INTERNATIONAL STANDARD

ISO 2490

Third edition
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Solid (monobloc) gear hobs with tenon drive or axial keyway, 0,5 to 40 module — Nominal dimensions

Fraises-mères monoblocs à entraînement par tenon ou par clavette, de modules 0,5 à 40 — Dimensions nominales

Reference number
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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.

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 2490 was prepared by Technical Committee ISO/TC 60, *Gears*, Subcommittee SC 1, *Nomenclature and wormgearing*.

This third edition cancels and replaces the second edition (ISO 2490:1996), of which Tables 1 and 2, Figure 1 and Annex A have been technically revised.

Solid (monobloc) gear hobs with tenon drive or axial keyway, 0,5 to 40 module — Nominal dimensions

1 Scope

This International Standard specifies the nominal dimensions of general-purpose single-start solid (monobloc) gear hobs with axial keyway or tenon drive of 0,5 to 40 module.

These hobs are intended for the production of gears which conform to ISO 54 and present a 20° pressure angle in conformity with ISO 53.

NOTE Solid hobs are those made from one solid piece of material, as opposed to hobs which have inserted blades.

2 Normative references

The following referenced documents are 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 53:1998, *Cylindrical gears for general and heavy engineering — Standard basic rack tooth profile*

ISO 54:1996, *Cylindrical gears for general engineering and for heavy engineering — Modules*

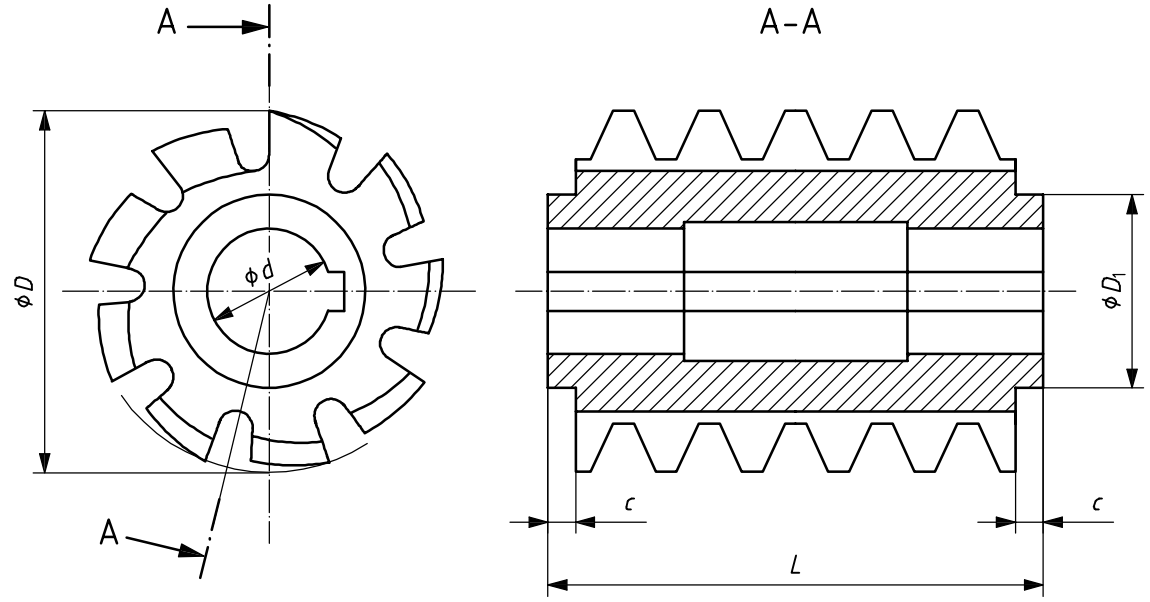
ISO 240:1994, *Milling cutters — Interchangeability dimensions for cutter arbors or cutter mandrels*

ISO 2768-1:1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

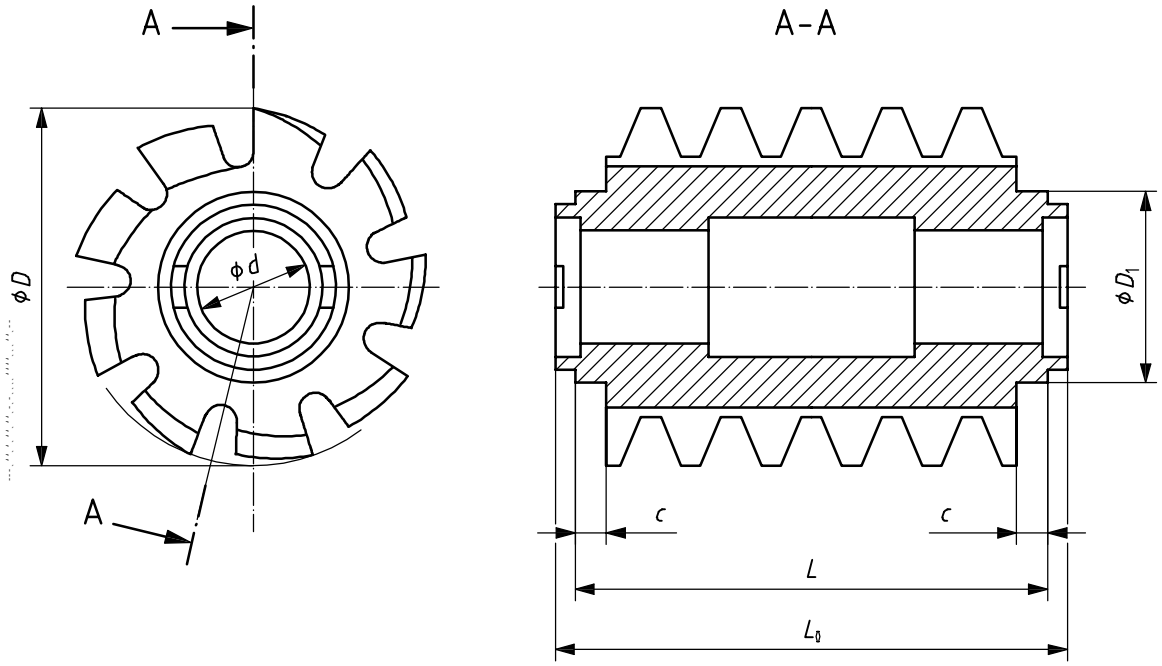
ISO 2780:1986, *Milling cutters with tenon drive — Interchangeability dimensions with cutter arbors — Metric series*

3 Nominal dimensions

The nominal dimensions shall be as shown in Figure 1 and given in Tables 1 and 2.



a) Hob with axial keyway



b) Hob with tenon drive

Key

$\varnothing D_1$ hub diameter (mm)
$\varnothing D$ outside diameter (mm)
$\varnothing d$ bore diameter (mm)
L overall length of hob with axial keyway (mm)
L_0 overall length of hob with tenon drive (mm)
c minimum hub length (mm)

NOTE Keyway dimensions are specified in ISO 240 and tenonway dimensions are specified in ISO 2780.

Figure 1 — Gear hob dimensions

Table 1 — Nominal dimensions of small-bore-type single-thread gear hobs

Type [b]	Module, m		Hub diameter	Outside diameter	Bore diameter	Reference			
	Series					Overall length	Overall length	Minimum hub length	Typical number of gashes
	I	II	D_1 mm	D [a] mm	d [b] mm	L [a] mm	L_0 [a] mm	c mm	
1	0,5	—	Diameter at manufacturer's discretion	24	8	10	—	1	12
	—	0,55		24	8	10	—	1	12
	0,6	—		24	8	10	—	1	12
	—	0,7		24	8	10	—	1	12
	—	0,75		24	8	12	—	1	12
	0,8	—		24	8	12	—	1	12
	—	0,9		24	8	12	—	1	12
	1,0	—		24	8	12	—	1	12
2	0,5	—		32	10	20	30	2	12
	—	0,55		32	10	20	30	2	12
	0,6	—		32	10	20	30	2	12
	—	0,7		32	10	20	30	2	12
	—	0,75		32	10	20	30	2	12
	0,8	—		32	10	20	30	2	12
	—	0,9		32	10	20	30	2	12
	1,0	—		32	10	20	30	2	12
	—	1,125		32	10	20	30	2	12
	1,25	—		40	10	25	35	2	10
	—	1,375		40	10	25	35	2	10
	1,50	—		40	10	25	35	2	10
	—	1,75		40	10	30	40	2	10
	2,0	—		40	10	30	40	2	10
3	0,5	—		32	13	20	30	2	12
	—	0,55		32	13	20	30	2	12
	0,6	—		32	13	20	30	2	12
	—	0,7		32	13	20	30	2	12
	—	0,75		32	13	20	30	2	12
	0,8	—		32	13	20	30	2	12
	—	0,9		32	13	20	30	2	12
	1,0	—		32	13	20	30	2	12
	—	1,125		32	13	20	30	2	12
	1,25	—		40	13	25	35	2	10
	—	1,375		40	13	25	35	2	10
	1,5	—		40	13	25	35	2	10
	—	1,75		40	13	30	40	2	10
	2,0	—		40	13	30	40	2	10

[a] Tolerances of outside diameter, D, L and L_0 shall be the "coarse" class as given in ISO 2768-1.

[b] The type is the segmentation based on the bore diameters.

Table 2 — Nominal dimensions of single-thread gear hobs

Module, m		Hub diameter	Outside diameter	Bore diameter	Reference			
Series					Overall length	Overall length	Minimum hub length	Typical number of gashes
I	II	D_1 mm	D [a] mm	d [b] mm	L [a] mm	L_0 [a] mm	c mm	
1	—	Diameter at manufacturer's discretion	50	22	50	65	4	14
—	1,125		50	22	50	65	4	14
1,25	—		50	22	50	65	4	14
—	1,375		50	22	50	65	4	14
1,5	—		55	22	55	70	4	14
—	1,75		55	22	55	70	4	14
2	—		65	27	60	75	4	14
—	2,25		65	27	60	75	4	14
2,5	—		70	27	65	80	4	14
—	2,75		70	27	65	80	4	14
3	—		75	32	70	85	4	14
—	3,5		80	32	75	90	4	14
4	—		85	32	80	95	4	14
—	4,5		90	32	85	100	4	14
5	—		95	32	90	105	4	14
—	5,5		100	32	95	110	5	12
6	—		105	32	100	115	5	12
—	6,5		110	32	110	125	5	12
—	7		115	32	115	130	5	12
8	—		120	32	140	160	5	10
—	9		125	32	140	160	5	10
10	—		130	32	170	190	5	10
—	11		150	40	170	190	6	9
12	—		160	40	200	220	6	9
—	14		180	40	200	220	6	9
16	—		200	50	250	275	6	9
—	18		220	50	250	275	6	9
20	—		240	60	300	325	6	9
—	22		250	60	300	325	6	9
25	—		280	60	360	385	6	9
—	28		320	80	400	430	6	9
32	—		350	80	450	480	6	9
—	36		380	80	450	480	6	9
40	—		400	80	480	510	6	9

[a] Tolerances of dimensions D, L and L_0 shall be the "coarse" class as given in ISO 2768-1.

[b] ISO 2780 (tenonway dimensions) only gives values for bores up to 50 mm in diameter.

Annex A
(informative)

Multiple thread hobs

Table A.1 — Small-bore gear hob outside diameters and lead angles (multi-threads)

Type [c]	Module, m		Number of threads, z_0									
	Series		All	1			2			3		
	I	II	Hub diameter D_1 mm	Outside diameter D mm	Bore diameter d mm	Lead angle [a, b] γ_0 °	Outside diameter D mm	Bore diameter d mm	Lead angle [a, b] γ_0 °	Outside diameter D mm	Bore diameter d mm	Lead angle [a, b] γ_0 °
1	0,5	—	Diameter at manufacturer's discretion	24	8	1,259	32	10	1,864	32	10	2,796
	—	0,55		24	8	1,393	32	10	2,058	32	10	3,088
	0,6	—		24	8	1,528	32	10	2,255	32	10	3,383
	—	0,65		24	8	1,665	32	10	2,453	32	10	3,681
	—	0,7		24	8	1,803	32	10	2,653	32	10	3,981
	—	0,75		24	8	1,943	32	10	2,854	32	10	4,283
	0,8	—		24	8	2,084	32	10	3,057	32	10	4,589
	—	0,9		24	8	2,372	32	10	3,469	32	10	5,207
	1	—		24	8	2,666	32	10	3,887	32	10	5,837
2 and 3	0,5	—		32	10	0,932	32	10	1,864	32	10	2,796
	—	0,55		32	10	1,029	32	10	2,058	32	10	3,088
	0,6	—		32	10	1,127	32	10	2,255	32	10	3,383
	—	0,65		32	10	1,226	32	10	2,453	32	10	3,681
	—	0,7		32	10	1,326	32	10	2,653	32	10	3,981
	—	0,75		32	10	1,427	32	10	2,854	32	10	4,283
	0,8	—		32	10	1,528	32	10	3,057	32	10	4,589
	—	0,9		32	10	1,734	32	10	3,469	32	10	5,207
	1	—		32	10	1,943	32	10	3,887	32	10	5,837
	—	1,125		32	10	2,209	32	10	4,421	32	10	6,640

Table A.1 (*continued*)

Type [c]	Module, m		Number of threads, z_0									
	Series		All	1			2			3		
	I	II	Hub diameter D_1 mm	Outside diameter D mm	Bore diameter d mm	Lead angle [a, b] γ_0 °	Outside diameter D mm	Bore diameter d mm	Lead angle [a, b] γ_0 °	Outside diameter D mm	Bore diameter d mm	Lead angle [a, b] γ_0 °
2 and 3 (cont)	1,25	—	Diameter at manufacturer's discretion	40	10	1,943	40	10	3,887	40	10	5,837
	—	1,375		40	10	2,155	40	10	4,313	40	10	6,478
	1,5	—		40	10	2,372	40	10	4,747	40	10	7,131
	—	1,75		40	10	2,816	40	10	5,638	40	10	8,474
	2	—		40	10	3,276	40	10	6,562	40	10	9,871

a Axial gashing is normally up to a 6° lead angle.

b The lead angle of the gear hob is calculated from the formula:

$$\sin\gamma_0 = \frac{m \times z_0}{D - 2h_{a0}}$$

where

γ_0 is the lead angle of the gear hob;

m is the module;

z_0 is the number of threads on the gear hob;

D is the outside diameter of the gear hob;

h_{a0} is the addendum of the gear hob (in conformity with ISO 53).

c The type is the segmentation based on the bore diameters.

Table A.2 — Gear hob outside diameters and lead angles (multi-threads)

Module, m		**Number of threads,** z_0															
Series		All	1				2				3				4			
		Hub diameter	Outside diameter	Bore diameter	Lead angle [b]	Maximum number of gashes [a]	Outside diameter	Bore diameter	Lead angle [b]	Maximum number of gashes [a]	Outside diameter	Bore diameter	Lead angle [b]	Maximum number of gashes [a]	Outside diameter	Bore diameter	Lead angle [b]	Maximum number of gashes [a]
		D_1	D	d	γ_0	N	D	d	γ_0	N	D	d	γ_0	N	D	d	γ_0	N
I	II		mm	mm	°		mm	mm	°		mm	mm	°		mm	mm	°	
1	—	Diameter at manufacturer's discretion	50	22	1,206	16	55	22	2,183	17	60	22	2,991	18	85	32	2,779	23
—	1,125		50	22	1,366	16	55	22	2,471	17	60	22	3,383	18	90	32	2,959	23
1,25	—		50	22	1,528	16	55	22	2,762	17	60	22	3,780	18	95	32	3,120	25
—	1,375		50	22	1,692	16	55	22	3,057	17	65	27	3,842	19	95	32	3,444	25
1,5	—		55	22	1,677	16	60	22	3,057	17	70	27	3,895	19	100	32	3,574	25
—	1,75		55	22	1,981	16	60	22	3,608	17	80	32	3,981	20	110	32	3,800	25
2	—		65	27	1,910	16	70	27	3,528	17	90	32	4,048	20	120	32	3,989	25
—	2,25		65	27	2,172	15	80	32	3,469	17	100	32	4,101	22	120	32	4,513	25
2,5	—		70	27	2,247	15	85	32	3,640	18	110	32	4,145	22	120	32	5,044	25
—	2,75		70	27	2,497	15	85	32	4,037	18	110	32	4,589	22	130	32	5,126	25
3	—		75	32	2,547	15	90	32	4,171	18	115	32	4,802	22	130	32	5,622	27
—	3,5		80	32	2,816	14	100	32	4,400	18	125	32	5,182	22	150	40	5,688	27
4	—		85	32	3,057	14	115	32	4,370	19	140	32	5,296	22	170	40	5,739	27
—	4,5		90	32	3,276	14	120	32	4,747	19	150	40	5,584	22	180	40	6,123	27
5	—		95	32	3,475	14	125	32	5,100	19	160	40	5,837	22	190	40	6,470	27
—	5,5		100	32	3,656	13	135	32	5,205	19	170	40	6,062	22	200	50	6,784	27
6	—		105	32	3,823	13	140	32	5,509	18	175	40	6,459	22	210	50	7,070	27
—	6,5		110	32	3,976	13	150	40	5,578	18								
—	7		115	32	4,117	13	155	40	5,844	18								
8	—		120	32	4,589	12	160	40	6,562	17								
—	9		125	32	5,037	12	170	40	7,010	16								
10	—		130	32	5,465	12	180	40	7,414	16								
—	11		150	40	5,152	11	200	50	7,327	16								
12	—		160	40	5,296	11	210	50	7,662	15								
—	14		180	40	5,541	10	240	60	7,850	15								
16	—		200	50	5,739	10	270	60	7,998	15								
—	18		220	50	5,904	10												
20	—		240	60	6,042	10												
—	22		250	60	6,478	10												
25	—		280	60	6,600	10												
—	28		320	80	6,431	10												
32	—		350	80	6,807	9												
—	36		380	80	7,131	9												
40	—		400	80	7,662	9												

Table A.2 (*continued*)

Module, m		**Number of threads,** z_0												
Series		All	5				6				7			
I	II	Hub diameter D_1	Outside diameter D mm	Bore diameter d mm	Lead angle [b] γ_0 °	Maximum number of gashes [a] N	Outside diameter D mm	Bore diameter d mm	Lead angle [b] γ_0 °	Maximum number of gashes [a] N	Outside diameter D mm	Bore diameter d mm	Lead angle [b] γ_0 °	Maximum number of gashes [a] N
1	—	Diameter at manufacturer's discretion	85	32	3,475	23	85	32	4,171	23	85	32	4,867	23
—	1,125		90	32	3,699	23	90	32	4,440	23	90	32	5,182	23
1,25	—		95	32	3,901	25	95	32	4,682	25	95	32	5,465	25
—	1,375		95	32	4,306	25	95	32	5,169	25	95	32	6,034	25
1,5	—		100	32	4,469	25	100	32	5,365	25	100	32	6,263	25
	1,75		110	32	4,752	25	110	32	5,705	25	110	32	6,660	25
2	—		120	32	4,989	25	120	32	5,990	25	120	32	6,993	25
—	2,25		120	32	5,645	25	120	32	6,779	25	120	32	7,915	25
2,5	—		120	32	6,309	25	120	32	7,578	25	120	32	8,850	25
—	2,75		130	32	6,412	25	130	32	7,701	25	130	32	8,995	25
3	—		130	32	7,033	27	130	32	8,450	27	130	32	9,871	27
—	3,5		150	40	7,117	27	150	40	8,550	27	150	40	9,989	27

[a] Axial gashing is normally up to a 6° lead angle.

[b] The lead angle of the gear hob is calculated from the formula:

$$\sin\gamma_0 = \frac{m \times z_0}{D - 2h_{a0}}$$

where

γ_0 is the lead angle of the gear hob;

m is the module;

z_0 is the number of threads on the gear hob;

D is the outside diameter of the gear hob;

h_{a0} is the addendum of the gear hob (in conformity with ISO 53).

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