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Geometrical product specifications (GPS) — Geometrical tolerancing — General geometrical and dimensional specifications".

Spécification géométrique des produits (GPS) — Tolérancement géométrique — Spécifications géométriques et dimensionnelles générales

ICS: 17.040.40

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

Introduction

This document is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO 14638). It influences the chain link A and B of the chain of standards on size and location.

The ISO/GPS matrix model given in ISO 14638 gives an overview of the ISO/GPS system of which this document is a part. The fundamental rules of ISO/GPS given in ISO 8015 apply to this document and the default decision rules given in ISO 14253-1 apply to the specifications made in accordance with this document, unless otherwise indicated.

For more detailed information of the relation of this document to other standards and the GPS matrix model, see [Annex B](#).

This document deals with general specifications. General specifications can be used to reduce the number of individual specification indications in technical product documentation (TPD). Many surfaces have individual requirements which are similar or identical. A single, general specification may be applied to these instead of multiple individual specifications.

All figures in this document for the 2D drawing indications have been drawn in first-angle projection with dimensions and tolerances in millimetres. It should be understood that third-angle projection and other units of measurement could have been used equally well without prejudice to the principles established.

The figures in this document represent either 2D drawing views or 3D axonometric views on 2D drawings and are intended to illustrate how a specification can be fully indicated with visible annotation. For possibilities of illustrating a specification where elements of the specification may be available through a query function or other interrogation of information on the 3D CAD model and rules for attaching specifications to 3D CAD models, see ISO 16792.

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Geometrical product specifications (GPS) — Geometrical tolerancing — General geometrical and dimensional specifications".

1 Scope

This document gives the rules of definition and interpretation of general specifications defined according to ISO 8015 (general tolerancing) applicable on the whole workpiece.

The general specifications can be applied to integral surfaces only, i.e. integral lines are excluded.

The general geometrical and dimensional specifications defined in this document applies to the following:

- for dimensional specifications:
 - for features of size:
 - linear size (\pm) (according to ISO 14405-1);
 - angular size (\pm) (according to ISO 14405-3);
- for geometrical specifications:
 - for integral features:
 - geometrical specifications with the characteristic surface profile (\triangle).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 5459, *Geometrical product specifications (GPS) — Geometrical tolerancing — Datums and datum systems*

ISO 8015, *Geometrical product specifications (GPS) — Fundamentals — Concepts, principles and rules*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8015, ISO 17450-1, ISO 17450-2, ISO 22432, ISO 25378 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

general geometrical and dimensional specifications

general specifications

general dimensional specification(s) and/or general geometrical specification(s)

3.2

general geometrical specifications

geometrical specification(s) indicated on the technical product definition (TPD) which is(are) not directly attached to the features of the workpiece by a leader line

3.3

general dimensional specifications

dimensional specification(s) indicated on the technical product definition (TPD) which is(are) not directly attached to the features of the workpiece by a leader line

4 Basics principles

4.1 General

When using general specifications, the specifier should be aware of the following risks:

- overlooking important functional requirements; and
- selecting unnecessary tight tolerances regarding the functional requirement.

It is the responsibility of the designer to ensure that:

- functional requirements are properly defined;
- the geometrical features influencing the functions are properly specified;
- the geometrical features are completely and unambiguously specified;
- the entire workpiece is completely specified.

General specifications indicate requirements which are applicable to all geometrical features of a workpiece, except those with individual dimensional or geometrical specifications. It is a way of minimising the number of indications on a TPD.

By default some geometries are excluded, see [5.2](#).

General specifications defined in other standards, and the link to these standards, are not covered by this document.

4.2 Basics rules

There are two types of general specifications:

- general dimensional specification;
- general geometrical specification.

The general dimensional specifications apply to those features of size that are not specified by an individual indicated dimensional specification.

The general geometrical specifications apply to those geometrical features that are not specified by:

- an individual geometrical specification applied to the integral feature or to its derived feature; and/or
- an individual indicated dimensional specification.

Only the specification types defined in [Tables 1](#) and [2](#) shall be used to define general specifications on integral features.

General specification applies to surfaces irrespective of a surface texture specification.

Whenever a size specification or a geometrical specification is applied to an individual geometrical feature, or a portion of a geometrical feature, then the general specification shall not apply. The dimensional and geometrical requirements for that feature shall be fully specified by other means.

4.3 Application of general dimensional specifications

General dimensional specifications shall apply to a feature of size identified on the drawing or 3D CAD model by a linear or an angular size which has no individual tolerance and which is not a TED or an auxiliary dimension. This is directly indicated on the TPD with its nominal value and its dimension or indirectly indicated by a CAD attribute.

4.4 General geometrical specification for integral features

There is only one general geometrical specification that can be applied for integral features (see [Table 1](#)).

In order to specify general geometrical specifications, a datum system shall be specified, see [4.5](#).

4.5 Requirements for datum system

The datum system indicated in a general geometrical specification shall lock all the necessary degrees of freedom, according to ISO 5459.

NOTE 1 This datum system does not necessarily consist of three datums, and does not necessarily lock all six degrees of freedom.

Each of the datum features identified in the datum section of the general geometrical specification shall have individual specifications, as they will not be covered by the general specifications.

NOTE 2 The datum system is chosen to reflect the functional requirements of the workpiece.

The general specifications shall also apply to any additional datum features identified on the TPD which are not individually specified.

4.6 Theoretical exact dimensions (TEDs)

The explicit theoretical exact dimensions (TEDs) can be defined directly on the drawing or indirectly by referring to a 3D CAD model.

4.7 Indication in a technical product documentation (TPD)

The tolerance of general specifications with the number of the standard shall be indicated in or near the title block or product definition data set in this order, as follows:

- General tolerances followed by the number of the standard (ISO 22081), followed by the specification and the tolerance value (see [Figure 1](#)).

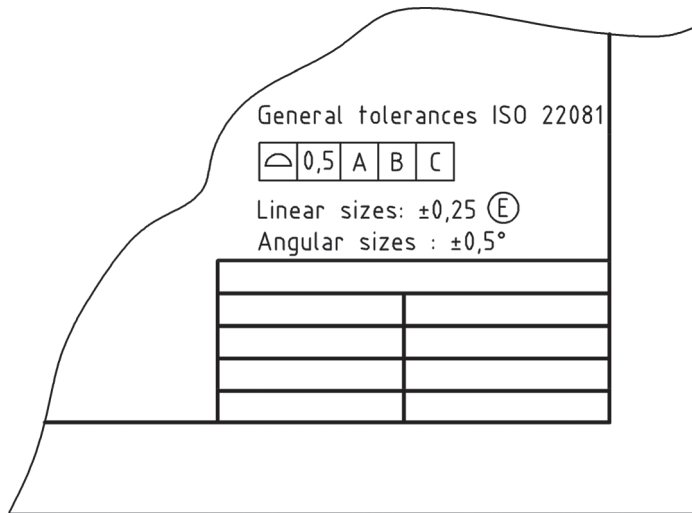


Figure 1 — General geometrical and dimensional specification indications

The tolerance values can be defined as single values, or as variable values dependent on the dimensions of these geometrical features and/or the distance of the geometrical feature to the datum system (the TEDs). In the last case rules shall be defined to obtain this value from a table (see Figure 4) or from documents associated with the definition (see Figure 2) if relevant.

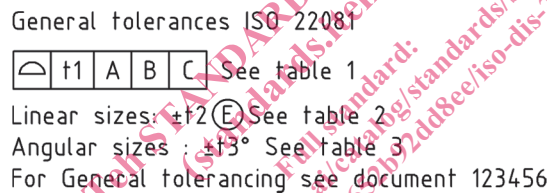


Figure 2 — Example of indications with the tolerance values tabled in a referenced document

5 Rules for general geometrical specification

5.1 Characteristic

The characteristic is defined by a general geometrical specification with a surface profile indicator (see Table 1).

Table 1 — General toleranced features

Type	Tolerance indicators in/near the title block	Controlled characteristics
General surface profile specification		Dimension, form, orientation and location

5.2 Toleranced features for integral features

Each defined general geometrical specification applies to each integral feature on the workpiece, with the following exceptions, see Figure 3:

- it does not apply to any feature of size identified by the methods stated in 4.3;
- it does not apply to any feature which has an individual indicated geometrical specification applied to it;