Tolerances for Single-start Hobs for Involute Spur Gears <u>DIN</u> 3968

Toleranzen eingängiger Wälzfräser für Stirnräder mit Evolventenverzahnung

The tolerances indicated in this Standard apply to all angles of action. Hobs are divided according to accuracy into five quality classes, namely A, B, C and D plus a special class AA to meet the most exacting requirements. The method of producing hobs of the various quality classes is left to the manufacturer.

Hob terms are dealt with in DIN 8000 (at present undergoing revision).

	Tolerances in μm (1 μm = 0.001 mm) for mod											les			
Serial No.	Measured quantity	denoting varia- tion	Quality class	0,63 to 1	over l to l,6	0ver 1,6 to 2,5	over 2,5 to 4	over 4 to 6,3	6,3 to	over 10 to 16	over 16 to 25	over 25 to 40			
	Bore diameter 1)		A	ISA tolerance field H 5											
		:	В	ISA tolerance field H 6											
1			С	ISA tolerance field H 6											
			D	ISA tolerance field H 7											
	# \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		AA1)				ISA to	lerand	e fiel	Ld H 5		:			
2	Form tolerance of bore 1)		All quality classes	N.		14	1/2 th	e bore	tole:	rance					
3	Tolerances for longitudinal or clutch drive keyway		All quality classes												
·	Radial run-out on both		A	5	5	5	6	8	10	12	16	20			
	proof flanges referenced to bore axis		В	6	6	6	8	10	12	16	20	25			
			С	10	10	10	12	16	20	25	32	40			
4		f _m	D		not defined										
				AA	5	5	5	5	5	5	6	6	. 8		
				The flan	highenges m	st poi	nts me t be m	asured ore th	on than 900	e two	proof				

¹⁾ Bores with recess are to be treated as a single-diameter through bore with regard to diameter and form tolerances. For hobs of quality class AA it is desirable that the bore should not be made with a recess.



Continued on pages 2 to 5

		·		·								
			Tolerances in µm (1 µm = 0.001 mm) for modules									
Serial No.	Measured quantity	Symbol denoting varia- tion	Quality class	0,63 to 1	to 1,6	1,6 to 2,5	2,5 to 4	over 4 to 6,3	6,3 to 10	10 to 16	16 to 25	25 to 40
	Axial run-out on hub faces						·					
	referenced to bore axis		A	3	3	3	5	5	8	8	10	10
	•		В	4	4	4	6	6	10	10	12	12
5		f _{pe}	С	6	6	6	10	10	16	16	20	20
			D	10	10	10	16	16	25	25	32	32
			AA	3	3	3	3	3	4:	5	5	6
											1	
	Radial run-out on tooth tips referenced to bore axis		A .	12	16	20	25	32	40	50	ස	80
			В	25	32	40	50	63	80	100	125	160
6		f _{rk}	С	50	63	80	100	125	160	200	250	315
			D	100	125	160	200	250	315	400	500	630
. 4			**	10	10	12	16	20	25	32	40	50
	Form and positional variation of cutting faces				·							
	Plane of axis Design line depth		1				·	·	-			
			A	12	16	20	25	32	40	50	ಟ	, 80
	Distance u is amount by which design line	-	В	25	32	40	50	ങ	80	100	125	160
7	is distant from plane of hob axis (Zero when rake angle is 0°)	FIN	С	50	ୟ	80	100	125	160	200	250	315
			D	100	125	160	200	250	315	400	500	ങ
	Test diagram Cutting depth Question line Question		*	10	10	12	16	20	25	32	40	50
	į.								1			

1		Tolerances in µm (1 µm = 0.001 mm) for mod										105
7	Measured quantity	Symbol denoting varia-	Quality class	0ver 0,63	over	over	over 2,5	over	over 6,3	over 10	over 16	over 25
Serial No.	4.5	tion	CIASS	to	to 1,6	to 2,5	to	to 6,3	to	to 16	to 25	to 40
	Individual pitch				0,1	2,3	-	دره		1.0	-	
	measured at half tooth height											,
			,									
-			A	± 12	± 16	± 20.	± 25	± 32	± 40	± 50	± 63	± 80
	(十)次	,	В	± 25	± 32	± 40	± 50	± 63	± 80	±1'00	±125	±160
8		f _{IN}	С	± 50	± 63	± 80	±100	±125	±160	±200	±250	±315
	Test diagram		D	±100	±125	±160	±200	±250	±315	±400	±500	±630
	Zero		AA	± 10	± 10	± 12	± 16	± 20	± 25	± 32	± 40	± 50
	Zerd			,A.								.
	1 2 3 4 5 6 7 8 9 11 10 12											
	Tooth to tooth pitch measured at half tooth height	7.4	A	12	16	20	25	32	40	50	63	80
	Test diagram Zero	fen										
9			С	25 50	32 63	40 80	50 100	63 125	160	100 200	125 250	315
			D.	100	125	160	200	250	315	400	500	630
			AA	10	10	18	16	10	Ì.	82	40	80
	Cumulative pitch measured at half tooth height											
	O -											,
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	·	-									
	77 17	4.	A	25	32	40	50	63	80	100	125	160
			В	50	63	80	100	125	160	200	250	315
10	10 mg/2 mg/2 mg/2 mg/2 mg/2 mg/2 mg/2 mg/2	F _{IM}	С	100	125	160	200	250	315	400	500	630
	Test diagram		D	200	250	315	400	500	630	800	1000	1250
			AA	20	20	25	32	⁷ 40	50	63	80	100
				Th.	i ii T ii T ii	H		01044		the to	 	ful .
-		·		#110 h1+n	l: Hin	ł 1; ł	C Pay	ta tha	1718	at ein	and all	

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				Tolerances in µm (1 µm = 0.001 mm) for modules											
Serial No.	Measured quantity	Symbol denoting variation	Quality class	over 0,63	over 1	1,6	2,5	4	over 6,3 to	over 10 to	over 16 to	over 25 to			
Ser No.				to 1	to 1,6	to 2,5	to 4	6,3	10	16	25	40			
	Gash lead over 100 mm hob length		A	± 70											
	referred to reference cylinder		В	±100											
11	100 mm	1 _{HN}	С	±140											
			D				`.	±200							
-			AA					± 50	***	•					
	ors error of cutting edge	Fis	A	10	11	12	14	16	20	25	32	40			
	Fis		В	20	22	25	28	32	40	50	ಟ	80			
12			С	40	45	50	56	દઉ	80	100	125	160			
			D	not defined											
			*	6	6	6	8	10	12	14	18	22			
	Tooth thickness on reference cylinder	ž.	A	- 25	– 2 8	- 32	- 36	- 40	- 50	– ഒ	- 80	-100			
13			В	- 50	- 56	- 63	- 71	- 80	-100	-125	-160	-200			
			С	-100	-112	-125	-140	-160	-200	-250	-320	-400			
			D	-100	-112	-125	-140	-160	-200	-250	-320	-400			
			AA	- 16	- 16	- 16	- 20	- 25	- 32	- 40	- 50	– ഒ			
			A	± 6	± 7	± 8	± 9	± 10	± 12	± 16	± 20	± 25			
	Hob lead from cutting edge to cutting edge in the		В	± 12	± 14	± 16	± 18	± 20	± 25	± 32	± 40	± 50			
	direction of hand		С	± 25	± 28	± 32	± 36	± 40	±: 50	± 63	± 80	±100			
			D	± 50	± 56	± 63	± 71	± 80	±100	±125	±160	±200			
14	H _N · H H _N · H	1 _{HF}	AA	± 4	± 4	± 4	± 5	± 6	± 8	± 10	± 12	± 16			
				Where: EN = lead of gashes or tooth rows E = hob lead (helix) i = number of gashes or tooth rows The sign in the brackets is + if the gash lead an the hob lead are in opposite directions, and - if they are in the same direction.											
											.1				

		1	1	Τ,	Colera	ices i) m 4 c	1 дв -	• 0.00	1 mm)	for mo	dules	
Serial Mo.	Measured quantity	Symbol denoting varia- tion	Quality class	1	ove		r ove 2,5		6,3	ove	r ove	r ove 25	
			Α	10	11	12	14	16	20	25	32	40	
			В	20	22	25	28	32	40	50	63	80	
	Hob lead in the direction of		С	40	45	50	56	63	80	100	125	160	
	hand between any two cutting edges on the same thread		D	80	90	100	112	125	160	. 200	250	320	
15	<u>n·H_N·H</u> ((H <u>N±H</u>)	FHF	AA	6	6	6	8	10	12	14	18	22	
				Where: HN = lead of gashes or tooth rows H = hob lead (helix) i = number of gashes or tooth rows n = number of cutting edges over which the measurement is made The sign in the brackets is + if the gash lead the hob lead are in opposite directions, and they are in the same direction.									
ĺ	Base pitch element measured from cutting edge to cutting edge		A	± 6	± 7	± 8	± 9	± 10	± 12	± 16	± 20	± 25	
			В	± 12	± 14	± 16	± 18	± 20	± 25	± 32	± 40	± 50	
16		f,	С	± 25	± 28	± 32	± 36	± 40	± 50	± 63	± 80	±100	
			D	not defined									
			AA	± 4	± 4	±4	± 5	± 6	± 8	± 10	± 12	± 16	
				Where: te = base pitch i = number of gashes or tooth rows									
	Base pitch within a contact region												
	contact region		A	12	14	16	18	20	25	32	/~ 40	50	
			В	25	28	32	36	40	50	ಟ	80	100	
17		F.	С	50	56	63	Л	80	100	125	160	200	
	est diagram		D				no	t defi	ined				
		•.	*	8	8	8	10	12	16	20	25	32	
	-contact region-				l		.	ĺ		.		İ	

Other relevant standards:

For fundamental terms and notation for hobs for involute spur gears, see DIH 8000 (at present undergoing revision)

For dimensions for hobs for spur gears with clutch drive slot or keyway, see DIN 8002

For bores, keyways and driving features for tools with parallel bore, see DIN 138