SLOVENSKI STANDARD
oSIST prEN ISO 286-1:2007

01-oktober-2007

Specifikacija geometrijskih veliļ in izdelka - ISO toleranļ ni sistem za dolģinske mere - 1. del: Temelji za tolerance, odstopanja in ujeme (ISO/DIS 286-1:2007)

Geometrical product specifications (GPS) - ISO code system for tolerances of linear sizes - Part 1: Basis of tolerances, deviations and fits (ISO/DIS 286-1:2007)

Geometrische Produktspezifikation (GPS) - ISO-Toleranzsystem für Längenmaße - Teil 1: Grundlagen für Toleranzen, Abmaße und Passungen (ISO/DIS 286-1:2007)

Spécification géométrique des produits (GPS) - Systeme de codification ISO pour les tolérances sur les tailles linéaires - Partie 1: Base des tolérances, écarts et ajustements (ISO/DIS 286-1:2007)

Ta slovenski standard je istoveten z: **prEN ISO 286-1**

ICS:

17.040.30 Merila Measuring instruments

oSIST prEN ISO 286-1:2007 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN ISO 286-1

June 2007

ICS 17.040.30

Will supersede EN 20286-1:1993

English Version

Geometrical product specifications (GPS) - ISO code system for tolerances of linear sizes - Part 1: Basis of tolerances, deviations and fits (ISO/DIS 286-1:2007)

Spécification géométrique des produits (GPS) - Système de codification ISO pour les tolérances sur les tailles linéaires - Partie 1: Base des tolérances, écarts et ajustements (ISO/DIS 286-1:2007)

Geometrische Produktspezifikation (GPS) - ISO-Toleranzsystem für Längenmaße - Teil 1: Grundlagen für Toleranzen, Abmaße und Passungen (ISO/DIS 286-1:2007)

This draft European Standard is submitted to CEN members for second parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 290.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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 Management Centre has the same status as the official versions.

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

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

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

Ref. No. prEN ISO 286-1:2007: E

Foreword

This document (prEN ISO 286-1:2007) 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 document is currently submitted to the second parallel Enquiry.

This document will supersede EN 20286-1:1993.

Endorsement notice

The text of ISO/DIS 286-1:2007 has been approved by CEN as prEN ISO 286-1:2007 without any modifications.

DRAFT INTERNATIONAL STANDARD ISO/DIS 286-1.2

ISO/TC **213** Secretariat: **DS**

Voting begins on: **2007-06-21** Voting terminates on: **2007-08-21**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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

Part 1:
Basis of tolerances, deviations and fits

Spécification géométrique des produits (GPS) — Système de codification ISO pour les tolérances sur les tailles linéaires —

Partie 1: Base des tolérances, écarts et ajustements

[Revision of first edition (ISO 286-1:1988)]

ICS 17.040.10

ISO/CEN PARALLEL ENQUIRY

The CEN Secretary-General has advised the ISO Secretary-General that this ISO/DIS covers a subject of interest to European standardization. **In accordance with the ISO-lead mode of collaboration as defined in the Vienna Agreement, consultation on this ISO/DIS has the same effect for CEN members as would a CEN enquiry on a draft European Standard.** Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

Contents

Page

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.

ISO 286-1 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This second edition cancels and replaces the first editions of ISO 286-1:1988 and ISO 1829:1975, which have been technically revised.

ISO 286 consists of the following parts, under the general title *Geometrical Product Specification (GPS) — ISO code system for tolerances of linear sizes*:

— *Part 1: Basis of tolerances, deviations and fits*

— *Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

Introduction

This International Standard 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 relation of this part of ISO 286 to other standards and the GPS matrix model see Annex C.

The need for limits and fits for machined workpieces was brought about mainly by the requirement for interchange ability 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 the most workpiece features. In order that 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. This International Standard gives the internationally accepted code system for tolerances of linear sizes. It provides a system of tolerances and deviations suitable for features of size type cylinder and type two parallel opposite surfaces. The main intention of this code system is the fulfilment of the function fit.

The term “hole“ or “shaft“ is used to designate features of size type cylinder (e.g. for the tolerancing of diameter of a hole or shaft) and type two parallel opposite surfaces (e.g. for the tolerancing of thickness of a key or width of a slot).

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

It has to be noted that the previous edition of ISO 286-1 (published 1988) had the envelope criterion as the default association criterion for the size of a feature of size, but ISO 14405 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 according to this standard are not sufficient for an effective control of the intended function of the fit. The envelope criterion according to ISO 14405 may be required. In addition the use of geometrical form tolerances and surface texture requirements may improve the control of the intended function.

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

Part 1:
Basis of tolerances, deviations and fits

1 Scope

This part of ISO 286 establishes the ISO code-system for tolerances to be used for linear sizes of features of size of type cylinder and type two parallel opposite surfaces.

It also defines the basic concepts and the related terminology for this code system. Furthermore, it provides a standardized selection of tolerance classes for general purposes from amongst the numerous possibilities.

Finally, it defines the basic terminology for fits between two features of size without constrains of orientation and location and explains the principles of "basic hole" and "basic shaft".

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard 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 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts.*

ISO 3534-2:1993, *Statistics - Vocabulary and symbols — Part 2: Statistical quality control.*

ISO 14253-1:1998, *Geometrical Product Specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformance or non-conformance with specifications.*

ISO 14405:—[1)], *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Linear size.*

ISO 14660-1:1999, *Geometrical Product Specification (GPS) — Geometrical features — Part 1: General terms and definitions.*

International vocabulary of basic and general terms in metrology (VIM). BIPM, IEC, IFCC, ISO, UIPAC, UIPAP, OIML, 2nd edition, 1993.

1) under preparation

3 Terms and definitions

3.1 Basic terminology

3.1.1
feature of size
geometrical shape defined by a linear or angular dimension which is a size

[ISO 14660-1, 2.2]

NOTE 1 The feature of size can be a cylinder, a sphere, two parallel opposite surfaces.

NOTE 2 In former editions, of International standards, such as ISO 286-1 and ISO 1938, the meanings of the terms "plain workpiece" and "single features" are close to that of "feature of size".

NOTE 3 For this standard only features of size type cylinder as well as type two parallel opposite surfaces, defined by a linear dimension, apply.

3.1.2
nominal integral feature
theoretically exact integral feature as defined by a technical drawing or by other means

[ISO 14660-1, 2.3]

3.1.3
hole
internal feature of size of a workpiece, including internal features of size which are not cylindrical

NOTE See also Introduction.

3.1.4
basic hole
hole chosen as a basis for a hole-basis fit system

NOTE 1 See also 3.3.4.1.

NOTE 2 For the purpose of the ISO code system, a basic hole is a hole for which the lower limit deviation is zero.

3.1.5
shaft
external feature of size of a workpiece, including external feature of size which are not cylindrical

NOTE See also Introduction.

3.1.6
basic shaft
shaft chosen as a basis for a shaft-basis fit system

NOTE 1 See also 3.3.4.2.

NOTE 2 For the purposes of the ISO code system, a basic shaft is a shaft for which the upper limit deviation is zero.

3.2 Terminology related to tolerances and deviations

3.2.1
size
value either of a local size or of a global linear size or of a calculation size or of a rank order size

[ISO 14405, 3.2]

NOTE The size can only be defined on features of size.

3.2.2
nominal size
size of a feature of perfect form as defined by the drawing specification

See Figure 1.

NOTE 1 Nominal size is used for the location of the limits of size by the application of the upper and lower limit deviations.

NOTE 2 In former times referred to as basic size.

3.2.3
actual size
size of the associated integral feature of size

See ISO 14660-1, 2.6.

NOTE The actual size is obtained by measurement.

3.2.4
limits of size
extreme permissible sizes of a feature of size

NOTE The actual size should lie between the upper and lower limits of size; the limits of size are also included.

3.2.4.1
upper limit of size
ULS
largest permissible size of a feature of size

See Figure 1.

3.2.4.2
lower limit of size
LLS
smallest permissible size of a feature of size

See Figure 1.

NOTE 1 Nominal size is used for the location of the limits of size by the application of the upper and lower limit deviations.

NOTE 2 In former times referred to as basic size.