

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

Part 1: Basis of tolerances, deviations and fits

ICS 17.040.10; 21.020

National foreword

This British Standard is the UK implementation of EN ISO 286-1:2010. It is identical to ISO 286-1:2010, incorporating corrigendum August 2013. It supersedes BS EN 20286-1:1993 which is withdrawn.

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Foreword

This document (EN ISO 286-1:2010) 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of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

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Endorsement notice

The text of ISO 286-1:2010 has been approved by CEN as a EN ISO 286-1:2010 without any modification.

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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 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 part of ISO 286 gives the internationally accepted code system for tolerances on linear sizes. It provides a system of tolerances and deviations suitable for two features of size types: “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 features of size type cylinder (e.g. for the tolerancing of diameter of a hole or shaft). For simplicity, they are also used for 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 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 286-1 (published in 1988) had the envelope criterion as the default association criterion for the size of a feature of size; 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 according to this part of ISO 286 are not sufficient for an effective control of the intended function of the fit. The envelope criterion according to 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.