

INTERNATIONAL STANDARD



243

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

Turning tools with carbide tips — External tools

Outils de tour à plaquettes en carbures métalliques — Outils d'extérieur

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Descriptors : tools, carbide tools, lathe tools, dimensions, orientation.

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 29 has reviewed ISO Recommendation R 243 and found it technically suitable for transformation. International Standard ISO 243 therefore replaces ISO Recommendation R 243-1961 to which it is technically identical.

ISO Recommendation R 243 was approved by the Member Bodies of the following countries :

Belgium	India	Portugal
Czechoslovakia	Italy	Romania
France	Mexico	South Africa, Rep. of
Germany	Netherlands	Sweden
Greece	Pakistan	United Kingdom
Hungary	Poland	U.S.S.R.

The Member Bodies of the following countries expressed disapproval of the Recommendation on technical grounds :

Austria
Switzerland
U.S.A.

Turning tools with carbide tips – External tools

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the types and the dimensions of turning tools with carbide tips; it deals only with external tools. It also gives the definition of right-hand and left-hand tools.

Internal tools are the subject of ISO 514; designation and marking are the subject of ISO 504.

The shank sections and the inserts used are selected respectively from those defined in ISO 241 and ISO 242.

2 REFERENCES

ISO 241, *Shanks for turning and planing tools – Types and dimensions of the section.*

ISO 242, *Carbide tips for brazing on turning tools.*

ISO 504, *Turning tools with carbide tips – Designation and marking.*

ISO 514, *Turning tools with carbide tips – Internal tools.*

3 SPECIFICATIONS

3.1 Types of external tools

Only seven types of tools, regarded as those most commonly used, have been retained; except for No. 4, each of these types can be provided as a left-hand or right-hand tool.

Dimension l given in table 2 is the nominal length of the ISO tip. It is equal to :

b for tool No. 4;

$0,8 b$ for tools No. 1, 2, 3, 5 and 6;

$0,4 b$ for tool No. 7.

Dimensions n and p , the 20° angle of tool No. 1, and in particular, the cutting angle of 10° , are given for information only, but should be used in the absence of any specification to the contrary, particularly in the case of tools delivered from stock.

3.2 Shank sections

For the particular case of external tools, only two types of sections are selected from among the various types provided for in ISO 241.

a) the square section $h = b$;

b) the rectangular section with a ratio of $h/b = 1,6$ approximately.

NOTE — The choice between these two sections for any given tool is in accordance with the table for external tools. This choice is based on present-day techniques, but may be subject to revision in the future on the basis of studies to be undertaken by various countries with a view to establishing which type of section is best adapted to its purpose from a technical point of view.

3.3 Overall lengths

Only one range of overall lengths is specified, the length being a function of the height h of the shank, whether of square or rectangular section.

These lengths, ranged approximately in the series of preferred numbers

R 40/2 for h from 10 to 25 mm, and

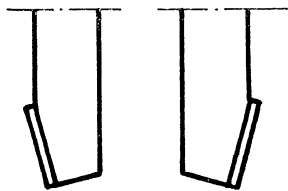
R 40/3 for h from 32 to 63 mm,

are practically a linear expression in terms of h , no value departing by more than 5 mm from the minimum value obtained with the linear formula : $3,6 h + 55$.

4 DEFINITION OF RIGHT-HAND TOOL AND LEFT-HAND TOOL

To define whether the direction of a tool is left-hand or right-hand, it is assumed that the tool in question is mounted on its base on a vertical table, with the leading face towards the onlooker and at the bottom.

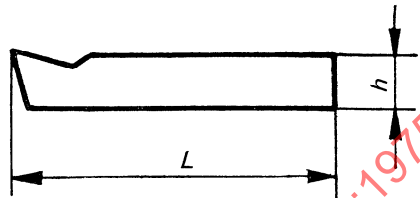
In these conditions, the tool is defined as *right-hand* when its cutting edge is directed towards the right of the onlooker, and as *left-hand* in the opposite case.



5 DIMENSIONS

5.1 Overall lengths

The overall length of the tool is a function of the height h of the shank (square or rectangular section), as given in the following table :



Dimensions in millimetres

Height h	10	12	16	20	25	32	40	50	63
Length L	90	100	110	125	140	170	200	240	280

Tolerance on length L : $+ 5 \%$
 0

5.2 Dimensions of tools No. 1, 2, 3

Cutting angle = 10° (for information only) l = nominal length of standard carbide tip							
Tool designation No.		1		2		3	
Type of carbide tip for a tool	right-hand	A	C	C		A	C
	left-hand	B	C	C		B	C
Tool							
Section $h \times b$	Length L^*	l	n	l	n	l	n
10×10	90	8	4	8	6		
12×12	100	10	5	10	7		
16×16	110	12	6	12	8		
20×20	125	16	8	16	10		
25×25	140	20	10	20	12		
32×32	170	25	12	25	14		
40×40	200	32	16	32	18		
50×50	240	40	20	40	22		
12×8	100					—	—
16×10	110					8	5
20×12	125					10	6
25×16	140					12	8
32×20	170					16	10
40×25	200					20	12
50×32	240					25	14

* Tolerance on length L : $+5\%$
0

NOTES

1 The dimension n , the angle of 20° in tool No. 1, and in particular the cutting angle of 10° are given simply for information, but in the absence of instructions to the contrary, they should be followed for tools delivered from stock.

2 The choice of tip *A* or *B* (according to the end of the tool) and *C*, for tools No. 1, 2 and 3, is left to the manufacturer's discretion. The same applies in all cases to the method of fixing the tip to the tool.

5.3 Dimensions of tools No. 4, 5, 6, 7

Cutting angle = 10° (for information only) l = nominal length of standard carbide tip									
Tool designation No.		4		5		6		7	
Type of carbide tip for a tool	right-hand	C		A C		A C		D	
	left-hand	C		B C		B C		D	
Tool									
Section $h \times b$	Length L^*	l	p	l	n	l	n	l	p
10 × 10	90			—	—	8	4		
12 × 12	100			—	—	10	5		
16 × 16	110			—	—	12	6		
20 × 20	125			16	10	16	8		
25 × 25	140			20	12	20	10		
32 × 32	170			25	16	25	12		
40 × 40	200			32	20	32	14		
50 × 50	240			40	25	40	18		
12 × 8	100	—	—					3	12
16 × 10	110	—	—					4	14
20 × 12	125	12	20					5	16
25 × 16	140	16	25					6	20
32 × 20	170	20	32					8	25
40 × 25	200	25	40					10	32
50 × 32	240	32	50					12	40

* Tolerance on length L : $\begin{matrix} + 5\% \\ 0 \end{matrix}$

NOTES

- 1 The dimensions n and p , and in particular the cutting angle of 10°, are given simply for information, but in the absence of instructions to the contrary, they should be followed for tools delivered from stock.
- 2 The choice of tip A or B (according to the end of the tool) and C , for tools No. 5 and 6, is left to the manufacturer's discretion. The same applies in all cases to the method of fixing the tip to the tool. For tool No. 7, however, the back face of the tip must be brazed.