INTERNATIONAL STANDARD

ISO
2538-2

First edition
2014-09-01

Geometrical product specifications (GPS) — Wedges —

Part 2:
Dimensioning and tolerancing

Spécification géométrique des produits (GPS) — Coins —

Partie 2: Cotation et tolérancement

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/213, *Dimensional and geometrical product specifications and verification*.

This first edition of ISO 2538-2, together with ISO 2538-1, cancels and replaces (ISO 2538:1998), which has been technically revised.

ISO 2538 consists of the following parts, under the general title *Geometrical product specifications (GPS) — Wedges*:

— *Part 1: Series of angles and slopes*

— *Part 2: Dimensioning and tolerancing*

Introduction

This part of ISO 2538 is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO/TR 14638). It influences chain links1, 2 and 3 of the chain of standards on angle.

The ISO/GPS Masterplan given in ISO/TR 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 specifications made in accordance with this document, unless otherwise indicated.

For more detailed information on the relation of this part of ISO 2538 to other standards and to the GPS matrix model, see Annex A.

In this part of ISO 2538, the figures illustrate the text only and should not be considered as design examples. For this reason, the figures are simplified and are not to scale.

Geometrical product specifications (GPS) — Wedges —

Part 2:
Dimensioning and tolerancing

1 Scope

This part of ISO 2538 specifies methods for the dimensioning and tolerancing of wedges.

NOTE   For simplicity, only truncated wedges have been represented in this part of ISO 2538; however, this document can be applied to any type of wedge.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2538-1:2014, *Geometrical product specification (GPS) — Wedges — Part 1: Series of angles and slopes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2538-1 apply.

4 Dimensioning of wedges

4.1 Characteristics of wedges

In order to define a wedge, the characteristics and dimensions shown in Table 1 may be used in those combinations most appropriate for the function of the wedge.

Table 1 — Characteristics and dimensions of wedges

Characteristics and dimensions	Letter symbol	Examples of indication	
		Preferred method	Optional method
Characteristics			
rate of wedge	C	1:2,835 641	—
slope angle	β	20°	—
slope	S	1:2,747 477	36,4 %
Dimensions			
height of wedge at the larger end	H		
height of wedge at the smaller end	h		
height of wedge at the selected cross-section	Hx		
thickness of wedge at the larger end	T		
thickness of wedge at the smaller end	t		
thickness of wedge at the selected cross-section	Tx		
length of wedge	L		
length locating a cross-section at which Hx or Tx is specified	Lx		

4.2 Dimensioning of wedges

No more dimensions than are necessary shall be specified. However, additional dimensions may be given as auxiliary dimensions in brackets for information (see Figure 2).

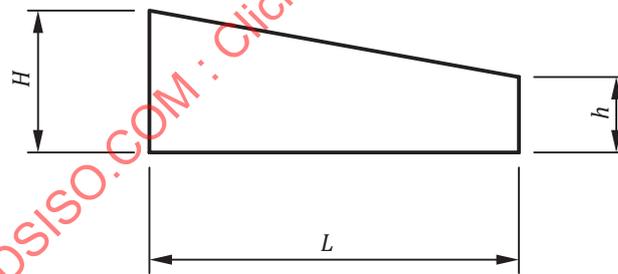Typical combinations of wedge characteristics and dimensions are shown in Figures 1 to 4.

Figure 1 — Dimensioning of wedge; heights of wedge specified
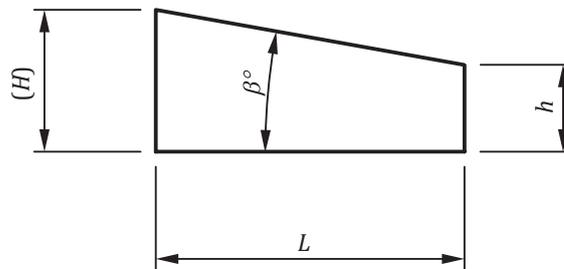

Figure 2 — Dimensioning of wedge; one height of wedge and wedge angle specified
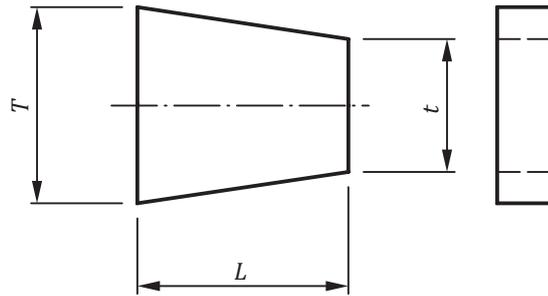
Figure 3 — Dimensioning of wedge; thicknesses of wedge specified
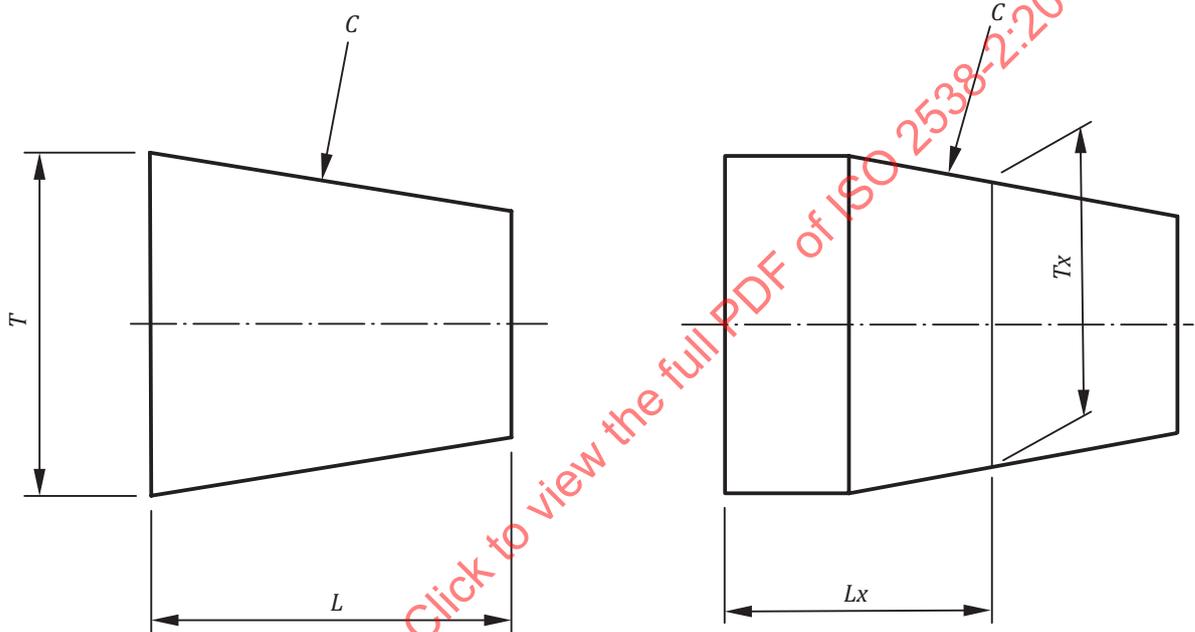

Figure 4 — Dimensioning of wedge; one thickness of wedge and rate of wedge specified

4.3 Standardized series of wedges

The preferred choice of wedge angle shall be from the standardized series of wedge angles specified in ISO 2538-1.

5 Tolerancing of wedges

Wedges can be toleranced (both size and sloped feature) in accordance with the methods given in Figures 5 to 10.

The letter symbol t is used to define the width of the tolerance zone.

NOTE 1   Alternative methods of tolerancing using only dimensional specifications do not give adequate indication with regard to the shape of the surface. Consequently, when alternative methods are used geometrical specifications according to ISO 1101 have to be added if required for functional reasons (see ISO 14405-2).

NOTE 2   Generally, in this standard, to express a geometrical specification of location, the characteristic symbol of position is used. The characteristic symbol for profile of any surface can also be used with the same meaning.

— The position characteristic symbol immediately gives the information that the toleranced feature is a flat surface.

— The profile of any surface characteristic symbol does not immediately give the information that the toleranced feature is a flat surface, it is necessary to analyse the indications of the whole drawing or query the CAD model of the part.
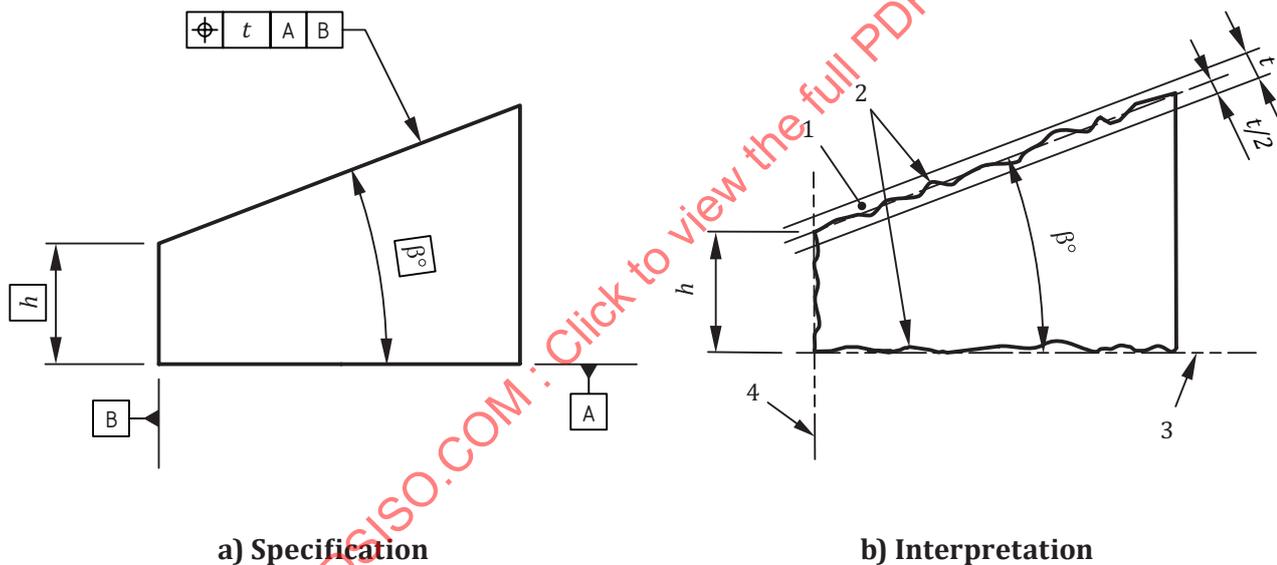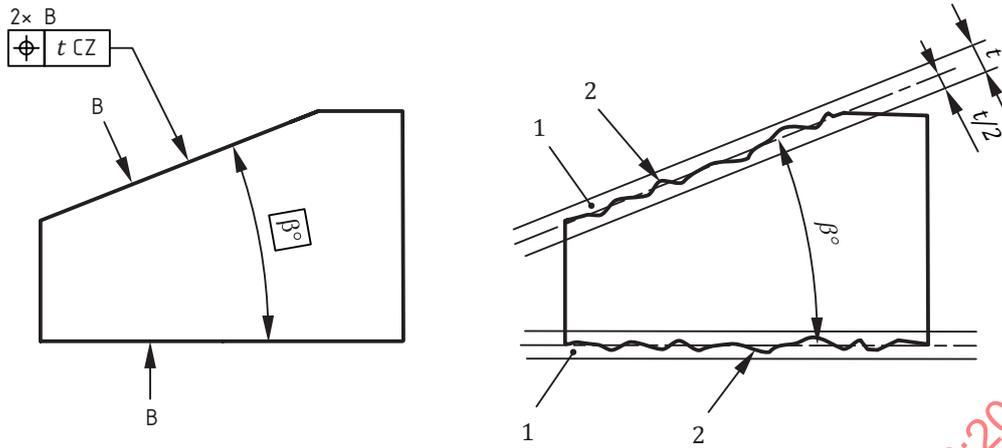

a) Specification   **b) Interpretation**

Key

1   tolerance zone
2   extracted surface
3   plane associated with the extracted "planar" surface, corresponding to the datum A
4   plane associated with the extracted "planar" surface, corresponding to the datum B with a perpendicularity constraint from datum A

The tolerance zone is limited by two parallel planes, each having a wedge angle β and located a distance t apart.

The wedge angle of the zone corresponds to the wedge angle β and located at the height h at associated datum plane B. The extracted surface of the wedge is required to be within this zone.

Figure 5 — Examples of geometrical specification on a wedge
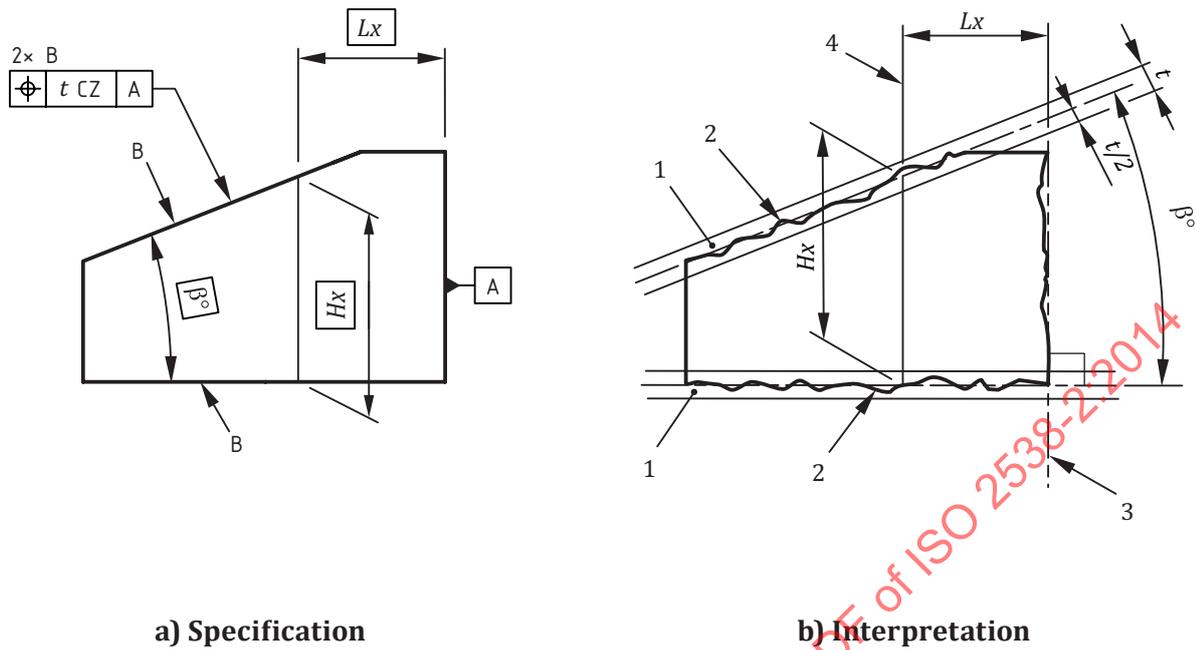
a) Specification

b) Interpretation

Key

1 tolerance zone
2 extracted surface

The two tolerance zones are limited by two parallel planes located a distance t apart on each side of the wedge. The plane pairs have a wedge angle β between them. The extracted surfaces of the wedge are required to be within these zones.

Figure 6 — Location of the sides of a wedge without datum

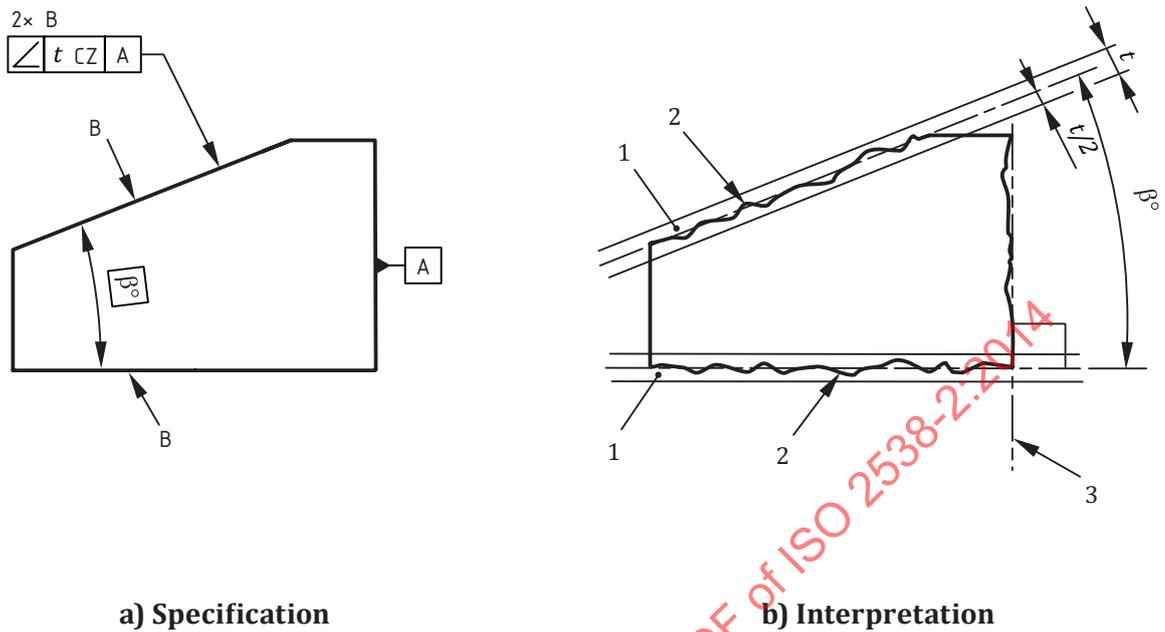**a) Specification**   **b) Interpretation**

Key

1   tolerance zone

2   extracted surface

3   plane associated with the extracted "planar" surface, corresponding to the datum A

4   constructed plane at the distance Lx from the associated plane (datum A)

The two tolerance zones are limited by two parallel planes located a distance t apart on each side of the wedge. The plane pairs have a wedge angle β between them. The lower planes are perpendicular to datum A and the intersection lines of the planes are parallel to datum A. The height Hx applies at the distance Lx from datum A. The extracted surfaces of the wedge are required to be within these zones.

Figure 7 — Wedge located (and orientated) from a datum
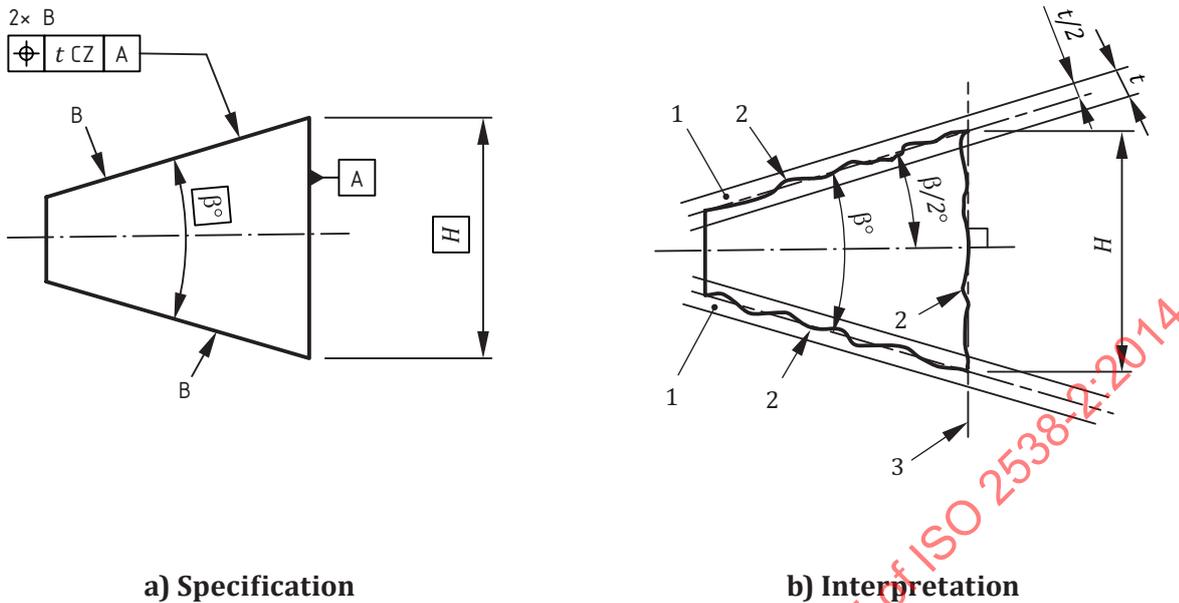
a) Specification   b) Interpretation

Key

1   tolerance zone

2   extracted surface

3   plane associated with the extracted "planar" surface, corresponding to the datum A

The two tolerance zones are limited by two parallel planes located a distance t apart on each side of the wedge. The plane pairs have a wedge angle β between them. The lower planes are perpendicular to datum A and the intersection lines of the planes are parallel to datum A. The extracted surfaces of the wedge are required to be within these zones.

The CZ modifier locks the two tolerance zones together. Without the CZ modifier, the two tolerance zones can rotate relative to each other, such that the orientation of the tolerance zone for the upper surface is perpendicular to the drawing plane and the orientation of the tolerance zone for the lower surface is not perpendicular to the drawing plane.

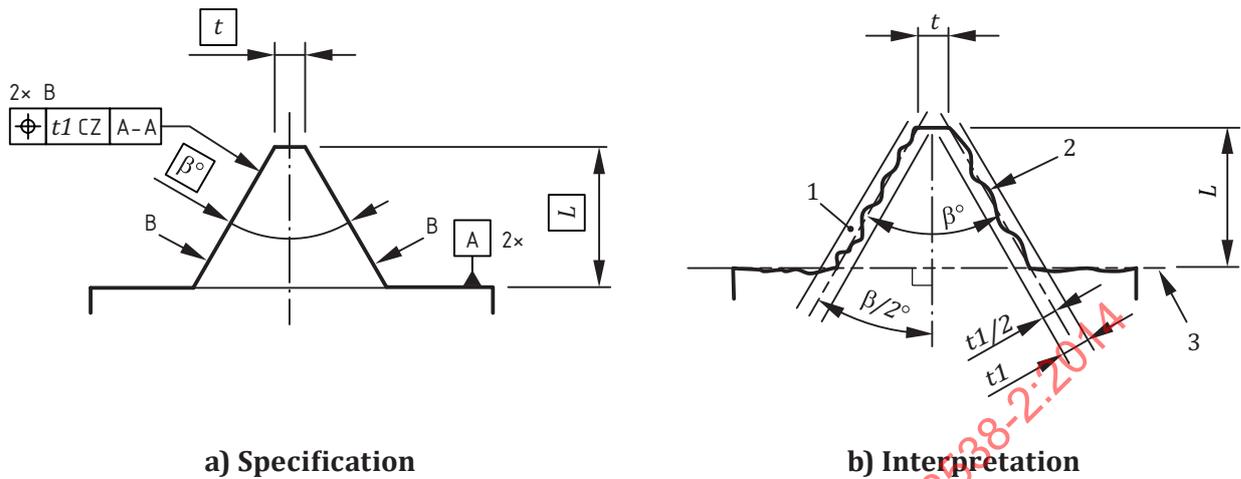**Figure 8 — Wedge orientated from a datum**

a) Specification b) Interpretation

Key

1 tolerance zone
2 extracted surface
3 plane associated with the extracted "planar" surface, corresponding to the datum A

The two tolerance zones are limited by two parallel planes located a distance t apart on each side of the wedge. The plane pairs have a wedge angle β between them and an angle of $90° - \beta/2$ to datum A. The intersection lines of the planes are parallel to datum A. The height H applies at datum A. The extracted surfaces of the wedge are required to be within these zones.

Figure 9 — Location of the two sides of a wedge from a single datum

a) Specification   **b) Interpretation**

Key

1   tolerance zone

2   extracted surface

3   plane associated with the extracted "planar" surface, corresponding to the datum A

The two tolerance zones are limited by two parallel planes located a distance t apart on each side of the wedge. The plane pairs have a wedge angle β between them and an angle of $90° - \beta/2$ to datum A. The intersection lines of the planes are parallel to datum A. The thickness t applies at the distance L from datum A. The extracted surfaces of the wedge are required to be within these zones.

NOTE   This type of tolerancing can be used, for example, for a slide wedge, vee-block and dovetail.

Figure 10 — Location of the two sides of a wedge from a common datum

Annex A
(informative)

Relation to the GPS matrix model

A.1 General

For full details about the GPS matrix model, see ISO/TR 14638.

The ISO/GPS Masterplan given in ISO/TR 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 specifications made in accordance with this document, unless otherwise indicated.

A.2 Information about this part of ISO 2538 and its use

This part of ISO 2538 on wedges covers definitions of feature characteristics for the tolerancing of wedges. It should be completed by standards covering feature characteristics, measurement, measurement equipment and calibration in order to allow an unambiguous understanding.

A.3 Position in the GPS matrix model

This part of ISO 2538 is a general GPS standard, which influences chain links 1, 2 and 3 of the chain of standards on angle in the general GPS matrix, as illustrated in Table A.1.