

# International Standard



# 7848

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## Shank type milling cutters for indexable inserts — Designation

*Fraises à queue à plaquettes amovibles — Désignation*

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## Foreword

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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 7848 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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# Shank type milling cutters for indexable inserts — Designation

## 1 Scope and field of application

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

## 2 References

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

ISO 297, *7/24 tapers for tool shanks for manual changing.*

ISO 1832, *Indexable inserts for cutting tools — Designation.*

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 3338/1, *Parallel shanks for milling cutters — Part 1: Dimensional characteristics of plain parallel shanks.*

ISO 3338/2, *Parallel shanks for milling cutters — Part 2: Dimensional characteristics of flatted parallel shanks.*

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

ISO 6262/1, *End mills with indexable inserts — Part 1: End mills with flatted parallel shank.*

ISO 6262/2, *End mills with indexable inserts — Part 2: End mills with Morse taper shank.*

ISO 7388/1, *Tool shanks with 7/24 taper for automatic tool changers — Part 1: Shanks Nos. 40, 45 and 50 — Dimensions.*

ISO 7406, *Bore type milling cutters for indexable inserts — Designation.*

## 3 Explanation of the code

The code consists of eleven symbols, all of which shall be used in any designation. Five symbols designate the characteristics of the body, two the characteristics of the shank, and four the method of holding and characteristics of the insert and the cutting length.

In addition to the standardized designation (symbols ① to ⑪) a supplementary symbol ⑫ 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:

- ① Number symbol identifying the cutter diameter (see 4.1).
  - ② Letter symbol identifying the type of cutter and the insert cutting edge angle<sup>1)</sup> (see 4.2).
  - ③ Number symbol identifying the number of slots (see 4.3).
  - ④ Letter symbol identifying the cutting direction<sup>1)</sup> (see 4.4).
  - ⑤ Number symbol identifying the protruding length (see 4.5).
  - ⑥ Letter symbol identifying the type of shank (see 4.6).
  - ⑦ Number symbol identifying the size of the shank (see 4.7).
  - Dash (not counted as a symbol).
  - ⑧ Letter symbol identifying the method of holding the insert (see 4.8).
  - ⑨ Letter symbol identifying the insert shape (see 4.9).
  - ⑩ Letter symbol identifying the normal clearance<sup>1)</sup> of the insert (see 4.10).
  - ⑪ Number symbol identifying the cutting length (see 4.11).
- Symbols for the characteristics of the body  
 Symbols for the characteristics of the shank  
 Symbols for holding and characteristics of the insert

*Examples :*

End mill, with round inserts :

① ② ③ ④ ⑤ ⑥ ⑦ — ⑧ ⑨ ⑩ ⑪  
 25 E 2 R 050 B 25 — S R P 08

Side and face cutting end mill, with inserts of various shapes and clearances :

① ② ③ ④ ⑤ ⑥ ⑦ — ⑧ ⑨ ⑩ ⑪  
 63 J 2 R 086 G 50 — F X X 56

Milling cutter of special design, with square inserts :

① ② ③ ④ ⑤ ⑥ ⑦ — ⑧ ⑨ ⑩ ⑪  
 100 X 3 R 120 F 06 — K S N 75

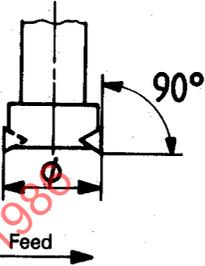
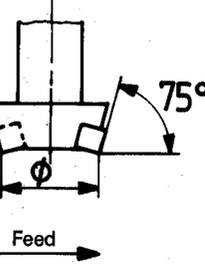
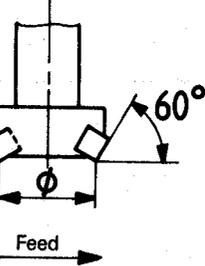
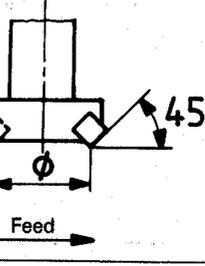
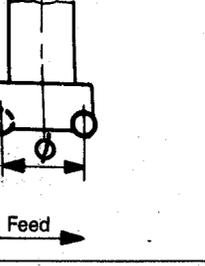
**4 Symbols**

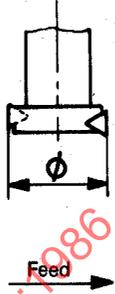
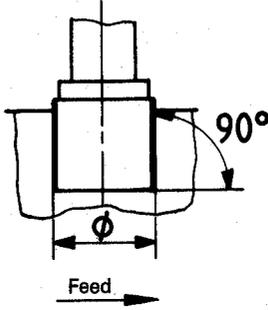
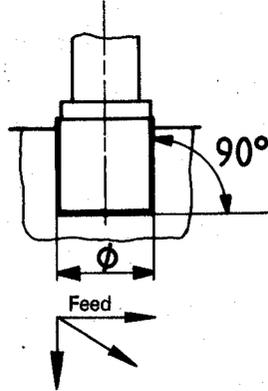
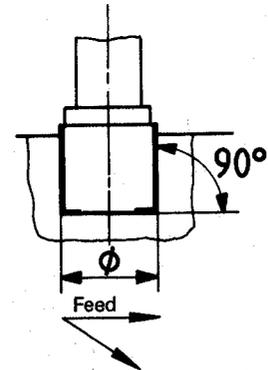
**4.1 Symbol for the cutter diameter — Reference ①**

The symbol for the cutter diameter is its effective cutting diameter, expressed in millimetres. The definition of the effective cutting diameter is given in the sketches of the table for the symbol ②.

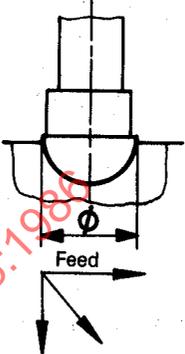
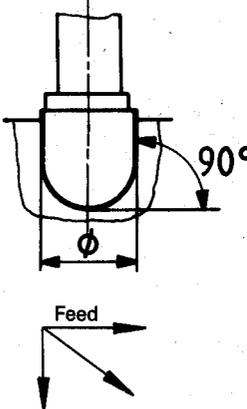
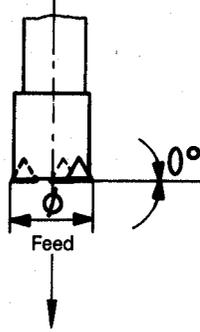
1) See ISO 3002/1.

4.2 Symbol for the type of cutter and for the insert cutting edge angle — Reference ②

Letter symbol	Type of cutter	Insert cutting edge angle $\kappa_r$	Figure
A	End mills (one insert per slot)	90°	
B		75°	
C		60°	
D		45°	
E		—	
Y		Any other cutting edge angle	—

Letter symbol	Type of cutter	Insert cutting edge angle $\kappa_r$	Figure
F	T-slot cutter (one insert per slot)	90°	
G	Side cutting end mill (more than one insert per slot)	90°	
H	Slotting drill (one or more inserts per slot)	90°	
J	Side and face cutting end mill (one or more inserts per slot)	90°	

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Letter symbol	Type of cutter	Insert cutting edge angle $\kappa_r$	Figure
K	Ball nose end mill (one or more inserts per slot)	—	
L	Ball nose side and face cutting end mill (more than one insert per slot)	90°	
M	Spot facing cutter	0°	
X	Shank type milling cutter of special design (for example dove-tail cutter, etc.)	—	—

**4.3 Symbol for the number of slots — Reference ③**

The symbol is a one- or two-digit number equal to the number of slots.

**NOTES**

- 1 Defined here is the effective number of slots, used to determine feed speed. For cutters of types G to L, 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.
- 2 For milling cutters with more than one insert per slot, the direction of the flute helix shall be specified in the manufacturer's catalogue.

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

Letter symbol	Direction of cut
R	Right hand
L	Left hand

**4.5 Symbol for the protruding length — Reference ⑤**

The protruding length of a shank type milling cutter is defined as follows:

- for milling cutters with parallel shank: the protruding length is the total length of the milling cutter minus the length of the parallel shank according to ISO 3338 (see figure 1);
- for milling cutters with Morse taper shank or with 7/24 shank: the protruding length is the distance from the face of the cutter to the gauge plane as defined in ISO 296 and ISO 297 respectively (see figures 2 and 3).

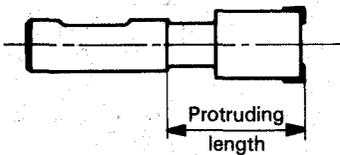


Figure 1

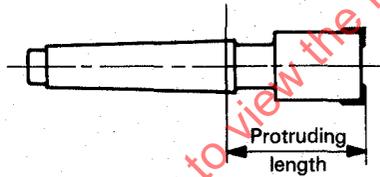


Figure 2

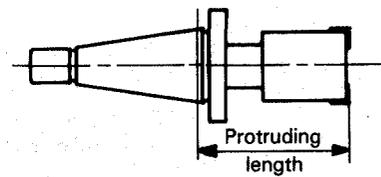


Figure 3

The symbol for the protruding length is a three-digit number, equal to the nominal value of the protruding length.

*Example:*

Protruding length 120 mm, symbol 120.

If the protruding length is less than 100 mm, the symbol shall have as its first digit a zero.

*Example:*

Protruding length 80 mm, symbol 080.

**4.6 Symbol for the type of shank — Reference ⑥**

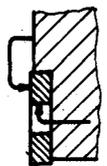
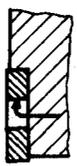
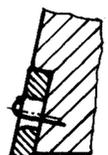
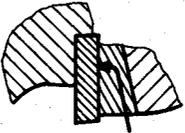
Letter symbol	Type of shank
A	Plain parallel shank (according to ISO 3338/1)
B	Flatted parallel shank (according to ISO 3338/2)
C	Whistle notch parallel shank (under study)
D	Threaded parallel shank (not standardized)
E	Morse taper shank (according to ISO 296)
F	Morse taper shank with positive drive (according to ISO 5413)
G	7/24 taper shank (according to ISO 297)
H	7/24 taper shank for automatic tool changing (according to ISO 7388/1)
J	Bridgeport-type (R8) shank
K	Threaded and flatted parallel shank (not standardized)
X	Shank of special design

**4.7 Symbol for the size of the shank — Reference ⑦**

The symbol for the size of the shank is a two-digit number:

- for parallel shanks: the nominal diameter in millimetres (for example, 25); for shanks smaller than 10 mm, the first digit is a zero (for example, 08);
- for Morse taper shanks: the number of the Morse taper, preceded by a zero (for example, Morse taper No. 3, symbol 03);
- for 7/24 taper shanks, the number of the shank (for example, 50).

**4.8 Symbol for the method of holding the insert — Reference ⑧**

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	Clamped in the cartridge	—
X	Special designs	Any	—