
End mills and slot drills —

Part 2:

**Dimensions and designation of milling
cutters with Morse taper shanks**

Fraises cylindriques 2 tailles et fraises à rainurer —

Partie 2: Dimensions et désignation des fraises à queue cône Morse

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Foreword

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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 1641-2 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 2, *High speed steel cutting tools and their attachments*.

This second edition cancels and replaces the first edition (ISO 1641-2:1978), of which it constitutes a minor revision. In particular, this includes updating of the normative references, addition of the designation (see Clause 4) and indication of the tolerance classes in accordance with ISO 2768-1 and ISO 2768-2.

ISO 1641 consists of the following parts, under the general title *End mills and slot drills*:

- *Part 1: Milling cutters with cylindrical shanks*
- *Part 2: Dimensions and designation of milling cutters with Morse taper shanks*
- *Part 3: Dimensions and designation of milling cutters with 7/24 taper shanks*

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End mills and slot drills —

Part 2:

Dimensions and designation of milling cutters with Morse taper shanks

1 Scope

This part of ISO 1641 specifies the general dimensions and designation of the following milling cutters with Morse taper and having a tapped hole:

- end mills, flat-ended or ball-nosed — standard series and long series;
- slot drills — short series and standard series.

Morse taper shanks are in accordance with ISO 296 and ISO 5413.

It is not applicable to the end mills and slot drills with cylindrical shank, which are dealt with in ISO 1641-1; it is not applicable to those with 7/24 taper shank, which are dealt with in ISO 1641-3.

This part of ISO 1641 is not applicable to solid hardmetal end mills and slot drills.

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 296, *Machine tools — Self-holding tapers for tool shanks*

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

ISO 2768-2, *General tolerances — Part 2: Geometrical tolerances for features without individual tolerance indications*

ISO 5413, *Machine tools — Positive drive of Morse tapers*

3 Dimensions

3.1 General

All dimensions and tolerances are given in millimetres. Tolerances not specified shall be of tolerance class “m” in accordance with ISO 2768-1 and of class “K” in accordance with ISO 2768-2.

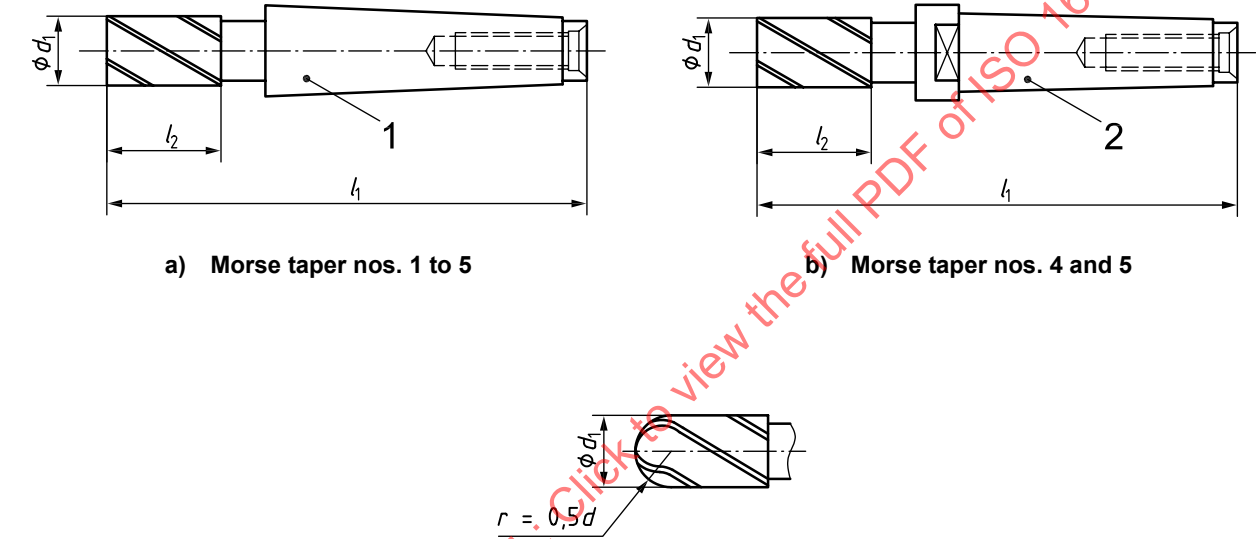
The values, l_1 and l_2 , shall be chosen such that the difference in length ($l_1 - l_2$) remains constant whatever the series (short, normal or long), according to Table 1.

Table 1 — Length difference ($l_1 - l_2$)

Morse taper no.	1	2	3	4		5	
				Alternative I	Alternative II	Alternative I	Alternative II
$(l_1 - l_2)$	70	85	102	125	148	158	186

3.2 Flat-ended end mills and ball-nosed cylindrical end mills

The dimensions of flat-ended end mills and ball-nosed cylindrical end mills shall be in accordance with the dimensions shown in Figure 1 and Table 2.



- Key
- 1 Morse taper in accordance with ISO 296
 - 2 Morse taper in accordance with ISO 5413

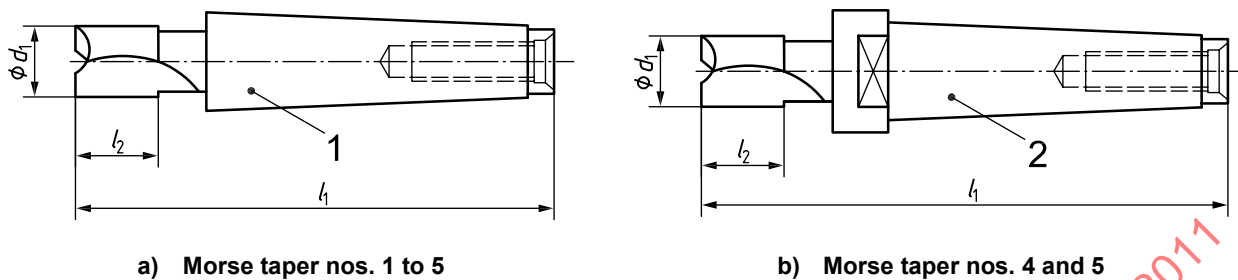
Figure 1 — Dimensions of flat-ended end mills and ball-nosed cylindrical end mills

Table 2 — Dimensions of flat-ended end mills and ball-nosed cylindrical end mills

Range of diameters, d_1 js14		Recommended diameters, d_1		Length, l_1				Length, l_2		Morse taper no.
				Normal series		Long series		Normal series	Long series	
From (excluded)	Up to (included)			Alternative I	Alternative II	Alternative I	Alternative II			
5	6	6	—	83		94		13	24	1
6	7,5	—	7	86		100		16	30	
7,5	9,5	8	9	89		108		19	38	
9,5	11,8	10	11	92		115		22	45	
11,8	15	12	14	96		123		26	53	2
				111		138				
15	19	16	18	117		148		32	63	
19	23,6	20	22	123		160		38	75	
23,6	30	25	28	140		177		45	90	3
				147		192				
30	37,5	32	36	155		208		53	106	
				178	201	231	254			
37,5	47,5	40	45	188	211	250	273	63	125	4
				221	249	283	311			
47,5	60	50	56	200	223	275	298	75	150	
				233	261	308	336			
60	75	63	—	248	276	338	366	90	180	5

3.3 Slot drills

The dimensions of slot drills shall be in accordance with the dimensions shown in Figure 2 and Table 3.



Key

- 1 Morse taper in accordance with ISO 296
- 2 Morse taper in accordance with ISO 5413

Figure 2 — Dimensions of slot drills

Table 3 — Dimensions of slot drills

Range of diameters, d_1 e8			Recommended diameters, d_1		Length, l_1						Length, l_2		Morse taper no.
					Short series		Normal series				Short series	Normal series	
From (excluded)	Up to (included)			Alternative I	Alternative II	Alternative I	Alternative II						
5	6	6	—		78		83	8	13	1			
6	7,5	—	7		80		86	10	16				
7,5	9,5	8	9		81		89	11	19				
9,5	11,8	10	11		83		92	13	22				
11,8	15	12	14		86		96	16	26	2			
					101		111						
15	19	16	18		104		117	19	32				
19	23,6	20	22		107		123	22	38				
					124		140						
23,6	30	25	28		128		147	26	45	3			
30	37,5	32	36		134		155	32	53				
				157		180				178		201	
37,5	47,5	40	45		163		186	38	63	4			
				196		224					188		211
47,5	60	50	56		170		193	45	75	5			
				203		231					221		249
60	75	63	—		211		239	53	90	4			
						248					261		276