INTERNATIONAL STANDARD

ISO 1641-2

Second edition
2011-06-15

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

Reference number
ISO 1641-2:2011(E)

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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 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*

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.

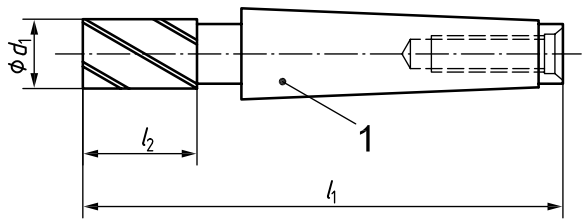
The values, l_1 and l_2, shall be chosen such that the difference in length $(l_1 - l_2)$ remains constant whatever the series (short, normal or long), according to Table 1.

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

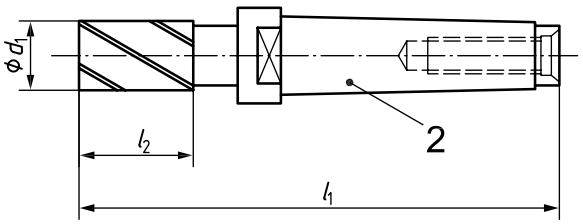
Morse taper no.	1	2	3	4		5	
				Alternative I	Alternative II	Alternative I	Alternative II
$(l_1 - l_2)$	70	85	102	125	148	158	186

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

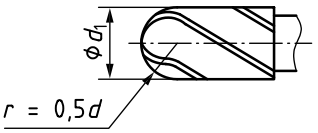
The dimensions of flat-ended end mills and ball-nosed cylindrical end mills shall be in accordance with the dimensions shown in Figure 1 and Table 2.



a) **Morse taper nos. 1 to 5**



b) **Morse taper nos. 4 and 5**



Key

1 Morse taper in accordance with ISO 296

2 Morse taper in accordance with ISO 5413

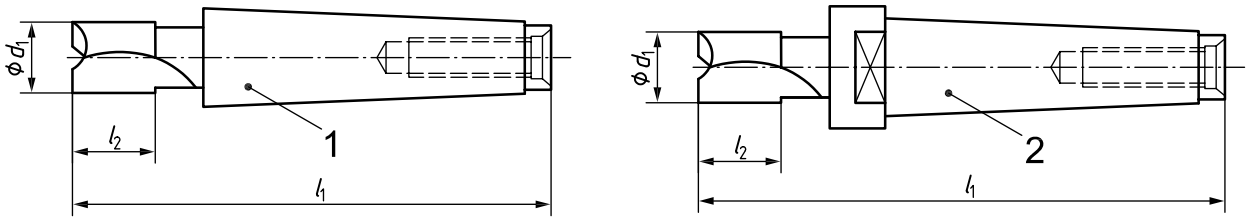
Figure 1 — Dimensions of flat-ended end mills and ball-nosed cylindrical end mills

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	
				111		138				2
15	19	16	18	117		148		32	63	
19	23,6	20	22	123		160		38	75	
				140		177				3
23,6	30	25	28	147		192		45	90	
30	37,5	32	36	155		208		53	106	
				178	201	231	254			4
37,5	47,5	40	45	188	211	250	273	63	125	
				221	249	283	311			5
47,5	60	50	56	200	223	275	298	75	150	4
				233	261	308	336			5
60	75	63	—	248	276	338	366	90	180	

3.3 Slot drills

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



a) Morse taper nos. 1 to 5 **b) Morse taper nos. 4 and 5**

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	
				101		111				2
15	19	16	18	104		117		19	32	
19	23,6	20	22	107		123		22	38	
				124		140				3
23,6	30	25	28	128		147		26	45	
30	37,5	32	36	134		155		32	53	
				157	180	178	201			4
37,5	47,5	40	45	163	186	188	211	38	63	
				196	224	221	249			5
47,5	60	50	56	170	193	200	223	45	75	4
				203	231	233	261			5
60	75	63	—	211	239	248	276	53	90	

4 Designation

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

Flat-ended end mills and ball-nosed cylindrical end mills in accordance with this part of ISO 1641 shall be designated by:

a) "Flat-ended end mills" or "ball-nosed cylindrical end mills";

b) the reference to this part of ISO 1641, i.e. ISO 1641-2;

c) a hyphen;

d) the recommended diameter, d_1;

e) a hyphen;

f) the Morse taper number.

EXAMPLE 1 A flat-ended end mill in accordance with ISO 1641-2 with recommended diameter $d_1 = 8$ and Morse taper no. 1 is designated as follows:

Flat-ended end mills ISO 1641-2 – 8 – 1

EXAMPLE 2 A ball-nosed cylindrical end mill in accordance with ISO 1641-2 with recommended diameter $d_1 = 8$ and Morse taper no. 1 is designated as follows:

Ball-nosed cylindrical end mills ISO 1641-2 – 8 – 1

4.2 Slot drills

Slot drills in accordance with this part of ISO 1641 shall be designated by:

a) "Slot drill";

b) the reference to this part of ISO 1641, i.e. ISO 1641-2;

c) a hyphen;

d) the recommended diameter, d_1;

e) a hyphen;

f) the Morse taper number.

EXAMPLE A slot drill in accordance with ISO 1641-2 with recommended diameter $d_1 = 8$ and Morse taper no. 1 is designated as follows:

Slot drill ISO 1641-2 – 8 – 1

ICS 25.100.20

Price based on 6 pages