BS EN ISO 2538-1:2014

BSI Standards Publication

Geometrical product specifications (GPS) — Wedges

Part 1: Series of angles and slopes (ISO 2538-1:2014)

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National foreword

This British Standard is the UK implementation of EN ISO 2538-1:2014. Together with BS EN ISO 2538-2 it supersedes BS EN ISO 2538:2003, which will be withdrawn upon publication of BS EN ISO 2538-2.

The UK participation in its preparation was entrusted to Technical Committee TDW/4, Technical Product Realization.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Spécification géométrique des produits (GPS) - Coins - Partie 1: Séries d'angles et d'inclinaisons (ISO 2538-1:2014)

Geometrische Produktspezifikation (GPS) - Keile - Teil 1: Reihen von Winkeln und Neigungen (ISO 2538-1:2014)

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Foreword

This document (EN ISO 2538-1:2014) 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of an identical text or by endorsement, at the latest by March 2015, and conflicting national standards shall be withdrawn at the latest by March 2015.

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Endorsement notice

The text of ISO 2538-1:2014 has been approved by CEN as EN ISO 2538-1:2014 without any modification.

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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 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/TC 213, *Dimensional and geometrical product specifications and verification*.

This first edition of ISO 2538-1, together with ISO 2538-2, 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 links 1 and 2 of the chain of standards on angle in the GPS matrix.

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.

INTERNATIONAL STANDARD **ISO 2538-1:2014(E)**

Geometrical product specifications (GPS) — Wedges —

Part 1: Series of angles and slopes

1 Scope

This International Standard specifies terms and definitions for wedges, three series of wedge angles from 120° to 0° 30′ and a series of wedge slopes from 1:10 to 1:500, for general mechanical engineering purposes.

2 Terms and definitions

For the purposes of this document, the following definitions apply.

2.1
wedge
pair of intersecting planes

Note 1 to entry: A wedge is a feature of size defined by an angular size.

Note 2 to entry: See Figure 1.

2.2
wedge angle
β
angular size of the wedge defined in a plane perpendicular to the wedge edge

Note 1 to entry: See Figure 1.

2.3
wedge slope
S
ratio of the difference between the heights H and h in two determined cross-sections to the signed distance L between these cross-sections

$$S = (H - h) / L = \tan\beta$$

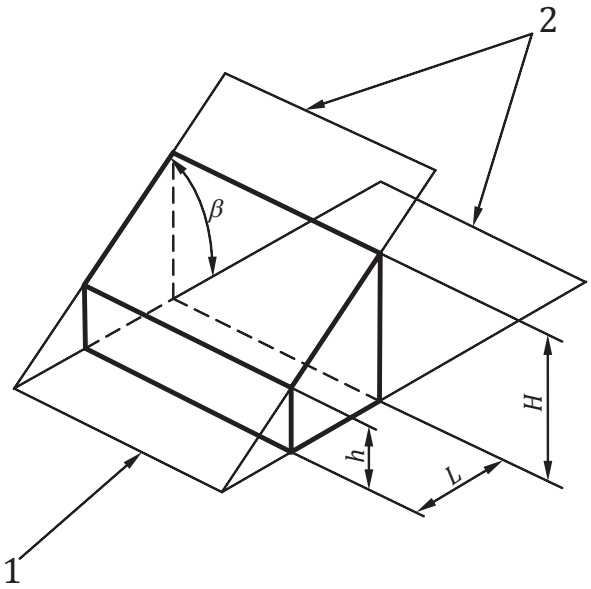
Note 1 to entry: L is positive for angles < 90° and negative for angles > 90°.

2.4
rate of wedge
C
2 × the tangent of half the wedge angle

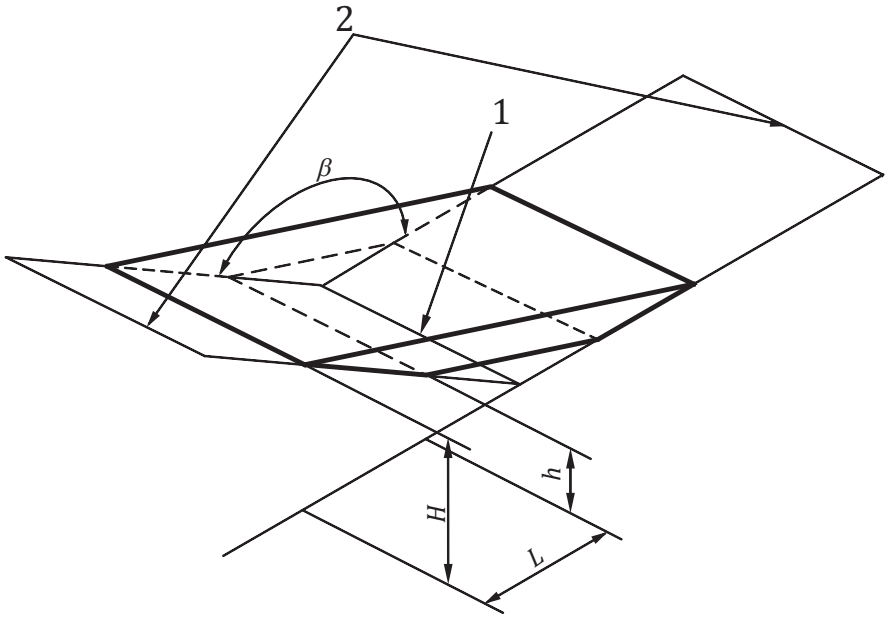
$$C = 2\tan\frac{\beta}{2}$$

2.5
wedge edge
straight line established by the intersection of the wedge planes

Note 1 to entry: See Figure 1.



a) Angles smaller than 90 degrees



b) Angles larger than 90 degrees

Key

1 wedge edge

2 wedge planes

Figure 1 — Wedges

2.6
vee-block
dove-tail
typical wedge with a large angle

Note 1 to entry: See Figures 2 and 3.

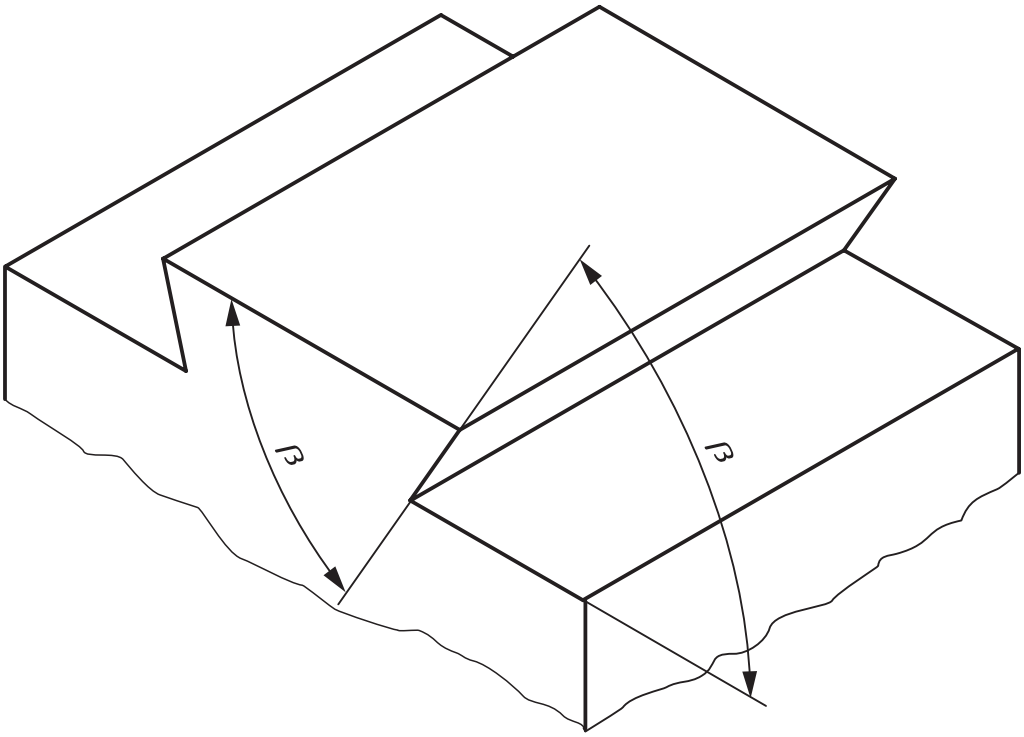


Figure 2 —Dovetail

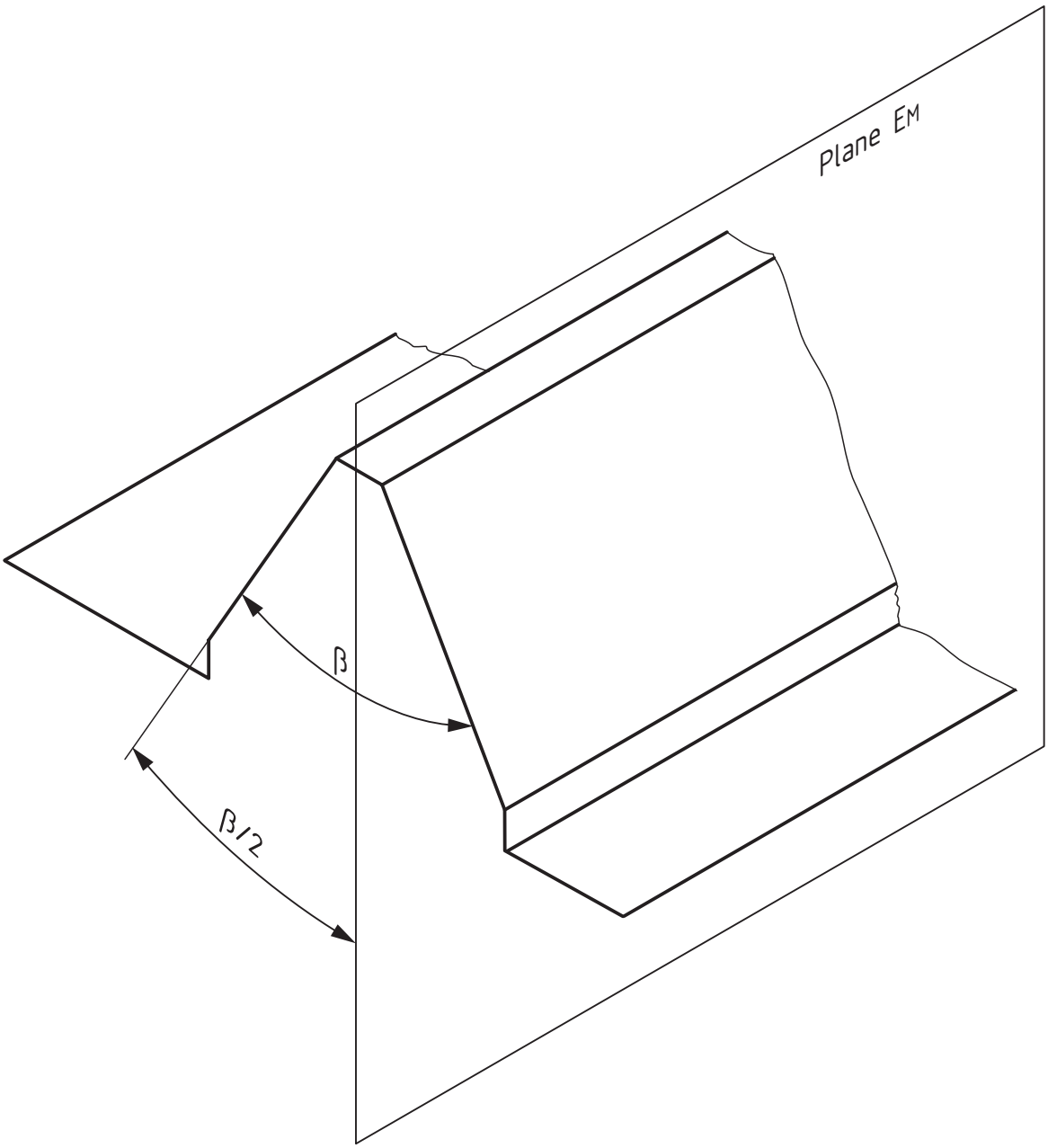


Figure 3 —Vee-block

3 Values

Table 1 shows the nominal values for angles and slopes and the calculated values for rates of wedges, slopes and slope angles for the wedge angles.

The angle series 1 and 2 as specified in Table 1 shall be used in this order of preference, with a view to reducing the range of tools, gauges and measuring instruments required for production of parts with one or more wedges.

The nominal values for angles of special wedges shall only be used for the applications as mentioned in the footnotes.

Table 1 — Nominal and calculated values of wedge angles, slopes and rate of wedges

Nominal values							Calculated values		
Wedge angle						Slope	Rate of wedge	Slope	Wedge angle
Series 1		Series 2		Special wedges					
β	$\beta/2$	β	$\beta/2$	β	$\beta/2$	S	C [c]	S [d]	β
120°	60°						1:0,288 675	1: –0,577 350	—
				108° [a]	54°		1:0,363 271	1:–0,324 920	—
90°	45°						1:0,500 000	—	—
		75°	37° 30′				1:0,651 613	1:0,267 949	—
				72° [a]	36°		1:0,688 190	1:0,324 920	—
60°	30°						1:0,866 025	1:0,577 350	—
				50° [b]			1:1,072 253	1:0,839 100	—
45°	22° 30′						1:1,207 107	1:1,000 000	—
		40°	20°				1:1,373 739	1:1,191 754	—
30°	15°						1:1,866 025	1:1,732 051	—
20°	10°						1:2,835 641	1:2,747 477	—
15°	7° 30′						1:3,797 877	1:3,732 051	—
		10°	5°				1:5,715 026	1:5,671 282	—
		8°	4°				1:7,150 333	1:7,115 370	—
		7°	3° 30′				1:8,174 928	1:8,144 346	—
		6°	3°				1:9,540 568	1:9,514 364	—
						1:10	—	—	5° 42′ 38,1″
5°	2° 30′						1:11,451 883	1:11,430 052	—
		4°	2°				1:14,318 127	1:14,300 666	—
		3°	1° 30′				1:19,094 230	1:19,081 137	—
						1:20	—	—	2° 51′ 44,7″
		2°	1°				1:28,644 981	1:28,636 253	—
						1:50	—	—	1° 8′ 44,7″
		1°	0° 30′				1:57,294 325	1:57,289 962	—
						1:100	—	—	34′ 22,6″
		0° 30′	0° 15′				1:114,590 832	1:114,588 650	—
						1:200	—	—	17′ 11,3″
						1:500	—	—	6′ 52,5″

[a] Application on vee-blocks.

[b] Application on dovetails.

[c] C is shown as 1:1/C.

[d] S is shown as 1:1/S.

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 parameters and corresponding values for some applications. 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 and 2 of the chain of standards on angle in the GPS matrix, as illustrated in Table A.1.

Table A.1 — Fundamental and general ISO GPS standards matrix

Fundamental GPS standards		**Global GPS standards**						
		General GPS standards						
		Chain link number	**1**	**2**	**3**	**4**	**5**	**6**
		Size						
		Distance						
		Radius						
		Angle	•	•				
		Form of line independent of datum						
		Form of line dependent on datum						
		Orientation						
		Location						
		Circular run-out						
		Total run-out						
		Datums						
		Roughness profile						
		Waviness profile						
		Primary profile						
		Surface defects						
		Edges						

A.4 Related standards

The related standards are those of the chains of standards indicated in Table A.1.

Bibliography

[1] ISO 1119:2011, *Geometrical product specifications (GPS) — Series of conical tapers and taper angles*

[2] ISO 3040:2009, *Geometrical product specifications (GPS) — Dimensioning and tolerancing — Cones*

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

[4] ISO 14253-1:2013, *Geometrical product specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformity or nonconformity with specifications*

[5] ISO/TR 14638, *Geometrical product specification (GPS) — Masterplan*

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