INTERNATIONAL STANDARD

ISO 1119

Third edition
2011-12-15

Geometrical product specifications (GPS) — Series of conical tapers and taper angles

Spécification géométrique de produits (GPS) — Série d'angles de cônes et de conicités

Reference number
ISO 1119:2011(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Values **1**
Annex A (informative) **Relation to the GPS matrix model** **5**
Bibliography **7**

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.

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.

ISO 1119 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This third edition cancels and replaces the second edition (ISO 1119:1998); the tables have been corrected and updated, but not technically modified.

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 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 of the relation of this International Standard to other standards and the GPS matrix model, see Annex A.

Geometrical product specifications (GPS) — Series of conical tapers and taper angles

1 Scope

This International Standard provides calculated values for a series of cones or conical tapers, ranging from 120° to less than 1°, or ratios from 1:0,289 to 1:500, intended for general use in technical engineering.

It applies only to plain conical surfaces, and excludes prismatic pieces, taper threads, bevel gears, etc.

2 Normative references

The following referenced document is indispensable for the application 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 3040, *Geometrical product specifications (GPS) — Dimensioning and tolerancing — Cones*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3040 apply.

4 Values

Series 1 and 2 initial values, as specified in Table 1, should be used in the order of preference given with the purpose of reducing the range of tools, gauges and measuring instruments required for production of conical parts.

Table 2 shall be used only for the particular applications indicated in the last column.

For information, these tables give calculated values for the cone angle or the rate of taper, in order to facilitate design, production and control of conical pieces.

Cones shall be dimensioned and toleranced according to ISO 3040.

Table 1 — Cones for general applications

Nominal values					
Initial value		Calculated values			
		Cone angle, α			Rate of taper, C
Series 1	Series 2	Degrees, minutes and seconds ° ' "	Degrees °	Radians rad	
120°		—	—	2,094 395 10	1:0,288 675 1
90°		—	—	1,570 796 33	1:0,500 000 0
	75°	—	—	1,308 996 94	1:0,651 612 7
60°		—	—	1,047 197 55	1:0,866 025 4
45°		—	—	0,785 398 16	1:1,207 106 8
30°		—	—	0,523 598 78	1:1,866 025 4
1:3		18° 55' 28,719 9"	18,924 644 42°	0,330 297 35	—
	1:4	14° 15' 0,117 7"	14,250 032 70°	0,248 709 99	—
1:5		11° 25' 16,270 6"	11,421 186 27°	0,199 337 30	—
	1:6	9° 31' 38,220 2"	9,527 283 38°	0,166 282 46	—
	1:7	8° 10' 16,440 8"	8,171 233 56°	0,142 614 93	—
	1:8	7° 9' 9,607 5"	7,152 668 75°	0,124 837 62	—
1:10		5° 43' 29,317 6"	5,724 810 45°	0,099 916 79	—
	1:12	4° 46' 18,797 0"	4,771 888 06°	0,083 285 16	—
	1:15	3° 49' 5,897 5"	3,818 304 87°	0,066 641 99	—
1:20		2° 51' 51,092 5"	2,864 192 37°	0,049 989 59	—
	1:30	1° 54' 34,857 0"	1,909 682 51°	0,033 330 25	—
1:50		1° 8' 45,158 6"	1,145 877 40°	0,019 999 33	—
1:100		34' 22,630 9"	0,572 953 02°	0,009 999 92	—
1:200		17' 11,321 9"	0,286 478 30°	0,004 999 99	—
1:500		6' 52,529 5"	0,114 591 52°	0,002 000 00	—

NOTE 1 For series 1, values from 120° to 1:3 are approximately in accordance with the R 10/2 series of preferred numbers, and values from 1:5 to 1:500 are in accordance with the R 10/3 series (see ISO 3).

NOTE 2 The calculated values are for information only.

Table 2 — Selection of cones for particular application

Nominal values					International Standard number	Applications
Initial value	Calculated values					
	Cone angle, α			Rate of taper, C		
	Degrees, minutes and seconds ° ' "	Degrees °	Radians rad			
7:24	16° 35' 39,444 3"	16,594 290 08°	0,289 625 00	1:3,428 571 4	ISO 297	Machine tool spindles, tool fits
11°54'	—	—	0,207 694 18	1:4,797 451 1	ISO 5237, ISO 8489-5	Cones and tubes for textile industry
8°40'	—	—	0,151 261 87	1:6,598 441 5	ISO 324 ISO 575 ISO 8489-3, ISO 8489-4,	
7°	—	—	0,122 173 05	1:8,174 927 7	ISO 8489-2	
1:9 [a]	6° 41' 34,776 9"	6,359 660 24	0,110 997 01	—	IEC 60095-2	Terminals of lead acid starter battery
1 : 9,98	5° 44' 10,550 0''	5,736 263 88°	0,100 116 69	—	ISO 12164-1	Hollow taper interface
1:12,262	4° 40' 12,151 4"	4,670 042 05°	0,081 507 61	—	ISO 239	Jacobs taper No. 2
1:12,972	4° 24' 52,903 9"	4,414 695 52°	0,077 050 97	—	ISO 239	Jacobs taper No. 1
1:15,748	3° 38' 13,442 9"	3,637 067 47°	0,063 478 80	—	ISO 239	Jacobs taper No. 33
6:100	3° 26' 12,177 6"	3,436 716 00°	0,059 982 01	1:16,666 666 7	ISO 594-1 ISO 595-1 ISO 595-2	Medical equipment
1:18,779	3° 3' 1,207 0"	3,050 335 27°	0,053 238 39	—	ISO 239	Jacobs taper No. 3
1:19,002	3° 0' 52,395 6"	3,014 554 34°	0,052 613 90	—	ISO 296	Morse taper No. 5
1:19,180	2° 59' 11,725 8"	2,986 590 50°	0,052 125 84	—	ISO 296	Morse taper No. 6
1:19,212	2° 58' 53,825 5"	2,981 618 20°	0,052 039 05	—	ISO 296	Morse taper No. 0
1:19,254	2° 58' 30,421 7"	2,975 117 13°	0,051 925 59	—	ISO 296	Morse taper No. 4
1:19,264	2° 58' 24,864 4"	2,973 573 43°	0,051 898 65	—	ISO 239	Jacobs taper No. 6
1:19,922	2° 52' 31,446 3"	2,875 401 76°	0,050 185 23	—	ISO 296	Morse taper No. 3
1:20,020	2° 51' 40,796 0"	2,861 332 23°	0,049 939 67	—	ISO 296	Morse taper No. 2

Table 2 (*continued*)

Nominal values					International Standard number	Applications
Initial value	Calculated values					
	Cone angle, α			Rate of taper, C		
	Degrees, minutes and seconds ° ' "	Degrees °	Radians rad			
1:20,047	2° 51' 26,928 3"	2,857 480 08°	0,049 872 44	—	ISO 296	Morse taper No. 1
1:20,288	2° 49' 24,780 2"	2,823 550 06°	0,049 280 25	—	ISO 239	Jacobs taper No. 0
1:23,904	2° 23' 47,624 4"	2,396 562 32°	0,041 827 90	—	ISO 296	Brown & Sharpe taper No. 1 to 3
1:28	2° 2' 45,817 4"	2,046 060 38°	0,035 710 49	—	ISO 10651-4	Resuscitators
1:38	1° 30' 27,708 0"	1,507 696 67°	0,026 314 27	—	ISO 368	Cones and tubes for textile industry
1:36	1° 35' 29,209 6"	1,591 447 11°	0,027 775 99	—	ISO 5356-1	Anaesthetic equipment
1:40	1° 25' 56,351 6"	1,432 319 89°	0,024 998 70	—		
1:64	0° 53' 42,822 0"	0,895 228 34°	0,015 624 68	—	ISO 368	Cones and tubes for textile industry

[a] In IEC 60095-2, the rate of taper is defined with a tolerance: 1 ±0,01:9.

NOTE 1 The values in this table should be used only for the particular applications mentioned in the rightmost column.

NOTE 2 The calculated values are for information only.

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 International Standard and its use

This International Standard on conical tapers covers definitions of parameters and corresponding values for some applications. It should be completed by standards covering chain links 3 to 6 in order to allow an unambiguous understanding.

A.3 Position in the GPS matrix model

This International Standard is a general GPS standard, which influences chain links 1 and 2 of the chain of standards on angle in the general GPS matrix, as illustrated in Figure A.1.

	Global GPS standards

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

Figure A.1 — Position in the GPS matrix model

A.4 Related standards

The related International Standards are those of the chains of standards indicated in Figure A.1.

Bibliography

[1] ISO 3:1973, *Preferred numbers — Series of preferred numbers*

[2] ISO 239:1999, *Drill chuck tapers*

[3] ISO 296:1991, *Machine tools — Self-holding tapers for tool shanks*

[4] ISO 297:1988, *7/24 tapers for tool shanks for manual changing*

[5] ISO 324:1978, *Textile machinery and accessories — Cones for cross winding for dyeing purposes — Half angle of the cone 4° 20′*

[6] ISO 368:2006, *Spinning preparatory, spinning and doubling (twisting) machinery — Tubes for ring-spinning, doubling and twisting spindles, taper 1:38 and 1:64*

[7] ISO 575:1978, *Textile machinery and accessories — Transfer cones — Half angle of the cone 4° 20′*

[8] ISO 594-1:1986, *Conical fittings with a 6 % (Luer) taper for syringes, needles and certain other medical equipment — Part 1: General requirements*

[9] ISO 595-1:1986, *Reusable all-glass or metal-and-glass syringes for medical use — Part 1: Dimensions*

[10] ISO 595-2:1987, *Reusable all-glass metal-and-glass syringes for medical use — Part 2: Design, performance requirements and tests*

[11] ISO 5237:1978, *Textile machinery and accessories — Cones for yarn winding (cross wound) — Half angle of the cone 5° 57′*

[12] ISO 5356-1:2004, *Anaesthetic and respiratory equipment — Conical connectors — Part 1: Cones and sockets*

[13] ISO 8015:2011, *Geometrical product specifications (GPS) — Fundamentals — Concepts, principles and rules*

[14] ISO 8489-2:1995, *Textile machinery and accessories — Cones for cross winding — Part 2: Dimensions, tolerances and designation of cones with half angle 3° 30′*

[15] ISO 8489-3:1995, *Textile machinery and accessories — Cones for cross winding — Part 3: Dimensions, tolerances and designation of cones with half angle 4° 20′*

[16] ISO 8489-4:1995, *Textile machinery and accessories — Cones for cross winding — Part 4: Dimensions, tolerances and designation of cones with half angle 4° 20′ for winding or dyeing purposes*

[17] ISO 8489-5:1995, *Textile machinery and accessories — Cones for cross winding — Part 5: Dimensions, tolerances and designation of cones with half angle 5° 57′*

[18] ISO 10651-4:2002, *Lung ventilators — Part 4: Particular requirements for operator-powered resuscitators*

[19] ISO 12164-1:2001, *Hollow taper interface with flange contact surface — Part 1: Shanks — Dimensions*

[20] 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*

[21] ISO/TR 14638:1995, *Geometrical product specification (GPS) — Masterplan*

[22] IEC 60095-2:1984, *Lead-acid starter batteries — Part 2: Dimensions of batteries and dimensions and marking of terminals*

ICS 17.040.01

Price based on 8 pages