

Hardmetal insert tooling —

Part 1: Specification for designation of indexable inserts for cutting tools

ICS 25.100.01

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Machine, Engineers and Hand Tools Standards Policy Committee (MTE/-) to Technical Committee MTE/18, upon which the following bodies were represented:

- British Hardmetal Association
- Federation of British Engineers' Tool Manufacturers
- Coopted member

This British Standard, having been prepared under the direction of the Machine, Engineers and Hand Tools Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 May 1993

© BSI 07-1999

First published September 1986
Second edition

The following BSI references relate to the work on this standard:
Committee reference MTE/18
Draft announced in *BSI News* May 1993

ISBN 0 580 21789 2

Amendments issued since publication

Amd. No.	Date	Comments
10899	February 2001	Indicated by a sideline

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
1 Scope	1
2 Normative references	1
3 Explanation of designation code	1
4 Symbols	2
5 Optional symbols	10
Annex A (informative) Symbols for insert size (reference ⑤) according to standardized inscribed circles for equilateral and round inserts	12
Annex B (informative) Symbols for standardized insert thicknesses (reference ⑥)	13
Figure 1 — Case 1: Inserts with odd numbers of sides and rounded corners	3
Figure 2 — Case 2: Inserts with even numbers of sides and rounded corners	3
Figure 3 — Case 3: Inserts with wiper edges	3
Figure 4 — Thickness of an insert	8
List of references	Inside back cover

National foreword

This Part of BS 4193 has been prepared under the direction of the Machine, Engineers and Hand Tools Standards Policy Committee. It is identical with ISO 1832:1991 *Indexable inserts for cutting tools — Designation*, including amendment 1:1999, prepared by Technical Committee ISO/TC 29, Small tools, Sub Committee SC9, Inserts in cutting material, and published by the International Organization for Standardization (ISO).

This Part supersedes BS 4193-1:1986 which is withdrawn.

Cross-references. The Technical Committee has reviewed the provisions of ISO 3002-1:1982, to which normative reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

Sidelining in this document indicates the most recent changes by amendment.

The BSI copyright displayed in this document indicates when the document was last issued.

1 Scope

This International Standard establishes a code for the designation of the usual types of indexable inserts for cutting tools, in hardmetal (carbide) or any other cutting materials, such as ceramics, etc., in order to simplify orders and specifications for such inserts.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3002-1:1982, *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*.

3 Explanation of designation code

The designation code comprises nine symbols for designating the dimensions and other characteristics of indexable inserts; the first seven symbols shall be used in every designation. One or both of the last two symbols may be used when necessary.

In addition to the standardized designation (symbols ① to ⑨), a supplementary symbol consisting of one or two characters may be added by the manufacturer for a better description of his products (for example, different chip breakers), provided that this symbol is separated from the standardized designation by a dash and that it does not contain letters specified for references ⑧ and ⑨.

No addition to or extension of the designation specified in this International Standard shall be made without consulting Technical Committee ISO/TC 29 and receiving its agreement. Rather than adding symbols not provided for in this system, it is preferable to add to the designation in accordance with this International Standard all necessary explanations in the form of detailed sketches or specifications.

However, if the symbol “X” is used in position 4 of the designation, it is possible to use, in positions 5, 6 and 7, symbols representing values not appearing in this International Standard but which shall be described explicitly by the sketch or the detailed specifications given in 4.4.

The significance of the symbols constituting the designation is as follows:

- | | | |
|--|---|--------------------|
| ① Letter symbol identifying insert shape (see 4.1). | } | Compulsory symbols |
| ② Letter symbol identifying normal clearance (see 4.2). | | |
| ③ Letter symbol identifying tolerance class (see 4.3). | | |
| ④ Letter symbol indicating fixing and/or chip-breakers (see 4.4). | | |
| ⑤ Number symbol identifying insert size (see 4.5). | | |
| ⑥ Number symbol identifying insert thickness (see 4.6). | | |
| ⑦ Letter or number symbol identifying insert corner configuration (see 4.7). | | |
| ⑧ Letter symbol indicating cutting edge condition (see 5.1). | } | Optional symbols |
| ⑨ Letter symbol identifying cutting direction (see 5.2). | | |

⑩ Manufacturer's symbol, if desired

EXAMPLE

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	—	⑩
Metric dimensions:	T	P	G	N	16	03	08	E	N	—	...
Inch dimensions:	T	P	G	N	3	2	2	E	N	—	...

NOTE The designations and symbols of the different angles allowing geometrical definition of the indexable inserts are in conformity with ISO 3002-1, with the following conventions:

- the insert is considered in the tool-in-hand system;
- the reference plane P_r is parallel to the base of the insert;
- the assumed working plane P_f is perpendicular to the reference plane P_r and is parallel to the assumed direction of feed motion. This plane is defined only in the case of inserts having one or more wiper edges.

The assumed direction of feed motion is taken parallel to the considered wiper edge (see note 1 of Table 9).

4 Symbols

4.1 Symbol for insert shape — Reference ①

See Table 1.

Table 1

Type	Letter symbol	Description of shape	Included angle, ε_r	Figure
I Equilateral and equiangular inserts	H	Hexagonal inserts	120°	
	O	Octagonal inserts	135°	
	P	Pentagonal inserts	108°	
	S	Square inserts	90°	
	T	Triangular inserts	60°	
II Equilateral but non-equiangular inserts	C	Rhombic inserts	80° ^a	
	D		55° ^a	
	E		75° ^a	
	M		86° ^a	
	V		35° ^a	
	W	Hexagonal inserts	80° ^a	
III Non-equilateral but equiangular inserts	L	Rectangular inserts	90°	
IV Non-equilateral and non-equiangular inserts	A	Parallelogram-shaped inserts	85° ^a	
	B		82° ^a	
	K		55° ^a	
V Round inserts	R	Round inserts	—	

^a The included angle considered is always the smaller angle.