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**Milling cutters — Designation —**

**Part 1:**

Shank type end mills of solid or tipped design

*Fraises — Désignation —*

*Partie 1: Fraises deux tailles, à queue monobloc ou à lames*

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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.

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.

International Standard ISO 11529-1 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 9, *Tools with cutting edges made of hard cutting materials*.

ISO 11529 consists of the following parts, under the general title *Milling cutters — Designation*:

- *Part 1: Shank type end mills of solid or tipped design*
- *Part 2: Shank type and bore type milling cutters with indexable inserts*

Annex A of this part of ISO 11529 is for information only.

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International Organization for Standardization  
Case postale 56 • CH-1211 Genève 20 • Switzerland  
Internet central@iso.ch  
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

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# Milling cutters — Designation —

## Part 1:

### Shank type end mills of solid or tipped design

#### 1 Scope

This part of ISO 11529 establishes a designation system for shank type end mills of solid or tipped design with a maximum diameter of 99,9 millimetres, with the purpose of simplifying communication between users and suppliers of such tools.

#### 2 Summary explanation of the designation system

Shank type end mills are designated by a code comprising symbols which identify the important features of the end mills.

Extensions to the designation codes to include manufacturer's or supplier's information about the end mills, and information about the material of the cutting part, are described in clauses 4 and 5.

No addition to or extension of the designation system given in this part of ISO 11529 shall be made without consulting with Technical Committee ISO/TC 29 and obtaining its agreement.

The symbols defined by this part of ISO 11529 are:  
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#### Position Definition of designation symbols

1	Designation symbol (letter) identifying the design of end mill (see 3.1)
2	Designation symbol (letter) identifying the type of end mill (see 3.2)
3	Designation symbol (number) identifying the cutting edge angle $\kappa_r$ (see 3.3)
4	Designation symbol (letter) identifying the helix angle $\lambda_s$ (see 3.4)
5	Designation symbol (number) identifying the diameter, $\varnothing$ (see 3.5)
6	Designation symbol (letter) identifying the hand of cutting (see 3.6)
7	Designation symbol (number) identifying the maximum cutting depth $\alpha_p$ (see 3.7)
8	Designation symbol (number) identifying the number of effective cutting edges (see 3.8)
9	Designation symbol (letter) identifying the type of shank (see 3.9)
10	Designation symbol (number) identifying the size of shank (see 3.10)

#### EXAMPLE

1	2	3	4	5	6	7	8	9	10
<b>A</b>	<b>G</b>	<b>90</b>	<b>E</b>	<b>120</b>	<b>R</b>	<b>025</b>	<b>04</b>	<b>A</b>	<b>12</b>

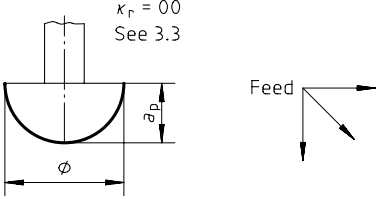
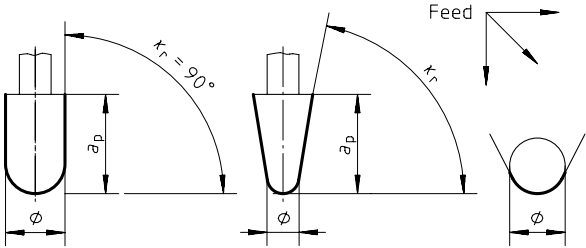
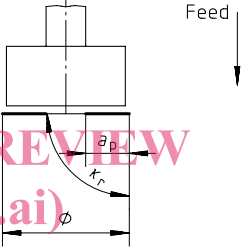
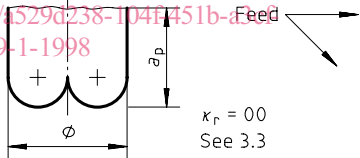
### 3 Designation symbols

#### 3.1 Designation symbol identifying design of end mill - Position 1

Designation symbol	Design
<b>A</b>	Solid with plain (continuous) cutting edges
<b>B</b>	Solid with interrupted (serrated) cutting edges
<b>D</b>	With brazed tips and plain (continuous) cutting edges
<b>E</b>	With brazed tips and interrupted (serrated) cutting edges
<b>F</b>	With mechanically clamped tips and plain (continuous) cutting edges
<b>G</b>	With mechanically clamped tips and interrupted (serrated) cutting edges

#### 3.2 Designation symbol identifying type of end mill - Position 2

Designation symbol	Type of end mill	Shape
<b>F</b>	T-slot cutter $a_p < \varnothing$	
<b>G</b>	End mill - side cutting ( $\kappa_r = 90^\circ$ ) Tapered end mill - side cutting $a_p \geq \varnothing$	
	End mill - side and centre cutting ( $\kappa_r = 90^\circ$ ) Tapered end mill - side and centre cutting $a_p > \varnothing$	
<b>J</b>	End mill - side cutting and ramping ( $\kappa_r = 90^\circ$ ) Tapered end mill - side cutting and ramping $a_p \geq \varnothing$	

Designation symbol	Type of end mill	Shape
<b>K</b>	Ball-nosed end mill - centre cutting $a_p \leq 0,5 \varnothing$	
<b>L</b>	Ball-nosed cylindrical end mill - side and centre cutting ( $\kappa_r = 90^\circ$ ) Ball-nosed tapered end mill - side and centre cutting $a_p \geq 0,5 \varnothing$	
	Spot facing cutter centre cutting = $a_p = 0,5 \varnothing$ not centre cutting = $a_p < 0,5 \varnothing$	
<b>N</b>	Toroidal end mill $a_p < \varnothing$	

**3.3 Designation symbol identifying cutting edge angle  $\kappa_r$  - Position 3**

The symbol identifying the cutting edge angle is a two-digit number, corresponding to the nominal cutting edge angle, in degrees, and omitting any decimals.  $\kappa_r$  is defined for the various types of end mill in 3.2, and in ISO 3002-1.

**EXAMPLE**

Cutting edge angle 90°: symbol 90

For end mills of types K and N, the symbol identifying the cutting edge angle shall be replaced by 00 (double zero).

If  $\kappa_r$  is a decimal value, the symbol identifying the cutting edge angle shall be replaced by XX, and the actual value shown as manufacturer's information (see clause 4).

**3.4 Designation symbol identifying helix angle — Position 4**

Normal helix angle $\lambda_s$	Designation symbol	
	Right hand helix	Left hand helix
0°	A	A
0° < $\lambda_s$ ≤ 5°	B	M
5° < $\lambda_s$ ≤ 10°	C	N
10° < $\lambda_s$ ≤ 15°	D	P
15° < $\lambda_s$ ≤ 20°	E	Q
20° < $\lambda_s$ ≤ 25°	F	S
25° < $\lambda_s$ ≤ 30°	G	T
30° < $\lambda_s$ ≤ 35°	H	U
35° < $\lambda_s$ ≤ 45°	J	V
45° < $\lambda_s$ ≤ 60°	K	W
Others	X	Y

**3.5 Designation symbol identifying diameter, Ø — Position 5**

The definition of the diameter of end mills is shown in the drawings in 3.2 (position 2).

The number symbol identifying the diameter of the end mill is a three digit number and corresponds to the diameter in tenths (1/10ths) mm.

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**EXAMPLES**

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End mill of diameter 5 mm: symbol 050  
End mill of diameter 75 mm: symbol 750

**3.6 Designation symbol identifying hand of cutting — Position 6**

The symbol for hand of cutting of end mill is:

Letter symbol	Hand of cutting of end mill
L	Left
R	Right

**3.7 Designation symbol identifying the maximum cutting depth,  $a_p$  — Position 7**

The symbol identifying the maximum cutting depth,  $a_p$ , (see definition in position 2, and in ISO 3002-3) is a three-digit number, in millimeters and omitting any decimals.

**EXAMPLES**

Maximum cutting depth 8 mm: symbol 008  
Maximum cutting depth 80 mm: symbol 080  
Maximum cutting depth 105 mm: symbol 105

NOTE —  $a_p$  is described in ISO 3002-3 as "back engagement of the cutting edge".

### 3.8 Designation symbol identifying the number of effective cutting edges - Position 8

The symbol identifying the number of cutting edges is a two-digit number corresponding to the number of effective cutting edges.

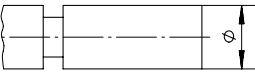
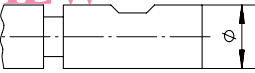

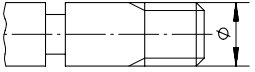
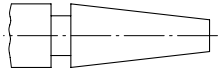
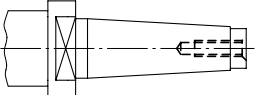
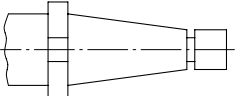
#### EXAMPLES

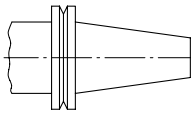
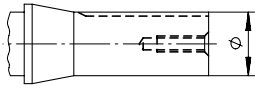
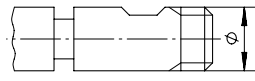
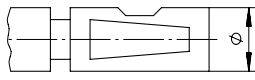
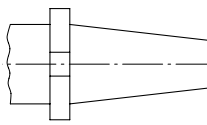
12 effective cutting edges: symbol 12

2 effective cutting edges: symbol 02

NOTE — The number of effective cutting edges is defined as "the number of cutting edges used to calculate the feed per tooth in the direction of feed motion from which  $\kappa_r$  is defined".

### 3.9 Designation symbol identifying type of shank - Position 9

Designation symbol	Type of shank	Figure
<b>A</b>	Plain cylindrical shank (ISO 338-1)  NOTE — The length may be greater than specified in ISO 3338-1, i.e. for power chucks.	
<b>B</b>	Flatted cylindrical shank (ISO 3338-2)	
<b>C</b>	Cylindrical shanks with 2° angular flat (whistle notch shank)	
<b>D</b>	Threaded cylindrical shank (ISO 3338-3)	
<b>E</b>	Morse taper shank, type A (ISO 296)	
<b>F</b>	Morse taper shank with positive drive (ISO 5413)	
<b>G</b>	7/24 taper shank (ISO 297)	

Designation symbol	Type of shank	Figure
<b>H</b>	7/24 taper shank for automatic tool changers (ISO 7388-1)	
<b>J</b>	Combined tapered and threaded shank with short cylinder (Bridgeport R8 type shank)	
<b>K</b>	Flatted cylindrical shank combined with a threaded shank	
<b>L</b>	Flatted cylindrical shank combined with 2° angular flat	
<b>M</b>	Shortened 7/24 taper shank (ISO 297)	
<b>X</b>	Other type of shank	

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### 3.10 Designation symbol identifying size of shank — Position 10

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

- for cylindrical shanks; the nominal diameter in millimeters (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 Manufacturer's information

If manufacturers need to give additional information (e.g. to distinguish between different corner configurations), the designation code should be extended and explanatory details given, e.g., in their catalogues.

The extension is to be separated from the standard code by a hyphen ( - ).

An example of extending the standard code is shown below:

1	2	3	4	5	6	7	8	9	10	Manufacturer's information
<b>A</b>	<b>G</b>	<b>90</b>	<b>E</b>	<b>120</b>	<b>R</b>	<b>025</b>	<b>04</b>	<b>A</b>	<b>12</b>	- .....

#### 5 Additional information about the material of the cutting part

When information is given about the material from which the cutting part of the end mill is made, this shall be given after the designation code, and if necessary after the extension for the manufacturer's information.

An example of extending the standard code to include the manufacturer's additional information and information about the cutting part is shown below:

1	2	3	4	5	6	7	8	9	10	Manufacturer's information	Cutting part material
<b>A</b>	<b>G</b>	<b>90</b>	<b>E</b>	<b>120</b>	<b>R</b>	<b>025</b>	<b>04</b>	<b>A</b>	<b>12</b>	- .....	.....

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