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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION
R 243

TURNING TOOLS WITH CARBIDE TIPS
METRIC SERIES

1st EDITION

December 1961

For each individual country the only valid standard is the national standard of that country.

Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

BRIEF HISTORY

The ISO Recommendation R 243, *Turning Tools with Carbide Tips – Metric Series*, was drawn up by Technical Committee ISO/TC 29, *Small Tools*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question by the Technical Committee began in 1955 and led, in 1958, to the adoption of a Draft ISO Recommendation.

In September 1959, this Draft ISO Recommendation (No. 309) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Belgium	Hungary	Poland
Burma	India	Portugal
Czechoslovakia	Italy	Romania
France	Mexico	Sweden
Germany	Netherlands	United Kingdom
Greece	Pakistan	U.S.S.R.

Three Member Bodies opposed the approval of the Draft:
Austria, Switzerland, U.S.A.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in December 1961, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 243 December 1961

TURNING TOOLS WITH CARBIDE TIPS

METRIC SERIES

INTRODUCTION

I. SCOPE

This ISO Recommendation relates to turning tools with carbide tips. For the present, it comprises two parts:

1. General
   1.1 Definition of right-hand tool and left-hand tool*
   1.2 Tool lengths
2. External tools.

Internal tools and various other matters, such as marking for example, may be the subjects of future ISO Recommendations.

As far as tool lengths and dimensions of external tools are concerned, this ISO Recommendation is valid for application in metric measure only; corresponding standardization in the inch system of measurement is to be the subject of future study.

The general definitions are applicable, however, whichever system of units of measurement is employed.

The shank sections and tips are selected from those contained in the relevant ISO Recommendations.**

II. SHANK SECTIONS

For the particular case of turning tools with carbide tips, only two types of sections are selected from among the various types provided for in the ISO Recommendation mentioned above:**

(*a*) the square section $h = b$,

(*b*) the rectangular section with a ratio of $\frac{h}{b} = 1.6$ approximately.

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.

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* Although this definition is purely conventional in character, this ISO Recommendation should be regarded as applicable on this point in countries using the inch system of measurement, as well as in countries using the metric system of measurement, in order to avoid all risk of confusion.

** ISO Recommendation R 241 – *Shanks for turning and planing tools. Sections and tolerances,* and ISO Recommendation R 242 – *Carbide tips for turning tools. Metric series.*

III. TOOL 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: $3.6\ h + 55$.

IV. 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

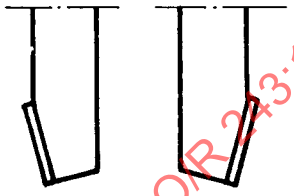
$0.4\ b$ for tool No. 7.

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.

1. GENERAL

1.1 Definition of right-hand tool and left-hand tool

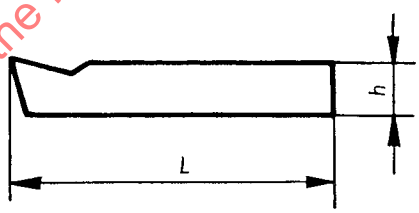
To define whether the direction of a tool is left-hand or right-hand, it is assumed that the tool in question is mounted on its base on a vertical table, with the leading face towards the onlooker and at the bottom.



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.

1.2 Tool lengths

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



Dimensions in millimetres

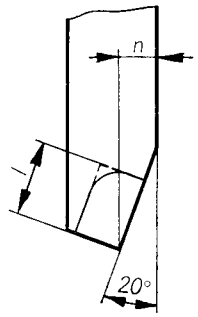
Height h	10	12	16	20	25	32	40	50	63
Length L	90	100	110	125	140	170	200	240	280

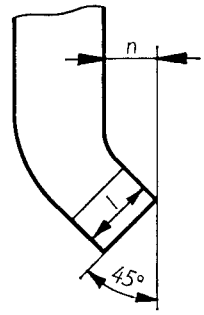
Tolerance on length L: $^{+5\%}_{0}$

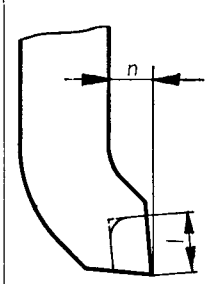
2. EXTERNAL TOOLS

Cutting angle = 10°
(for information only)

l = nominal length of standard carbide tip







Tool designation		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

NOTE

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.

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.

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