BS ISO 243:2014

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Turning tools with carbide tips — External tools

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National foreword

This British Standard is the UK implementation of ISO 243:2014.

The UK participation in its preparation was entrusted to Technical Committee MTE/18, Tools tips and inserts for cutting applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL STANDARD

ISO 243

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Turning tools with carbide tips — External tools

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

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 29, *Small tools*, Subcommittee SC 9, *Tools with cutting edges made of hard cutting materials*.

This second edition cancels and replaces the first edition (ISO 243:1975), of which it constitutes a minor revision.

Turning tools with carbide tips — External tools

1 Scope

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.

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

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 241, *Shanks for turning and planing tools — Shapes and dimensions of the section*

ISO 242, *Carbide tips for brazing on turning 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 and Table 3 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 unless otherwise specified, 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 mm to 25 mm, and

R 40/3 for *h* from 32 mm 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. See Figure 1.

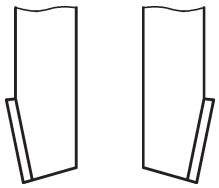


Figure 1 — Right-hand tool and left-hand tool

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 Table 1. See Figure 2.

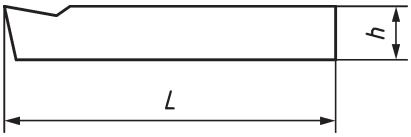


Figure 2 — Dimensions

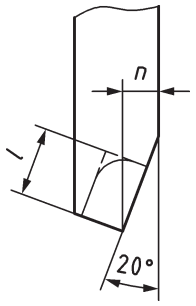
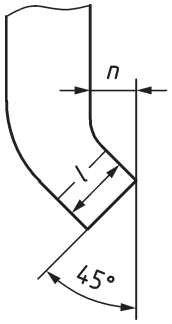
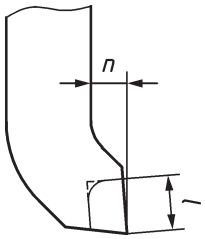
Table 1 — Dimensions

Dimensions in millimetres

Height *h*	10	12	16	20	25	32	40	50	63
Length *L*[a]	90	100	110	125	140	170	200	240	280
[a] Tolerance on length *L*: $^{+5}_{0}$%									

5.2 Dimensions of tools No. 1, 2, 3

Table 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
Type of carbide tip for a tool — left-hand	B	C	C		B	C
Tool: Section $h \times b$ / Length L[a]	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

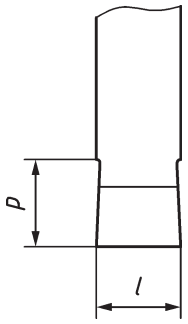
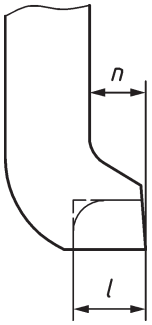
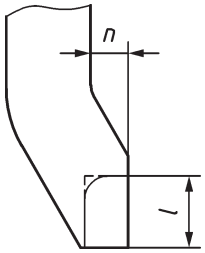
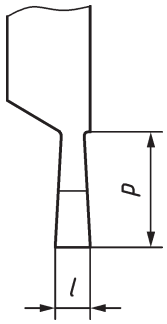
[a] Tolerance on length L: $^{+5}_{0}$ %

NOTE 1 The dimension n, the angle of 20° in tool No. 1, and in particular the cutting angle of 10° are given only for information, but unless otherwise specified, they should be followed for tools delivered from stock.

NOTE 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

Table 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[a]	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

[a] Tolerance on length L: $^{+5}_{0}$ %

NOTE 1 The dimensions n and p, and in particular the cutting angle of 10°, are given only for information, but unless otherwise specified, they should be followed for tools delivered from stock.

NOTE 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.

Annex A
(informative)

Relationship between designations in ISO 243 and ISO 13399 series

Table A.1 — Relationship between designations in ISO 243 and ISO 13399 series

Symbol in ISO 243	**Reference in** ISO 243	**Property name in** ISO 13399	**Symbol in** ISO 13399	**Reference in** ISO 13399
b	Clause 3.2; Clause 5.2, Table 2; Clause 5.3, Table 3	shank width	B	ISO/TS 13399-3 ID-#: 71CF298751FCF
h	Clause 3.2; Clause 5.1, Table 1; Clause 5.2, Table 2; Clause 5.3, Table 3	shank height	H	ISO/TS 13399-3 ID-#: 71CF29883E014
—	Clause 4	hand	HAND	ISO/TS 13399-3 ID-#: 71CF29872F0AB
L	Clause 3.3; Clause 5.1, Table 1; Clause 5.2, Table 2; Clause 5.3, Table 3, style 5, 6	functional length	LF	ISO/TS 13399-3 ID-#: 71CE7A9DFA23A
l	Clause 3.1; Clause 5.2, Table 2; Clause 5.3, Table 3, style 5, 6	cutting edge length	L	ISO/TS 13399-2 ID-#: 71DD6C95DA49B
l	Clause 3.1; Clause 5.3, Table 3, style 4, 7	cutting width	CW	ISO/TS 13399-2 ID-#: 71CEAEBE2B825
n	Clause 3.1; Clause 5.2, Table 2; Clause 5.3, Table 3	functional width 2	WF2	ISO/TS 13399-3 ID-#: 71D193F495583
p	Clause 3.1; Clause 5.3, Table 3	cutting depth maximum	CDX	ISO/TS 13399-3 ID-#: 71CEAEBD5A66A
20°	Clause 5.2, Table 2;	tool lead angle	PSIR	ISO/TS 13399-3 ID-#: 71D078F77616B
45°	Clause 5.2, Table 2;	tool lead angle	PSIR	ISO/TS 13399-3 ID-#: 71D078F77616B

Bibliography

[1] ISO 504, *Turning tools with carbide tips — Designation and marking*

[2] ISO 514, *Turning tools with carbide tips — Internal tools*

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