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# International Standard



# 7406

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Bore type milling cutters for indexable inserts — Designation

*Fraises à trou à plaquettes amovibles — Désignation*

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Ref. No. ISO 7406-1986 (E)

Descriptors : tools, cutting tools, milling cutters, inserts, designation.

## 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7406 was prepared by Technical Committee ISO/TC 29, *Small tools*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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# Bore type milling cutters for indexable inserts — Designation

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## 1 Scope and field of application

This International Standard establishes a code for the designation of bore type milling cutters intended for indexable inserts, with the purpose of simplifying orders and specifications for such tools.

It covers the designation of face milling cutters, side and face (slotting) milling cutters, shell end mills as well as simple designs of slab milling cutters.

## 2 References

ISO 1832, *Indexable (throwaway) inserts for cutting tools — Designation — Code of symbolization.*

ISO 3002/1, *Basic quantities in cutting and grinding — Part 1: Geometry of the active part of cutting tools — General terms, reference systems, tool and working angles, chip breakers.*

ISO 6462, *Face milling cutters with indexable inserts — Dimensions.*

ISO 6986, *Side and face milling (slotting) cutters with indexable inserts — Dimensions.*

ISO 7848, *Shank type milling cutters for indexable inserts — Designation.*

## 3 Explanation of the code

The code consists of eleven symbols of which the first ten symbols shall be used in any designation. The last symbol shall be used only for side and face (slotting) milling cutters, shell end mills and slab milling cutters. Four symbols designate the characteristics of the body and seven the clamping and characteristics of the inserts.

In addition to the standardized designation (symbols ① to ⑩), a supplementary symbol ⑪ consisting of a maximum of two letters and/or numbers may be added by the manufacturer after the standardized designation for a better description of his products, subject to this symbol being separated from the standardized designation by a dash.

No addition to or extension of the code given in this International Standard shall be made without consultation with technical committee ISO/TC 29 and its agreement. Rather than adding symbols not provided for in this system, it is preferable to add to the designation conforming to this International Standard any necessary explanations in detailed sketches or specifications.

The meaning of the eleven symbols constituting the code is as follows:

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>① Number symbol identifying the cutter diameter (see 4.1).</li> <li>② Letter symbol identifying the type of cutter and the type and/or size of the attachment (see 4.2).</li> <li>③ Number symbol identifying the number of slots (see 4.3).</li> <li>④ Letter symbol identifying cutting direction (see 4.4).</li> </ul> <p>— Dash (not counted as a symbol).</p> <ul style="list-style-type: none"> <li>⑤ Letter symbol identifying the method of holding the insert (see 4.5).</li> <li>⑥ Number symbol identifying insert cutting edge angle (see 4.6).</li> <li>⑦ Letter symbol identifying the insert shape (see 4.7).</li> <li>⑧ Letter symbol identifying the normal clearance of insert (see 4.8).</li> <li>⑨ Number symbol identifying the indexable insert size (see 4.9).</li> <li>⑩ Letter symbol identifying the normal clearance of the wiper edge (see 4.10).</li> <li>⑪ Number symbol identifying the cutting width of side and face milling cutters or of slab milling cutters (see 4.11).</li> </ul> | } | <p>Symbols for the characteristics of the body</p>             |
| <ul style="list-style-type: none"> <li>⑫ Symbol for the manufacturer, at his option.</li> </ul>  | } | <p>Symbols for clamping and characteristics of the inserts</p> |

Examples :

Face milling cutter :

①	②	③	④	—	⑤	⑥	⑦	⑧	⑨	⑩
250	C	20	R	—	W	75	S	N	12	P

Side and face milling (slotting) cutter :

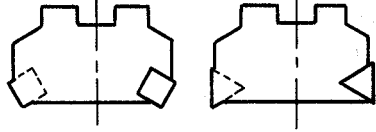
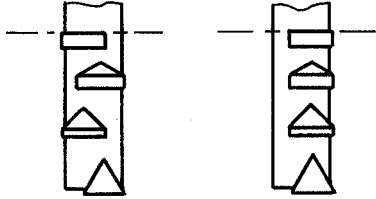
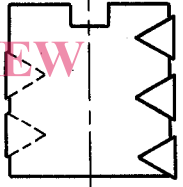
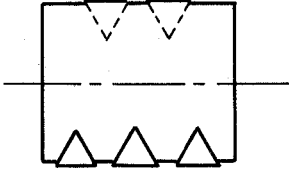
①	②	③	④	—	⑤	⑥	⑦	⑧	⑨	⑩	⑪
160	H	18	N	—	F	90	T	P	16	P	20

## 4 Symbols

### 4.1 Symbol for the cutter diameter — Reference ①

The number symbol for the cutter diameter is a two- or three-digit number equal to the cutting diameter in millimetres.

4.2 Symbol for the type of cutter and for the type and/or size of the attachment — Reference ②

Letter symbol	Type and/or size of the attachment	Type of cutter
A	Tenon drive, hexagon socket head cap screw (type A in ISO 6462)	 <p>Face milling cutters</p>
B	Tenon drive, cutter retaining screw (type B of ISO 6462)	
C	Centring arbor having a 7/24 taper (type C in ISO 6462)	
X	Special designs	
E	Bore diameter 22 mm	 <p>Side and face milling cutters with staggered (for slotting) or straight teeth</p>
F	Bore diameter 27 mm	
G	Bore diameter 32 mm	
H	Bore diameter 40 mm	
J	Bore diameter 50 mm	
K	Bore diameter 60 mm	
M	Bore diameter 80 mm	
N	Bore diameter 100 mm	
Y	Special designs	
T	Tenon drive	 <p>Shell end mills</p>
U	Key drive	 <p>Slab milling cutters</p>

4.3 Symbol for the number of slots — Reference ③

The number symbol is also the number of slots.


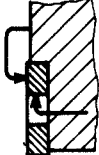

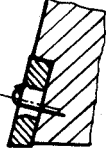
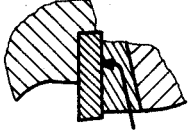

NOTE — Defined here is the effective number of slots used to determine feed speed. It does not always correspond to the real total number of slots on the tool, because of the staggered disposition of the inserts on the milling cutter.

One-digit values are to be preceded by 0 (zero); for example for eight slots, the symbol is 08.

4.4 Symbol for the cutting direction of the cutter — Reference ④

Letter symbol	Type of cutter	Direction of cut
R	Face milling cutters, side and face milling cutters with straight teeth and shell end mills	Right hand
L		Left hand
N	Side and face milling cutters with staggered teeth (for slotting) and slab milling cutters	Either side (neutral)

4.5 Symbol for the method of holding the insert — Reference ⑤

Letter symbol	Method of holding	Insert	Figure
C	Top clamping	Without hole	
M	Top and hole clamping	With cylindrical hole	
P	Hole clamping	With cylindrical hole	
S	Screw clamping through hole	With partly cylindrical hole	
W	Wedge type clamping behind the insert	Any	
F	Wedge type clamping in front of the insert	Any	
K	Cartridge with insert	Any	—
X	Special designs	Any	—

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#### 4.6 Symbol for the insert cutting edge angle — Reference ⑥

The symbol is the angle expressed in degrees; see also ISO 1832.

For round inserts with the diameter converted from an inch value, symbol ⑥ is 00; for round inserts with metric diameter, it is M0.

#### 4.7 Symbol for the insert shape — Reference ⑦

Letter symbol	Insert shape	Insert type
H O P S T	Hexagonal Octagonal Pentagonal Square Triangular	Equilateral and equiangular
C D E M V W	Rhombic with 80° included angle Rhombic with 55° included angle Rhombic with 75° included angle Rhombic with 86° included angle Rhombic with 35° included angle Hexagonal with 80° included angle	Equilateral but non-equiangular
L	Rectangular	Non-equilateral but equiangular
A B K	Parallelogram-shaped with 85° included angle Parallelogram-shaped with 82° included angle Parallelogram-shaped with 55° included angle	Non-equilateral and non-equiangular
R	Round	Round

NOTE — The included angle is always the smaller angle.

If the milling cutter is equipped with inserts of different shapes, the symbol for the insert shape shall be X.

#### 4.8 Symbol for the normal clearance of insert — Reference ⑧

Letter symbol	Insert normal clearance
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

NOTE — For non-equilateral inserts, the symbol applies to the normal clearance of the longer side.

If the milling cutter is equipped with inserts having different normal clearances, the symbol for the normal clearance shall be X.

4.9 Symbol for the indexable insert size — Reference ⑨

Insert type	Number symbol
Equilateral and equiangular (H, O, P, S, T) and equilateral and non-equiangular (C, D, E, M, V, W)	The designation symbol for the insert size is the side length, disregarding any decimals. <i>Example :</i> Edge length : 16,5 mm Symbol of designation : 16
Non-equilateral and equiangular (L) and non-equilateral and non-equiangular (A, B, K)	The designation symbol for the insert size is always given for the major or the longer cutting edge. The designation symbol is the length, disregarding any decimals. <i>Example :</i> Length of the major cutting edge : 19,5 mm Symbol of designation : 19
Round insert (R)	The designation symbol for the insert size is always given for the diameter value disregarding any decimals. <i>Example :</i> Diameter : 15,875 mm Symbol of designation : 15

NOTE — When the symbol resulting from the value has only one digit, it shall be preceded by 0 (zero).

*Example :*

Cutting edge length : 9,525 mm  
Symbol of designation : 09

If the milling cutter is equipped with inserts having different sizes, the symbol for the insert size shall be XX.

4.10 Symbol for the normal clearance of the wiper edge of the insert — Reference ⑩

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Letter symbol	Normal clearance of the wiper edge
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

If the milling cutter is equipped with inserts having different wiper normal clearances, the wiper symbol shall be X.

NOTE — For milling cutters designed to receive indexable inserts without wiper edges (e.g. milling cutters with round inserts), reference ⑩ is not used. However, if reference ⑪ has to be specified by a symbol, reference ⑩ will be represented by a dash (—).

4.11 Symbol for the cutting width of side and face (slotting) milling cutters, shell end mills and slab milling cutters — Reference ⑪

The number symbol is a two- or three-digit number equal to the nominal cutting width in millimetres (disregarding any decimals) of side and face (slotting) milling cutters, shell end mills and of slab milling cutters. For cutting widths smaller than 10 mm, the first digit shall be 0 (zero).

*Example :*

Cutting width : 8 mm  
Symbol of designation : 08

NOTE — The possibility of adjusting the cutting width of side and face milling cutters shall be indicated in the catalogues for these tools. The nominal width is in this case the mean value of the adjusting range.