
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

STANDARDSISO.COM : Click to view the full PDF of ISO 1641-2:2011



STANDARDSISO.COM : Click to view the full PDF of ISO 1641-2:2011



COPYRIGHT PROTECTED DOCUMENT

© ISO 2011

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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*

[STANDARDSISO.COM](https://standardsiso.com) : Click to view the full PDF of ISO 1641-2:2017

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.

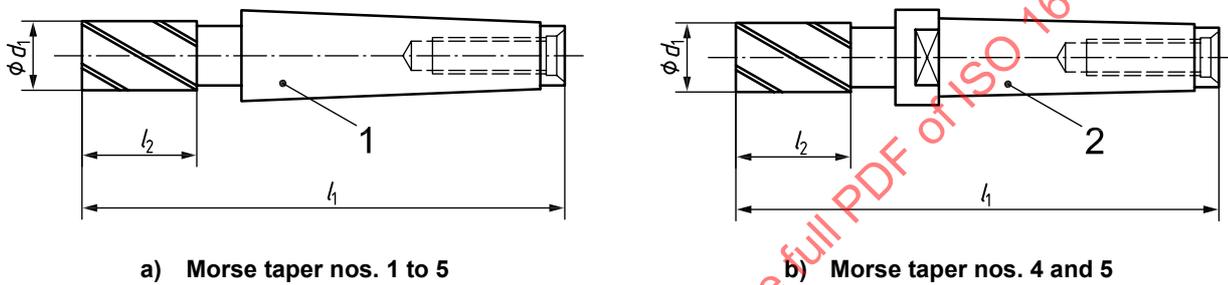
The values, l_1 and l_2 , shall be chosen such that the difference in length ($l_1 - l_2$) remains constant whatever the series (short, normal or long), according to Table 1.

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

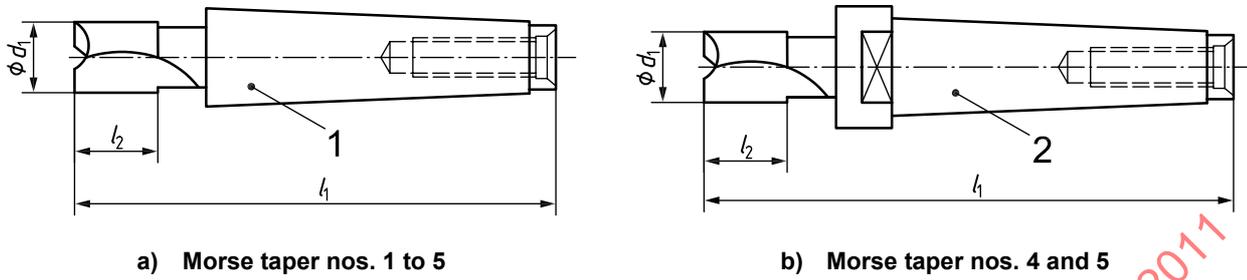
Figure 1 — Dimensions of flat-ended end mills and ball-nosed cylindrical end mills

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 | Alternative I | Alternative II | | | |
| 5 | 6 | — | 83 | 94 | 94 | 13 | 24 | | | |
| 6 | 7,5 | 7 | 86 | 100 | 100 | 16 | 30 | | | |
| 7,5 | 9,5 | 8 | 89 | 108 | 108 | 19 | 38 | | 1 | |
| 9,5 | 11,8 | 10 | 92 | 115 | 115 | 22 | 45 | | | |
| 11,8 | 15 | 12 | 96 | 123 | 123 | 26 | 53 | | | |
| 15 | 19 | 16 | 111 | 138 | 138 | 32 | 63 | | 2 | |
| 19 | 23,6 | 20 | 117 | 148 | 148 | 38 | 75 | | | |
| 23,6 | 30 | 25 | 123 | 160 | 160 | 45 | 90 | | 3 | |
| 30 | 37,5 | 32 | 140 | 177 | 177 | 53 | 106 | | | |
| 37,5 | 47,5 | 40 | 147 | 192 | 192 | 63 | 125 | | 4 | |
| 47,5 | 60 | 50 | 155 | 208 | 208 | 75 | 150 | | 5 | |
| 60 | 75 | 63 | 178 | 231 | 231 | 90 | 180 | | | |
| | | | 188 | 250 | 250 | | | | | |
| | | | 221 | 283 | 283 | | | | | |
| | | | 200 | 275 | 275 | | | | | |
| | | | 233 | 308 | 308 | | | | | |
| | | | 248 | 338 | 338 | | | | | |
| | | | 201 | 254 | 254 | | | | | |
| | | | 211 | 273 | 273 | | | | | |
| | | | 249 | 311 | 311 | | | | | |
| | | | 223 | 298 | 298 | | | | | |
| | | | 261 | 336 | 336 | | | | | |
| | | | 276 | 366 | 366 | | | | | |

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