SLOVENSKI STANDARD
SIST ISO 2768-2:1999

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Splo̓ne tolerance - 2. del: Tolerance geometrijskih znaļ ilnosti brez posebnih toleranļ nih oznak

General tolerances -- Part 2: Geometrical tolerances for features without individual tolerance indications

Tolérances générales -- Partie 2: Tolérances géométriques pour éléments non affectés de tolérances individuelles

Ta slovenski standard je istoveten z: ISO 2768-2:1989

ICS:

17.040.10 Tolerance in ujemi Limits and fits

SIST ISO 2768-2:1999 **en**

INTERNATIONAL STANDARD

ISO 2768-2

First edition
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General tolerances —

Part 2:
Geometrical tolerances for features without individual tolerance indications

Tolérances générales —

Partie 2: Tolérances géométriques pour éléments non affectés de tolérances individuelles

Reference number
ISO 2768-2 : 1989 (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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 2768-2 was prepared by Technical Committee ISO/TC 3, *Limits and fits*.

This first edition of ISO 2768-2, together with ISO 2768-1 : 1989, cancel and replace ISO 2768 : 1973.

ISO 2768 consists of the following parts, under the general title *General tolerances:*

— *Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

— *Part 2: Geometrical tolerances for features without individual tolerance indications*

Annexes A and B of this part of ISO 2768 are for information only.

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Introduction

All features on component parts always have a size and a geometrical shape. For the deviation of size and for the deviations of the geometrical characteristics (form, orientation and location) the function of the part requires limitations which, when exceeded, impair this function.

The tolerancing on the drawing should be complete to ensure that the elements of size and geometry of all features are controlled, i.e. nothing shall be implied or left to judgement in the workshop or in the inspection department.

The use of general tolerances for size and geometry simplifies the task of ensuring that this prerequisite is met.

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General tolerances —

Part 2:
Geometrical tolerances for features without individual tolerance indications

1 Scope

This part of ISO 2768 is intended to simplify drawing indications and specifies general geometrical tolerances to control those features on the drawing which have no respective individual indication. It specifies general geometrical tolerances in three tolerance classes.

This part of ISO 2768 mainly applies to features which are produced by removal of material. Its application to features manufactured by other processes is possible; however, special examination is required to ascertain whether the customary workshop accuracy lies within the general geometrical tolerances specified in this part of ISO 2768.

2 General

When selecting the tolerance class, the respective customary workshop accuracy has to be taken into consideration. If smaller geometrical tolerances are required or larger geometrical tolerances are permissible and more economical for any individual feature, such tolerances should be indicated directly in accordance with ISO 1101 (see clause A.2).

General geometrical tolerances in accordance with this part of ISO 2768 apply when drawings or associated specifications refer to this part of ISO 2768 in accordance with clause 6. They apply to features which do not have respective individual geometrical tolerance indications.

General geometrical tolerances apply to all geometrical tolerance characteristics, excluding cylindricity, profile of any line, profile of any surface, angularity, coaxiality, positional tolerances and total run-out.

In any event, general geometrical tolerances in accordance with this part of ISO 2768 should be used when the fundamental tolerancing principle in accordance with ISO 8015 is used and indicated on the drawing (see clause B.1).

3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 2768. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 2768 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1101 : 1983, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.*

ISO 2768-1 : 1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications.*

ISO 5459 : 1981, *Technical drawings — Geometrical tolerancing — Datums and datum-systems for geometrical tolerances.*

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

4 Definitions

For the purposes of this part of ISO 2768, the definitions for geometrical tolerances given in ISO 1101 and ISO 5459 apply.

5 General geometrical tolerances
(see also clause B.1)

5.1 Tolerances for single features

5.1.1 Straightness and flatness

The general tolerances on straightness and flatness are given in table 1. When a tolerance is selected from table 1, it shall be based, in the case of straightness, on the length of the corresponding line and, in the case of flatness, on the longer lateral length of the surface, or the diameter of the circular surface.

Table 1 — General tolerances on straightness and flatness

Values in millimetres

Tolerance class	Straightness and flatness tolerances for ranges of nominal lengths					
	up to 10	over 10 up to 30	over 30 up to 100	over 100 up to 300	over 300 up to 1 000	over 1 000 up to 3 000
H	0,02	0,05	0,1	0,2	0,3	0,4
K	0,05	0,1	0,2	0,4	0,6	0,8
L	0,1	0,2	0,4	0,8	1,2	1,6

5.1.2 Circularity

The general tolerance on circularity is equal to the numerical value of the diameter tolerance, but in no case shall it be greater than the respective tolerance value for circular radial run-out given in table 4 (see examples in clause B.2).

5.1.3 Cylindricity

General tolerances on cylindricity are not specified.

NOTES

1 The cylindricity deviation comprises three components: circularity deviation, straightness deviation and parallelism deviation of opposite generator lines. Each of these components is controlled by its individually indicated or its general tolerance.

2 If, for functional reasons, the cylindricity deviation has to be smaller than the combined effect (see clause B.3) of the general tolerances on circularity, straightness and parallelism, an individual cylindricity tolerance in accordance with ISO 1101 should be indicated for the feature concerned.

Sometimes, e.g. in the case of a fit, the indication of the envelope requirement Ⓔ is appropriate.

5.2 Tolerances for related features

5.2.1 General

The tolerances specified in 5.2.2 to 5.2.6 apply to all features which are in relation to one another and which have no respective individual indication.

5.2.2 Parallelism

The general tolerance on parallelism is equal to the numerical value of the size tolerance or the flatness/straightness tolerance, whichever is the greater. The longer of the two features shall be taken as the datum; if the features are of equal nominal length, either may be taken as the datum (see clause B.4).

5.2.3 Perpendicularity

The general tolerances on perpendicularity are given in table 2. The longer of the two sides forming the right angle shall be taken as the datum; if the sides are of equal nominal length, either may be taken as the datum.

Table 2 — General tolerances on perpendicularity

Values in millimetres

Tolerance class	Perpendicularity tolerances for ranges of nominal lengths of the shorter side			
	up to 100	over 100 up to 300	over 300 up to 1 000	over 1 000 up to 3 000
H	0,2	0,3	0,4	0,5
K	0,4	0,6	0,8	1
L	0,6	1	1,5	2

5.2.4 Symmetry

The general tolerances on symmetry are given in table 3. The longer of the two features shall be taken as the datum; if the features are of equal nominal length, either may be taken as the datum.

NOTE — The general tolerances on symmetry apply where

— at least one of the two features has a median plane, or

— the axes of the two features are perpendicular to each other.

See examples in clause B.5.

Table 3 — General tolerances on symmetry

Values in millimetres

Tolerance class	Symmetry tolerances for ranges of nominal lengths			
	up to 100	over 100 up to 300	over 300 up to 1 000	over 1 000 up to 3 000
H	0,5			
K	0,6		0,8	1
L	0,6	1	1,5	2

5.2.5 Coaxiality

General tolerances on coaxiality are not specified.

NOTE — The deviation in coaxiality may, in an extreme case, be as great as the tolerance value for circular radial run-out given in table 4, since the deviation in radial run-out comprises the deviation in coaxiality and the deviation in circularity.

5.2.6 Circular run-out

The general tolerances on circular run-out (radial, axial and any surface of revolution) are given in table 4.

For general tolerances on circular run-out, the bearing surfaces shall be taken as the datum if they are designated as such. Otherwise, for circular radial run-out, the longer of the two features shall be taken as the datum; if the features are of equal nominal length, either may be taken as the datum.

Table 4 — General tolerances on circular run-out

Values in millimetres

Tolerance class	Circular run-out tolerances
H	0,1
K	0,2
L	0,5

6 Indications on drawings

6.1 If general tolerances in accordance with this part of ISO 2768 shall apply in conjunction with the general tolerances in accordance with ISO 2768-1, the following information shall be indicated in or near the title block:

a) "ISO 2768";

b) the tolerance class in accordance with ISO 2768-1;

c) the tolerance class in accordance with this part of ISO 2768.

EXAMPLE

ISO 2768-mk

In this case the general tolerances for angular dimensions in accordance with ISO 2768-1 do not apply to right angles (90°), which are implied but not indicated, because this part of ISO 2768 specifies general tolerances on perpendicularity.

6.2 If the general dimensional tolerances (tolerance class m) shall not apply, the respective letter shall be omitted from the designation to be indicated on the drawing:

EXAMPLE

ISO 2768-K

6.3 In cases where the envelope requirement Ⓔ also applies to all single features of size[1], the designation "E" shall be added to the general designation specified in 6.1:

EXAMPLE

ISO 2768-mK-E

NOTE — The envelope requirement Ⓔ cannot apply to features with individually indicated straightness tolerances which are greater than their size tolerances, e.g. stock material.

7 Rejection

Unless otherwise stated, workpieces exceeding the general geometrical tolerance shall not lead to automatic rejection provided that the ability of the workpiece to function is not impaired (see clause A.4).

1) For the purposes of this part of ISO 2768, a single feature of size comprises a cylindrical surface or two parallel plane surfaces.