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**Geometrical Product Specifications
(GPS)—Series of conical tapers
and taper angles**

ICS 17.040.01

Reference number : JIS B 0612 : 2002 (E)

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by the Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS B 0612 : 1987** is replaced with this Standard.

This revision has been prepared according to the revision of the International Standard corresponding to this Standard, **ISO 1119 : 1998** *Geometrical Product Specifications (GPS)—Series of conical tapers and taper angles*.

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Geometrical Product Specifications (GPS)— Series of conical tapers and taper angles

Introduction This Japanese Industrial Standard has been prepared based on the second edition of **ISO 1119 Geometrical Product Specifications (GPS)—Series of conical tapers and taper angles** published in 1998 without modifying the technical contents.

Portions underlined with dots are the matters not stated in the original International Standard.

This Standard is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see **TR B 0007**). It influences chain links 1 and 2 of the chain of standards on angle.

For more detailed information of the relation of this Standard to other standards and the GPS matrix model, see annex A.

NOTE **TR B 0007** is identical with **ISO/TR 14638 Geometrical product specification (GPS)—Masterplan**.

1 Scope This Standard gives a series of cones or conical tapers, ranging from 120° to less than 1°, or ratios from 1 : 0.288 6 to 1 : 500, intended for general use in mechanical engineering.

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

The method of dimensioning and tolerancing conical surfaces on drawings is covered in **JIS B 0028**.

NOTE The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO 1119 : 1998 *Geometrical Product Specifications (GPS)—Series of conical tapers and taper angles* (IDT)

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0028 *Technical drawings—Dimensioning and tolerancing—Cones*

NOTE **ISO 3040 : 1990** *Technical drawings—Dimensioning and tolerancing—Cones* is identical with the said standard.

JIS Z 8601 *Preferred numbers*

NOTE **ISO/R 3 : 1953** *Preferred numbers—Series of preferred numbers* is equivalent to the said standard.

3 Definitions For the purposes of this Standard, the following definitions apply.

3.1 cone angle α included angle between generatrices as measured in the axial plane section

3.2 rate of taper C ratio of the difference between the diameters of two sections to the distance between these sections

$$C = \frac{D-d}{L} = 2 \tan \frac{\alpha}{2} = \frac{1}{\frac{1}{2} \cot \frac{\alpha}{2}}$$

See figure 1.

- NOTES 1 The rate of taper is a dimensionless quantity.
- 2 The expression $C = 1 : 20$ means that a diameter difference $D - d$ of 1 mm occurs in an axial distance L of 20 mm between diameters D and d and that

$$\frac{1}{2} \cot \frac{\alpha}{2} = 20$$

Information 1 The rate of taper is generally expressed as $1 : x$ or $\frac{1}{x}$.

- 2 For expression of other taper rates, see **JIS B 0028**.
- 3 The rate of taper corresponds to the rate of prism specified in **JIS B 0615**.

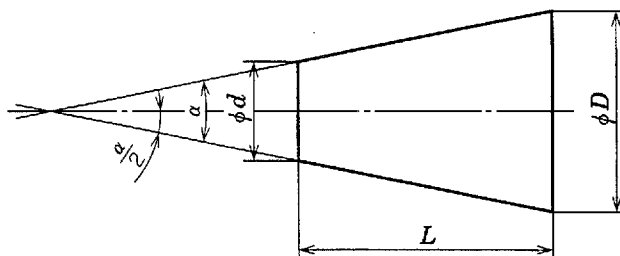


Figure 1

4 Values 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 conical parts.

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

These tables give calculated values for cone angle or rate of taper, to facilitate design, production, and control of conical pieces.

Table 1 Cones for general applications

Basic value				Calculated values			
		Cone angle, α			Rate of taper, C		
Series 1	Series 2			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	$\frac{1}{3}$			18° 55' 28.719 9"	18.924 644 42°	0.330 297 35	—
		1 : 4	$\frac{1}{4}$	14° 15' 0.117 7"	14.250 032 70°	0.248 709 99	—
1 : 5	$\frac{1}{5}$			11° 25' 16.270 6"	11.421 186 27°	0.199 337 30	—
		1 : 6	$\frac{1}{6}$	9° 31' 38.220 2"	9.527 283 38°	0.166 282 46	—
		1 : 7	$\frac{1}{7}$	8° 10' 16.440 8"	8.171 233 56°	0.142 614 93	—
		1 : 8	$\frac{1}{8}$	7° 9' 9.607 5"	7.152 668 75°	0.124 837 62	—
1 : 10	$\frac{1}{10}$			5° 43' 29.317 6"	5.724 810 45°	0.099 916 79	—
		1 : 12	$\frac{1}{12}$	4° 46' 18.797 0"	4.771 888 06°	0.083 285 16	—
		1 : 15	$\frac{1}{15}$	3° 49' 5.897 5"	3.818 304 87°	0.066 641 99	—
1 : 20	$\frac{1}{20}$			2° 51' 51.092 5"	2.864 192 37°	0.049 989 59	—
		1 : 30	$\frac{1}{30}$	1° 54' 34.857 0"	1.909 682 51°	0.033 330 25	—
1 : 50	$\frac{1}{50}$			1° 8' 45.158 6"	1.145 877 40°	0.019 999 33	—
1 : 100	$\frac{1}{100}$			34' 22.630 9"	0.572 953 02°	0.009 999 92	—
1 : 200	$\frac{1}{200}$			17' 11.321 9"	0.286 478 30°	0.004 999 99	—
1 : 500	$\frac{1}{500}$			6' 52.529 5"	0.114 591 52°	0.002 000 00	—
NOTE For series 1, values from 120° to 1 : 3 are approximately in accordance with the R10/2 series of preferred numbers, and values from 1 : 5 to 1 : 500 are in accordance with the R10/3 series (see JIS Z 8601).							

Table 2 Selection of cones for particular application

Basic value		Calculated values				Standard number (informative)	Applications
		Cone angle, α			Rate of taper, C		
11° 54'		—	—	0.207 694 18	1:4.797 451 1	JIS L 6417 ISO 8489-5	Cones and tubes for textile industry
8° 40'		—	—	0.151 261 87	1:6.598 441 5	ISO 8489-3, -4 ISO 324, ISO 575	
7°		—	—	0.122 173 05	1:8.174 927 7	ISO 8489-2	
1 : 38	$\frac{1}{38}$	1° 30' 27.708 0"	1.507 696 67°	0.026 314 27	—	ISO 368	
1 : 64	$\frac{1}{64}$	53' 42.822 0"	0.895 228 34°	0.015 624 68	—	ISO 368	
7 : 24	$\frac{7}{24}$	16° 35' 39.443 8"	16.594 289 94°	0.289 625 00	1:3.428 571 4	JIS B 6101	Machine tool spindles, Tool fits
1 : 12.262	$\frac{1}{12.262}$	4° 40' 12.151 4"	4.670 042 05°	0.081 507 61	—	JIS B 4634	Jacobs taper No. 2
1 : 12.972	$\frac{1}{12.972}$	4° 24' 52.903 9"	4.414 695 52°	0.077 050 97	—	JIS B 4634	Jacobs taper No. 1
1 : 15.748	$\frac{1}{15.748}$	3° 38' 13.442 9"	3.637 067 47°	0.063 478 80	—	JIS B 4634	Jacobs taper No. 33
6 : 100	$\frac{6}{100}$	3° 26' 12.177 6"	3.436 716 00°	0.059 982 01	1:16.666 666 7	ISO 594-1 ISO 595-1, -2	Medical equipment
1 : 18.779	$\frac{1}{18.779}$	3° 3' 1.207 0"	3.050 335 27°	0.053 238 39	—	JIS B 4634	Jacobs taper No. 3
1 : 19.002	$\frac{1}{19.002}$	3° 0' 52.395 6"	3.014 554 34°	0.052 613 90	—	JIS B 4003	Morse taper No. 5
1 : 19.180	$\frac{1}{19.180}$	2° 59' 11.725 8"	2.986 590 50°	0.052 125 84	—	JIS B 4003	Morse taper No. 6
1 : 19.212	$\frac{1}{19.212}$	2° 58' 53.825 5"	2.981 618 20°	0.052 039 05	—	JIS B 4003	Morse taper No. 0
1 : 19.254	$\frac{1}{19.254}$	2° 58' 30.421 7"	2.975 117 13°	0.051 925 59	—	JIS B 4003	Morse taper No. 4
1 : 19.264	$\frac{1}{19.264}$	2° 58' 24.864 3"	2.973 573 43°	0.051 898 65	—	JIS B 4634	Jacobs taper No. 6
1 : 19.922	$\frac{1}{19.922}$	2° 52' 31.446 3"	2.875 401 76°	0.050 185 23	—	JIS B 4003	Morse taper No. 3
1 : 20.020	$\frac{1}{20.020}$	2° 51' 40.796 0"	2.861 332 23°	0.049 939 67	—	JIS B 4003	Morse taper No. 2
1 : 20.047	$\frac{1}{20.047}$	2° 51' 26.928 3"	2.857 480 08°	0.049 872 44	—	JIS B 4003	Morse taper No. 1
1 : 20.288	$\frac{1}{20.288}$	2° 49' 24.780 2"	2.823 550 06°	0.049 280 25	—	JIS B 4634	Jacobs taper No. 0
1 : 23.904	$\frac{1}{23.904}$	2° 23' 47.624 3"	2.396 562 32°	0.041 827 90	—	ISO 296	Brown & Sharpe taper No. 1 to 3
1 : 28	$\frac{1}{28}$	2° 2' 45.817 4"	2.046 060 38°	0.035 710 49	—	ISO 8382	Resuscitators
1 : 36	$\frac{1}{36}$	1° 35' 29.209 6"	1.591 447 11°	0.027 775 99	—	JIS T 7201-2-1	Anaesthetic equipment
1 : 40	$\frac{1}{40}$	1° 25' 56.351 6"	1.432 319 89°	0.024 998 70	—	JIS T 7201-2-1	
NOTE The values in this table should be used only for the particular applications mentioned in the rightmost column.							
Information							
1 : 9	$\frac{1}{9}$	6° 21' 34.776 9"	6.359 660 24°	0.110 997 01	—	JIS D 5301	Terminals of batteries