

JIS

JAPANESE INDUSTRIAL STANDARD

Single Thread Gear Hobs

JIS B 4354—1988

Translated and Published

by

Japanese Standards Association

Printed in Japan

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Single Thread Gear Hobs

B 4354-1988

1. Scope

This Japanese Industrial Standard specifies the single thread hobs for involute spur gears and helical gears 1 to 25 mm in module (m) and 20° in standard pressure angle (α), hereinafter referred to as the "hobs".

2. Definitions

For the purposes of this Standard, the definitions given in JIS B 0174 and JIS B 0102 apply.

3. Grade

The grade of hobs shall be classified according to precision into 4 grades of Grade 0, Grade 1, Grade 2 and Grade 3.

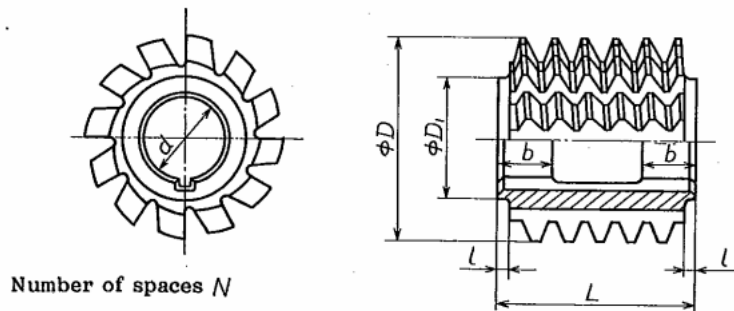
4. Shape and Dimensions

The shape and dimensions shall be as given in Table 1.

The shape of spaces shall be straight line spaces and helix spaces, and the hob of not more than 3° in tooth lead angle shall, as a rule, be of straight line spaces.

The standard tooth profile of hobs shall be the full depth tooth profile specified in JIS B 4350.

Table 1. Shape and Dimensions of Hob



Unit: mm

Module m			Outer diameter D	Total length L	Bore diameter d		Reference			
Series ⁽¹⁾					Type A	Type B	Outer diameter of hob D_1	Length of bearing section b	Length of hob l	Number of spaces N
1	2	3								
1			50	50	22	22.225	34	12	4	12
1.25							55	55		
1.5			60	60						
	1.75						65	65		16
2			70	70						
	2.25						75	75		45
2.5			80	80	50	22				
	2.75						85	85	55	24
3			90	90	60	28				
	3.25						95	95	65	32
	3.5		100	100	70	36				
	3.75						105	105	75	40
4			110	110	80	44				
	4.5						115	115	85	48
5			120	120	90	52				
	5.5						125	125	95	56
6			130	130	100	60				
	6.5						135	135	105	64
7			140	140	110	68				
	7						145	145	115	72
8			150	150	120	76				
	8						155	155	125	80
9			160	160	130	84				
	9						165	165	135	88
10			170	170	140	92				
	10						175	175	145	96
11			180	180	150	100				
	11						185	185	155	104
12			190	190	160	108				
	12						195	195	165	112
13			200	200	170	116				
	13						205	205	175	120
14			210	210	180	124				
	14						215	215	185	128
15			220	220	190	132				
	15						225	225	195	136
16			230	230	200	140				
	16						235	235	205	144
17			240	240	210	148				
	17						245	245	215	152
18			250	250	220	156				
	18						255	255	225	160
19			260	260	230	164				
	19						265	265	235	168
20			270	270	240	172				
	20						275	275	245	176
21			280	280	250	180				
	21						285	285	255	184
22			290	290	260	188				
	22						295	295	265	192
23			300	300	270	196				
	23						305	305	275	200
24			310	310	280	204				
	24						315	315	285	208
25			320	320	290	212				
	25						325	325	295	216
26			330	330	300	220				
	26						335	335	305	224
27			340	340	310	228				
	27						345	345	315	232
28			350	350	320	236				
	28						355	355	325	240
29			360	360	330	244				
	29						365	365	335	248
30			370	370	340	252				
	30						375	375	345	256
31			380	380	350	260				
	31						385	385	355	264
32			390	390	360	268				
	32						395	395	365	272
33			400	400	370	276				
	33						405	405	375	280
34			410	410	380	284				
	34						415	415	385	288
35			420	420	390	292				
	35						425	425	395	296
36			430	430	400	300				
	36						435	435	405	304
37			440	440	410	308				
	37						445	445	415	312
38			450	450	420	316				
	38						455	455	425	320
39			460	460	430	324				
	39						465	465	435	328
40			470	470	440	332				
	40						475	475	445	336
41			480	480	450	340				
	41						485	485	455	344
42			490	490	460	348				
	42						495	495	465	352
43			500	500	470	356				
	43						505	505	475	360
44			510	510	480	364				
	44						515	515	485	368
45			520	520	490	372				
	45						525	525	495	376
46			530	530	500	380				
	46						535	535	505	384
47			540	540	510	388				
	47						545	545	515	392
48			550	550	520	396				
	48						555	555	525	400
49			560	560	530	404				
	49						565	565	535	408
50			570	570	540	412				
	50						575	575	545	416
51			580	580	550	420				
	51						585	585	555	424
52			590	590	560	428				
	52						595	595	565	432
53			600	600	570	436				
	53						605	605	575	440
54			610	610	580	444				
	54						615	615	585	448
55			620	620	590	452				
	55						625	625	595	456
56			630	630	600	460				
	56						635	635	605	464
57			640	640	610	468				
	57						645	645	615	472
58			650	650	620	476				
	58						655	655	625	480
59			660	660	630	484				
	59						665	665	635	488
60			670	670	640	492				
	60						675	675	645	496
61			680	680	650	500				
	61						685	685	655	504
62			690	690	660	508				
	62						695	695	665	512
63			700	700	670	516				
	63						705	705	675	520
64			710	710	680	524				
	64						715	715	685	528
65			720	720	690	532				
	65						725	725	695	536
66			730	730	700	540				
	66						735	735	705	544
67			740	740	710	548				
	67						745	745	715	552
68			750	750	720	556				
	68						755	755	725	560
69			760	760	730	564				
	69						765	765	735	568
70			770	770	740	572				
	70						775	775	745	576
71			780	780	750	580				
	71						785	785	755	584
72			790	790	760	588				
	72						795	795	765	592
73			800	800	770	596				
	73						805	805	775	600
74			810	810	780	604				
	74						815	815	785	608
75			820	820	790	612				
	75						825	825	795	616
76			830	830	800	620				
	76						835	835	805	624
77			840	840	810	628				
	77						845	845	815	632
78			850	850	820	636				
	78						855	855	825	640
79			860	860	830	644				
	79						865	865	835	648
80			870	870	840	652				
	80						875	875	845	656
81			880	880	850	660				
	81						885	885	855	664
82			890	890	860	668				
	82						895	895	865	672
83			900	900	870	676				
	83						905	905	875	680
84			910	910	880	684				
	84						915	915	885	688
85			920	920	890	692				
	85						925	925	895	696
86			930	930	900	700				
	86						935	935	905	704
87			940	940	910	708				
	87						945	945	915	712
88			950	950	920	716				
	88						955	955	925	720
89			960	960	930	724				
	89						965	965	935	728
90			970	970	940	732				
	90						975	975	945	736
91			980	980	950	736				
	91						985	985	955	740
92			990	990	960	744				
	92						995	995	965	748
93			1000	1000	970	748				
	93						1005	1005	975	752
94			1010	1010	980	752				
	94						1015	1015	985</	

Table 1 (Continued)

Unit: mm

Module m			Outer diameter D	Total length L	Bore diameter d		Reference			
Series ⁽¹⁾					Type A	Type B	Outer diameter of hob D_1	Length of bearing section b	Length of hob l	Number of spaces N
1	2	3								
16			200	230	40	38.1	70	58	6	8
	18		220	250	50	50.8	80	62		
20			240	270				68		
	22		250	300				75		
25			270	320				80		

Note ⁽¹⁾ The series of modules shall be in accordance with JIS B 1701.

- Remarks 1. The keyway shall be in accordance with the specifications of JIS B 4201. However, that of 26.988 mm in bore diameter shall, as a rule, be in accordance with that of nominal diameter 27 mm.
2. The permissible deviation of d shall be as follows. However, that shown in parentheses is shown for informative reference. The numerical values of permissible deviations shall be in accordance with Table 2.

d \ Grade	0	1	2	3
32 or under	H 5			H 6
Over 32	(H 5)	H 6		

3. The permissible deviations of D and L shall respectively be of coarse grade specified in JIS B 0405.
4. Type B of d should preferably not be used.
5. The shape shown in Table 1 is an example.

5. Quality

5.1 Appearance The hobs shall, in appearance, be free from defects such as macro structural flaws, cracks, harmful foldings, flaws, rust, etc., and its finishing shall be excellent.

5.2 Surface Roughness The surface roughness of the cutting part shall be 0.8 μ (3.2 S) specified in JIS B 0601 in the face when tested in accordance with 7.1.

5.3 Hardness The hardness of the cutting part shall be HRC 64 (HV 800) and upwards.

5.4 Precision The precision shall be in accordance with Table 2 and Table 3 when tested in accordance with 7.3.

5.5 Sharpness The sharpness of hobs shall be excellent.

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Table 2. Precision

Unit: μm

No.	Item	Basic dimension (mm)	Permissible deviation					
			22	27	32	40	50	
		Grade	22.225	26.988	31.75	38.1	50.8	
1	Bore diameter ⁽²⁾ <i>d</i>	0	$+ \frac{9}{0}(\text{H } 5)$	$+ \frac{9}{0}(\text{H } 5)$	$+ \frac{11}{0}(\text{H } 5)$	$(+ \frac{11}{0})(\text{H } 5)$	$(+ \frac{11}{0})(\text{H } 5)$	$(+ \frac{13}{0})(\text{H } 5)$
		1				$+ \frac{16}{0}(\text{H } 6)$	$+ \frac{16}{0}(\text{H } 6)$	$+ \frac{19}{0}(\text{H } 6)$
		2						
		3	$+ \frac{13}{0}(\text{H } 6)$	$+ \frac{13}{0}(\text{H } 6)$	$+ \frac{16}{0}(\text{H } 6)$			

Note (2) The bore shall be finished by lap finish or by that equivalent thereto and the contacting surface of shaft bearing part shall be not less than 75 %.

Remark: The numerical values shown in parentheses are for informative reference.

Table 3. Precision

Unit: μm

No.	Item		Module <i>m</i> (mm) Grade	Tolerances or permissible deviation						
				1 or over up to and incl. 1.6	Over 1.6 up to and incl. 2.5	Over 2.5 up to and incl. 4	Over 4 up to and incl. 6.3	Over 6.3 up to and incl. 10	Over 10 up to and incl. 16	Over 16 up to and incl. 25
2	Hub	Outer periphery runout	0	5	5	5	6	6	(8)	(8)
			1	5	5	6	8	10	12	16
			2	6	6	8	10	12	18	20
			3	10	10	12	16	20	25	32
3		Surface runout	0	3	3	4	5	5	(6)	(6)
			1	5	5	5	6	8	10	12
			2	6	6	6	8	10	12	16
			3	8	8	8	10	12	16	20
4	Outer periph- ery	Tip runout	0	16	16	20	25	32	(40)	(50)
			1	25	25	25	32	40	50	63
			2	32	32	40	50	63	80	100
			3	63	63	80	100	125	160	200
5		Single division error (±)	0	16	20	25	32	40	(50)	(63)
			1	25	32	40	50	63	80	100
			2	40	50	63	80	100	125	160
			3	63	80	100	125	160	200	250
6	Space	Cumulative division error	0	32	40	50	63	80	(100)	(125)
			1	50	63	80	100	125	160	200
			2	80	100	125	160	200	250	315
			3	125	160	200	250	315	400	500
7		Centripetality	0	10	12	16	20	25	(32)	(40)
			1	16	20	25	32	40	50	63
			2	25	32	40	50	63	80	100
			3	40	50	63	80	100	125	160
8		Lead error (±)	(According to separate table)							
9	Face	Single pitch error (±)	0	5	6	8	10	12	(16)	(20)
			1	8	10	12	16	20	25	32
			2	12	16	20	25	32	40	50
			3	25	32	40	50	63	80	100
10		3 pitch error (±)	0	10	10	12	16	20	(25)	(32)
			1	16	16	20	25	32	40	50
			2	25	25	32	40	50	63	80
			3	40	50	63	80	100	125	160
11		Neighboring error	0	5	5	6	8	10	(12)	(16)
			1	8	8	10	12	16	20	25
			2	12	12	16	20	25	32	40
			3	(20)	(25)	(32)	(40)	(50)	(63)	(80)
12	Tooth trace	One-revolution cumulative error	0	8	8	10	12	16	(20)	(25)
			1	12	12	16	20	25	32	40
			2	20	20	25	32	40	50	63
			3	(32)	(30)	(50)	(63)	(80)	(100)	(125)
13		Three-revolution cumulative error	0	12	12	16	20	25	(32)	(40)
			1	20	20	25	32	40	50	63
			2	32	32	40	50	63	80	100
			3	(50)	(63)	(80)	(100)	(125)	(160)	(200)
14	Tooth profile	Tooth profile error	0	5	6	8	10	14	(22)	(36)
			1	8	10	12	16	22	36	56
			2	12	16	20	25	36	56	90
			3	20	25	32	40	56	90	140
15		Tooth thickness error (-)	0	20	20	25	25	32	(40)	(50)
			1	20	20	25	32	40	50	63
			2	32	32	40	50	63	80	100
			3	50	50	63	80	100	125	160

Separate Table of Table 3

Unit: μm

No.	Item		Total length of job Grade	Permissible deviation				
				50 max.	Over 50 up to and incl. 100	Over 100 up to and incl. 150	Over 150 up to and incl. 200	Over 200
8	Space	Lead error (±)	Each grade	40	60	80	100	120

- Remarks 1. In the case of applying the items of the tooth trace of Nos. 11, 12 and 13, the items of faces of Nos. 9 and 10 may be omitted.
2. The numerical values given in parentheses are for informative reference.