</p>	$k_{w \min}^b = 0,7 \left[(k_{\max} - IT15) - \left(x + \frac{d_{w \min} - e_{\min}}{2} \tan \delta_{\max} \right) \right]$ <p>x is the greater of $c_{\min} \times 1,25$ or $c_{\min} + 0,4$</p> <p>δ is the flange angle</p> <p>Dimensions k_w^a, k, d_w, e and δ are in accordance with ISO 225.</p>			<p>^b For gauging, see annex A of the product standards</p>
	 <p>Figure 8 a)</p>			