

SLOVENSKI STANDARD

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Nadomešča:

SIST EN 20286-2:2000

SIST EN 20286-2:2000/prA1:2008

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Specifikacija geometrijskih veličin izdelka - Sistem ISO za tolerance dolžinskih mer - 2. del: Preglednice standardnih toleranc in mejnih odstopkov za luknje in gredi (ISO 286-2:2010)

Geometrical product specifications (GPS) - ISO code system for tolerances on linear sizes - Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts (ISO 286-2:2010)

Geometrische Produktspezifikation (GPS) - ISO-Toleranzsystem für Längenmaße - Teil 2: Tabellen der Grundtoleranzgrade und Grenzabmaße für Bohrungen und Wellen (ISO 286-2:2010)

Spécification géométrique des produits (GPS) - Système de codification ISO pour les tolérances sur les tailles linéaires - Partie 2: Tableaux des classes de tolérance normalisées et des écarts limites des alésages et des arbres (ISO 286-2:2010)

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17.040.10	Tolerance in ujemi	Limits and fits
17.040.40	Specifikacija geometrijskih veličin izdelka (GPS)	Geometrical Product Specification (GPS)

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 286-2

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English Version

Geometrical product specifications (GPS) - ISO code system for tolerances on linear sizes - Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts (ISO 286-2:2010)

Spécification géométrique des produits (GPS) - Système de codification ISO pour les tolérances sur les tailles linéaires - Partie 2: Tableaux des classes de tolérance normalisées et des écarts limites des alésages et des arbres (ISO 286-2:2010)

Geometrische Produktspezifikation (GPS) - ISO-Toleranzsystem für Längenmaße - Teil 2: Tabellen der Grundtoleranzgrade und Grenzabmaße für Bohrungen und Wellen (ISO 286-2:2010)

This European Standard was approved by CEN on 15 May 2010.

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Foreword

This document (EN ISO 286-2:2010) has been prepared by Technical Committee ISO/TC 213 "Dimensional and geometrical product specifications and verification" in collaboration with Technical Committee CEN/TC 290 "Dimensional and geometrical product specification and verification" the secretariat of which is held by AFNOR.

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 December 2010, and conflicting national standards shall be withdrawn at the latest by December 2010.

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**Geometrical product specifications
(GPS) — ISO code system for tolerances
on linear sizes —****Part 2:
Tables of standard tolerance classes and
limit deviations for holes and shafts**

iTeh STANDARD PREVIEW

(standard)
*Spécification géométrique des produits (GPS) — Système de
codification ISO pour les tolérances sur les tailles linéaires —**Partie 2: Tableaux des classes de tolérance normalisées et des écarts
limites des alésages et des arbres*<https://standards.iteh.ai/catalog/standards/sist/93a404c7-a495-4630-9dac-8a4c27db7029/sist-en-iso-286-2-2010>Reference number
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ISO 286-2:2010(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 286-2 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This second edition cancels and replaces the first edition (ISO 286-2:1988), which has been technically revised. It also incorporates the Technical Corrigendum ISO 286-2:1988/Cor.1:2006.

ISO 286 consists of the following parts, under the general title *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes*: [SIST EN ISO 286-2:2010](https://standards.iteh.ai/catalog/standards/sist/93a404c7-a493-4630-9dac-8a4c274b7029/sist-en-iso-286-2-2010)

- *Part 1: Basis of tolerances, deviations and fits*
- *Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts*

Introduction

This part of ISO 286 is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO/TR 14638). It influences chain links 1 and 2 of the chain of standards on size in the general GPS matrix.

For more detailed information on the relationship of this part of ISO 286 to the GPS matrix model, see Annex B.

The need for limits and fits for machined workpieces was brought about mainly by the requirement for interchangeability between mass-produced parts and the inherent inaccuracy of manufacturing methods, coupled with the fact that “exactness” of size was found to be unnecessary for most workpiece features. In order that the fit function could be satisfied, it was found sufficient to manufacture a given workpiece so that its size lay within two permissible limits, i.e. a tolerance, this being the variation in size acceptable in manufacture while ensuring the functional fit requirements of the product.

Similarly, where a specific fit condition is required between mating features of two different workpieces, it is necessary to ascribe an allowance, either positive or negative, to the nominal size to achieve the required clearance or interference. ISO 286 gives the internationally accepted code system for tolerances on linear sizes. It provides a system of tolerances and deviations suitable for two types of feature: “cylinder” and “two parallel opposite surfaces”. The main intention of this code system is the fulfilment of the function fit.

The terms “hole”, “shaft” and “diameter” are used to designate the types of feature of cylinders (e.g. for the tolerancing of the diameter of a hole or shaft). For simplicity, they are also used for two parallel opposite surfaces (e.g. for the tolerancing of the thickness of a key or the width of a slot).

The pre-condition for the application of the ISO code system for tolerances on linear sizes for the features forming a fit is that the nominal sizes of the hole and the shaft are identical.

The previous edition of ISO 286-2 (published in 1988) had the envelope criterion as the default association criterion for the size of a feature; however, ISO 14405-1 changes this default association criterion to the two-point size criterion. This means that form is no longer controlled by the default specification of size.

In many cases, the diameter tolerances specified in this part of ISO 286 are not sufficient for effective control of the intended function of the fit. The envelope criterion specified in ISO 14405-1 may be required. In addition, the use of geometrical form tolerances and surface texture requirements may improve the control of the intended function.

A general graphical representation of the relationship between the respective tolerance classes and their deviations is given in Annex A.

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Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes —

Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts

1 Scope

This part of ISO 286 gives values of the limit deviations for commonly used tolerance classes for holes and shafts calculated from the tables given in ISO 286-1. This part of ISO 286 covers values for the upper limit deviations ES (for holes) and es (for shafts), and the lower limit deviations EI (for holes) and ei (for shafts) (see Figures 1 and 2).

NOTE In the tables of limit deviations, the values of the upper limit deviation ES or es are shown above the values of the lower limit deviation EI or ei except for tolerance classes JS and js which are symmetrical about the zero line.

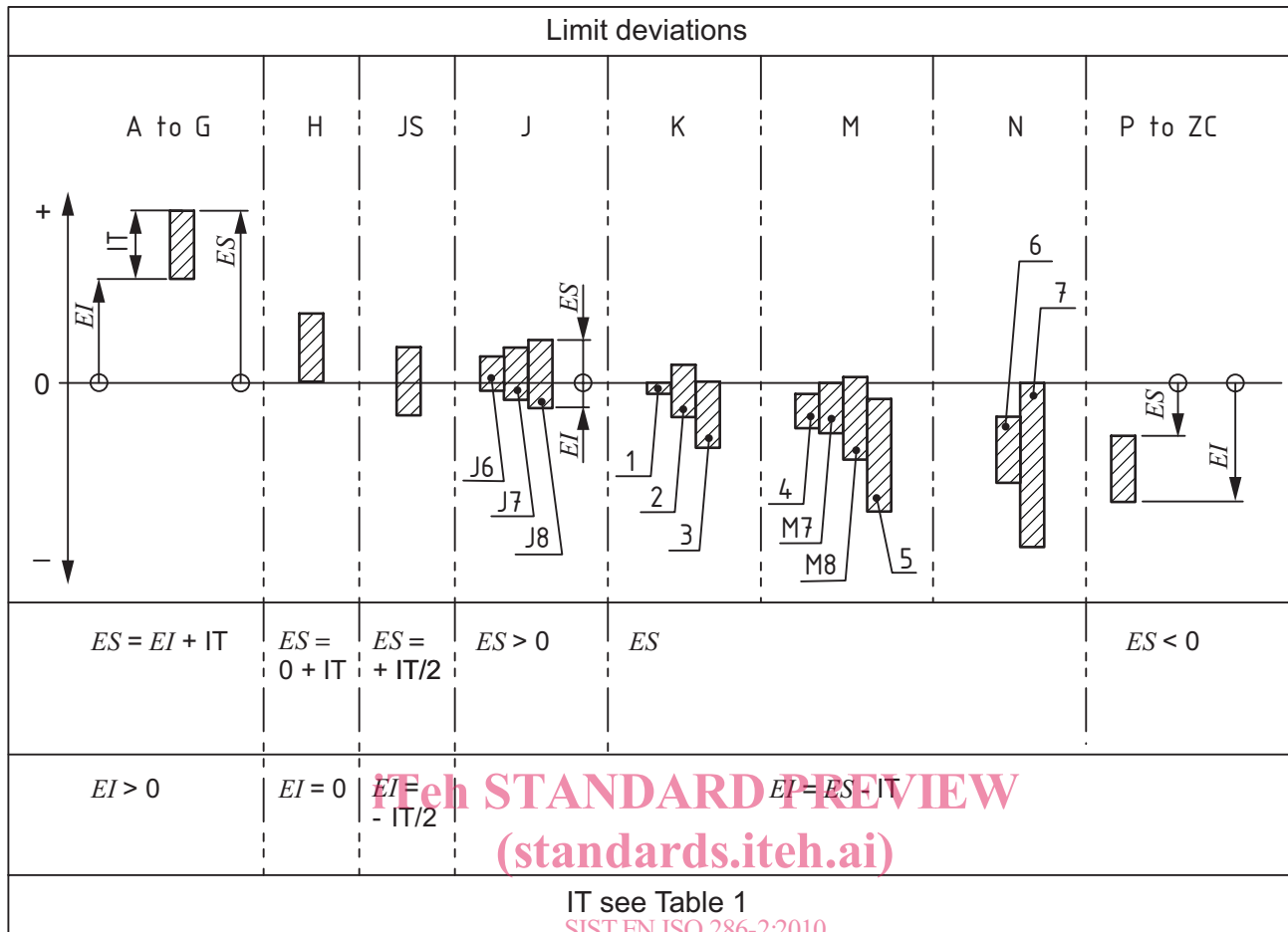
The ISO system for tolerances on linear size provides a system of tolerances and deviations suitable for features of the following types:

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- a) cylinders;
 - b) two parallel opposite surfaces.

For simplicity, and also because of the importance of cylindrical workpieces of circular section, only these are referred to explicitly. It should be clearly understood, however, that the tolerances and deviations given in this part of ISO 286 equally apply to workpieces of other than circular sections.

In particular, the term “hole” or “shaft” is used to designate features of the cylinder type (e.g. for the tolerancing of the diameter of a hole or shaft) and, for simplicity, these terms are also used for two parallel opposite surfaces (e.g. for the tolerancing of the thickness of a key or the width of a slot).

For further information on terminology, symbols, the basis of the system, etc., see ISO 286-1.

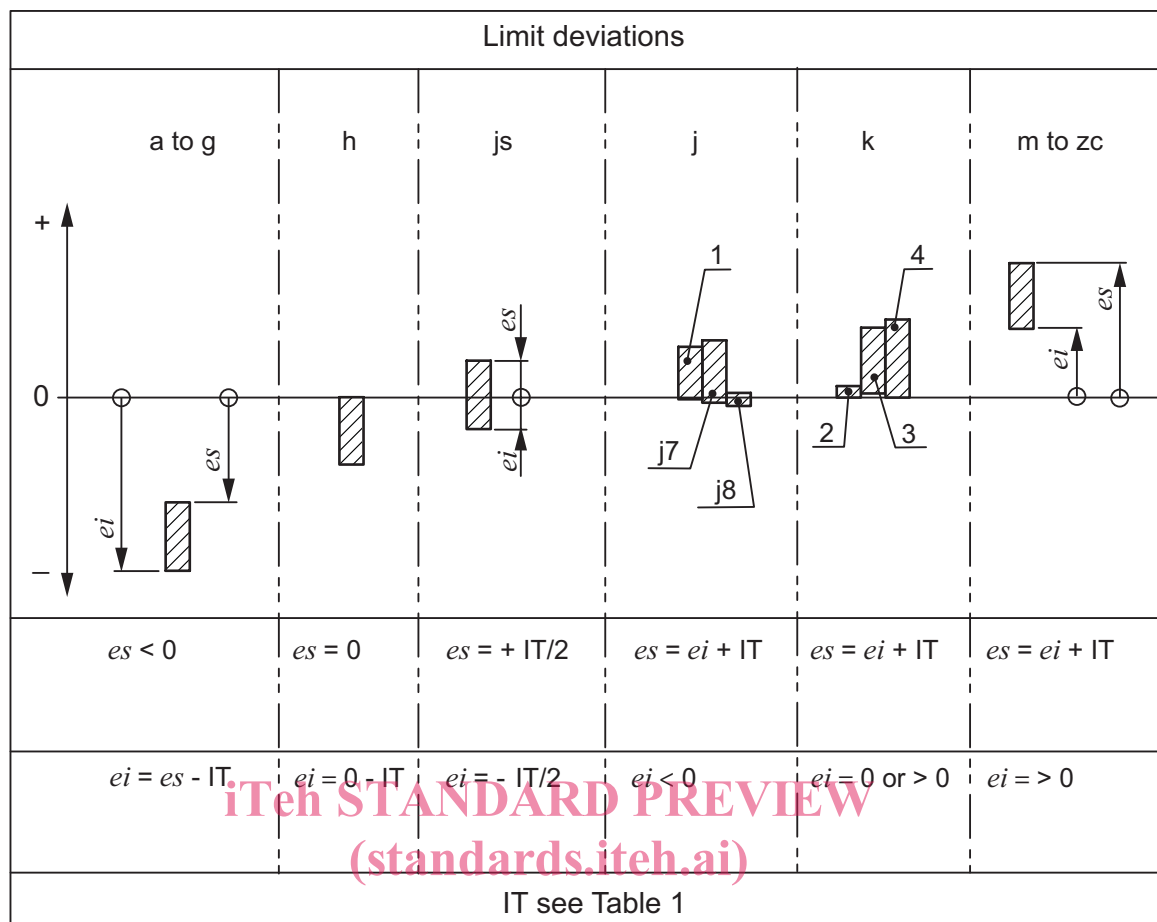


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Key

- 1 K1 to K3, and also K4 to K8 for sizes for which — < nominal size ≤ 3 mm (for the significance of the dash, see e.g. footnote “b” to Table 2)
- 2 K4 to K8 for sizes for which 3 mm < nominal size ≤ 500 mm
- 3 K9 to K18
- 4 M1 to M6
- 5 M9 to M18
- 6 N1 to N8
- 7 N9 to N18

Figure 1 — Upper and lower limit deviations for holes (internal features)

**Key**

- 1 j5, j6
- 2 k1 to k3, and k4 to k7 for sizes for which $— < \text{nominal size} \leq 3 \text{ mm}$ (for the significance of the dash, see e.g. footnote “b” to Table 2)
- 3 k4 to k7 for sizes for which $3 \text{ mm} < \text{nominal size} \leq 500 \text{ mm}$
- 4 k8 to k18

Figure 2 — Upper and lower limit deviations for shafts (external features)

2 Normative references

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 286-1:2010, *Geometrical product specifications (GPS) — ISO code system for tolerances of linear sizes — Part 1: Basis of tolerances, deviations and fits*

3 Standard tolerances

The values of standard tolerance grades IT01 to IT18, inclusive, are given in Table 1.