भारतीय मानक
Indian Standard

IS 9897 : 2024
ISO 1832 : 2017

कटिंग औजारों के लिए परिवर्त्य इन्सर्ट — अभिनाम

(चौथा पुनरीक्षण)

Indexable Inserts for Cutting Tools — Designation

(Fourth Revision)

ICS 25.100.01

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Cutting Tools Sectional Committee, PGD 32

NATIONAL FOREWORD

This Indian Standard (Fourth Revision) which is identical to ISO 1832 : 2017 'Indexable Inserts for Cutting Tools — Designation' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on recommendation of the Cutting Tools Sectional Committee and approval of the Production and General Engineering of Division Council.

This standard was first published in 1993 based on ISO 1832 : 1985 and was subsequently revised thrice. The fourth revision of this standard has been undertaken to align it with latest version of ISO 1832.

The main changes have been incoporated in this revision are as follows:

a) Normative references in **2** have been updated;
b) Table 5 has been modified by including new variety of rhombic inserts of shape V having 12.7 mm diameter of inscribed circle; and
c) Table 17 has been modified by including letter symbol for full cutting edge length.

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to t his standard, they should be read as 'Indian Standard'; and
b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	Corresponding Indian Standard	Degree of Equivalence
ISO 513 Classificatio and application of hard cutting materials for metal removal with defined cutting edges — Designation of the main groups and groups of application	IS 2428 : 2024/ISO 513 : 2012 Classification and application of hard cutting materials for metal removal with defined cutting edges — Designation of the main groups and groups of application (*third revision*)	Identical
ISO 3002-1 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	IS 11522 (Part 1) : 1986/ISO 3002-1 : 1982 Recommendations for basic quantities in cutting and grinding: Part 1 Geometry of the active part of cutting tools, general terms, reference systems, tool and working angles and chip breakers	Identical
ISO 16463 Polycrystalline diamond inserts, tipped — Dimensions, types	IS 17027 : 2018/ISO 16463 : 2014 Polycrystalline diamond inserts, tipped — Dimensions, types	Identical

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Indian Standard

INDEXABLE INSERTS FOR CUTTING TOOLS —

DESIGNATION

(Fourth Revision)

1 Scope

This document establishes a code for the designation of the usual types of indexable inserts for cutting tools in hard cutting materials or any other cutting materials, in order to simplify orders and specifications for such inserts.

It also specifies the designations for cubic boron nitride (BL, BH, BC) inserts, tipped and solid, as well as polycrystalline diamond (DP) inserts, tipped.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 513, *Classification and application of hard cutting materials for metal removal with defined cutting edges — Designation of the main groups and groups of application*

ISO 3002-1, *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*

ISO 16462, *Cubic boron nitride inserts, tipped or solid — Dimensions, types*

ISO 16463, *Polycristalline diamond inserts, tipped — Dimensions, types*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Explanation of designation code

For indexable inserts, the designation code comprises nine symbols for designating the dimensions and other characteristics; the first seven symbols (symbols ① to ⑦) shall be used in every designation. Symbols ⑧ and ⑨ may be used when necessary.

For tipped inserts in accordance with ISO 16462 and ISO 16463, the designation code comprises 12 symbols for designating the dimensions and other characteristics; symbols ① to ⑦ as well as ⑪ and ⑫ shall be used in every designation. Symbols ⑧, ⑨ and ⑩ may be used when necessary. Symbols ⑪ and ⑫ shall be separated by a dash as shown in Clause 4, example 2.

In addition to the standardized designation for indexable inserts and tipped inserts, a supplementary symbol ⑬ consisting of one or two characters may be added by the manufacturer for a better description of his/her product (for example, different chip breakers), provided this symbol is separated from the standardized designation by a dash and that it does not contain letters specific to references ⑧, ⑨ and ⑩.

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

However, if the letter symbol "X" is used in position 4 of the designation, it is allowed to use, in positions 5, 6 and 7, symbols representing values not appearing in this document, but which shall be described explicitly using the sketch or the detailed specifications given in 5.4.

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

① Letter symbol identifying **insert shape (see 5.1)**

② Letter symbol identifying **normal clearance (see 5.2)**

③ Letter symbol identifying **tolerance class (see 5.3)**

④ Letter symbol indicating **fixing and/or chip breakers (see 5.4)**

⑤ Number symbol identifying **insert size (see 5.5)**

⑥ Number symbol identifying **insert thickness (see 5.6)**

Compulsory symbols for indexable inserts

⑦ Letter or number symbol identifying **insert corner configuration (see 5.7)**

⑧ Letter symbol indicating (optional symbol for indexable and tipped inserts) **cutting edge condition (see 6.2)**

⑨ Letter symbol identifying (optional symbol for indexable and tipped inserts) **cutting direction (see 6.3)**

⑩ Number symbol identifying (optional symbol for tipped inserts) **size of cutting edge condition (see 7.2)**

⑪ Letter symbol identifying **style of tipped or solid cutting edge and number of tipped corners (see 7.3)**

⑫ Letter or number symbol identifying **length of tipped cutting edge (see 7.4)**

Compulsory symbols for tipped inserts according to ISO 16462 and ISO 16463, except as noted

⑬ Manufacturer's symbol or cutting material designation according to ISO 513 (optional symbol for indexable and tipped inserts)

EXAMPLE 1   General designation

		①	②	③	④	⑤	⑥	⑦	⑧	⑨		⑬
Metric dimensions:		T	P	G	N	16	03	08	E	N	—	...
Inch dimensions:		T	P	G	N	3	2	2	E	N	—	...

EXAMPLE 2   Designation of inserts according to ISO 16462 and ISO 16463

	①	②	③	④	⑤	⑥	⑦	⑧	⑩	⑨	⑪	⑫	⑬
Designation of insert for turning	S	N	M	A	15	06	08	E		(N)	—	B	L	—	...
Designation of insert for milling	T	P	G	T	16	T3	AP	S	01520	R	—	M	028	—	...

The designations and symbols of the different angles allowing geometrical definition of the indexable inserts shall conform 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 to Table 9).

For the relationship between designations in this document and the ISO 13399 series, see Annex C.

5   Symbols

### 5.1   Symbol for insert shape — Reference ①

See Table 1.

Table 1
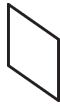
Type		Letter symbol	Description of shape	Included angle, ε_r	Illustration
I	Equilateral and equian-gular inserts	H	Hexagonal inserts	120°	⬡
		O	Octagonal inserts	135°	⯃
		P	Pentagonal inserts	108°	⬠
		S	Square inserts	90°	▢
		T	Triangular inserts	60°	△
[a] The smaller angle is always the included angle that is considered.					

3

Table 1 *(continued)*
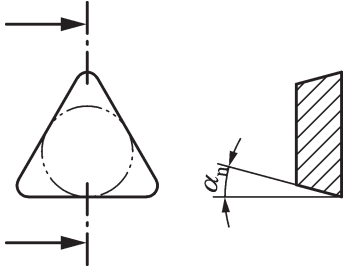
Type		Letter symbol	Description of shape	Included angle, ε_r	Illustration
II	Equilateral but non-equiangular inserts	C	Rhombic inserts	80°a	
		D		55°a	
		E		75°a	
		M		86°a	
		V		35°a	
		W	Trigon inserts	80°a	
III	Non-equilateral but equiangular inserts	L	Rectangular inserts	90°	
IV	Non-equilateral and non-equiangular inserts	A	Parallelogram-shaped inserts	85°a	
		B		82°a	
		K		55°a	
V	Round inserts	R	Round inserts	—	

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

5.2 Symbol for normal clearance — Reference ②

See Table 2.

Table 2

Letter symbol
For normal clearance, choose, from the letter symbols listed below, the one that corresponds to the major cutting edge (see the figure below).
If (in spite of different clearances) all cutting edges have to be used as major cutting edges, the symbol to be used for the designation of the normal clearance shall be the symbol applicable to the normal clearance of the longer cutting edge, which is also considered the major cutting edge for the indication of the insert size (see reference ⑤).

	A — 3°
	B — 5°
	C — 7°
	D — 15°
	E — 20°
	F — 25°
	G — 30°
	N — 0°
	P — 11°
	O — Other normal clearances requiring special specification

5.3 Symbol for tolerance class — Reference ③

See Table 3.

The dimensions concerned are *d* (nominal diameter of the inscribed circle of the insert), *s* (thickness of the insert) and *m*. For this last dimension, the three cases represented in Figures 1 to 3 are distinguished.
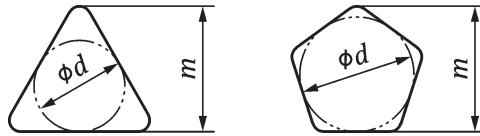
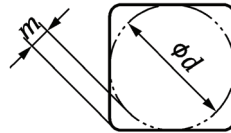**Figure 1 — Case 1: inserts with odd numbers of sides and rounded corners**

Figure 2 — Case 2: inserts with even numbers of sides and rounded corners
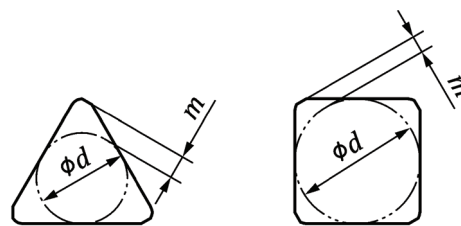

Figure 3 — Case 3: inserts with wiper edges (see Note 1 in Table 9)

Table 3

Letter	Tolerance in millimetres			Tolerance in inches		
	d	m	s	d	m	s
A[a]	±0,025	±0,005	±0,025	±0,001	±0,000 2	±0,001
F[a]	±0,013	±0,005	±0,025	±0,000 5	±0,000 2	±0,001
C[a]	±0,025	±0,013	±0,025	±0,001	±0,000 5	±0,001
H	±0,013	±0,013	±0,025	±0,000 5	±0,000 5	±0,001
E	±0,025	±0,025	±0,025	±0,001	±0,001	±0,001
G	±0,025	±0,025	±0,13	±0,001	±0,001	±0,005
J[a]	from ±0,05[b] to ±0,15[b]	±0,005	±0,025	from ±0,002[b] to ±0,006[b]	±0,000 2	±0,001
K[a]	from ±0,05[b] to ±0,15[b]	±0,013	±0,025	from ±0,002[b] to ±0,006[b]	±0,000 5	±0,001
L[a]	from ±0,05[b] to ±0,15[b]	±0,025	±0,025	from ±0,002[b] to ±0,006[b]	±0,001	±0,001
M	from ±0,05[b] to ±0,15[b]	from ±0,08[b] to ±0,2[b]	±0,13	from ±0,002[b] to ±0,006[b]	from ±0,003[b] to ±0,008[b]	±0,005
N	from ±0,05[b] to ±0,15[b]	from ±0,08[b] to ±0,2[b]	±0,025	from ±0,002[b] to ±0,006[b]	from ±0,003[b] to ±0,008[b]	±0,001
U	from ±0,08[b] to ±0,25[b]	from ±0,13[b] to ±0,38[b]	±0,13	from ±0,003[b] to ±0,01[b]	from ±0,005[b] to ±0,015[b]	±0,005

a   These tolerance classes normally apply to indexable inserts with wiper edges.

b   The tolerance is dependent upon the insert size (see Tables 4 and 5) and should be indicated for insert according to the corresponding dimensional standards.

Tolerances on *d* for tolerance classes J, K, L, M, N and U for inserts of shapes H, O, P, S, T, C, E, M, W and R and tolerances on *m* for tolerance classes M, N and U for inserts with an included angle of 60° or more, of shapes H, O, P, S, T, C, E, M and W, are indicated in Table 4.

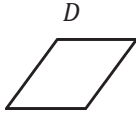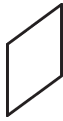**Table 4**

Diameter of inscribed circle *d*		Tolerance on *d*				Tolerance on *m*			
		Classes J, K, L, M, N		Class U		Classes M and N		Class U	
mm	in	mm	in	mm	in	mm	in	mm	in
4,76	3/16	±0,05	±0,002	±0,08	±0,003	±0,08	±0,003	±0,13	±0,005
5,56	7/32								
6[a]	—								
6,35	1/4								
7,94	5/16								
8[a]	—								
9,525	3/8								
10[a]	—								
12[a]	—	±0,08	±0,003	±0,13	±0,005	±0,13	±0,005	±0,2	±0,008
12,7	1/2								
15,875	5/8	±0,1	±0,004	±0,18	±0,007	±0,15	±0,006	±0,27	±0,011
16[a]	—								
19,05	3/4								
20[a]	—								
25[a]	—	±0,13	±0,005	±0,25	±0,01	±0,18	±0,007	±0,38	±0,015
25,4	1								
31,75	1 1/4	±0,15	±0,006	±0,25	±0,01	±0,2	±0,008	±0,38	±0,15
32[a]	—								
		H	**O**	**P**	**S**	**T**	**C, E, M**	**W**	**R** (tolerance on *d* only)
Shape of the inserts concerned		⬡	⬢	⬠	▢	△	▱	△	◯
[a] Applies only to round inserts.									

In the case of rhombic inserts with an included angle of 55° (shape D) and of 35° (shape V), the values for tolerance classes M and N on *d* and *m* are indicated in Table 5.
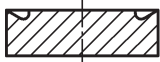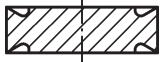
Table 5

Diameter of inscribed circle *d*		Tolerance on *d*		Tolerance on *m*		Shape of the inserts concerned
		Classes M and N		Classes M and N		
mm	in	mm	in	mm	in	
5,56	7/32	± 0,05	± 0,002	± 0,11	± 0,004	*D*
6,35	1/4					
7,94	5/16					
9,525	3/8					
12,7	1/2	± 0,08	± 0,003	± 0,15	± 0,006	
15,875	5/8	± 0,1	± 0,004	± 0,18	± 0,007	
19,05	3/4					
6,35	1/4	± 0,05	± 0,002	± 0,16	± 0,006	*V*
7,94	5/16					
9,525	3/8					
12,7	1/2	± 0,08	± 0,003	± 0,25	± 0,010	

5.4 Symbol for fixing and/or chip breakers — Reference ④

See Table 6.

Table 6

Letter symbol	Fixing	Chip breakers[a]	Illustration
N	Without fixing hole	Without chip breakers	
R		Chip breakers on one face only	
F		Chip breakers on both faces	
A	With cylindrical fixing hole	Without chip breakers	
M		Chip breakers on one face only	
G		Chip breakers on both faces	
W	With partly cylindrical fixing hole, 40° to 60° countersink on one side only	Without chip breakers	
T		Chip breakers on one face only	

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[a] The definition of chip breakers is given in ISO 3002-1.

[b] Non-equilateral inserts shall always be designated in reference ④ by X because the indication of width (measured perpendicularly on the major cutting edge or perpendicularly on the longer edge) and details concerning special features or construction are necessary.

The letter symbol X shall not be used for those insert shapes which are not defined under reference ①.

Table 6 *(continued)*

Letter symbol	Fixing	Chip breakers[a]	Illustration
Q	With partly cylindrical fixing hole, 40° to 60° countersinks on both sides	Without chip breakers	
U		Chip breakers on both faces	
B	With partly cylindrical fixing hole, 70° to 90° countersink on one side only	Without chip breakers	
H		Chip breakers on one face only	
C	With partly cylindrical fixing hole, 70° to 90° countersinks on both sides	Without chip breakers	
J		Chip breakers on both faces	
X[b]	With dimensions or details requiring detailed explanation, a sketch or additional specifications		—

a   The definition of chip breakers is given in ISO 3002-1.

b   Non-equilateral inserts shall always be designated in reference ④ by X because the indication of width (measured perpendicularly on the major cutting edge or perpendicularly on the longer edge) and details concerning special features or construction are necessary.

The letter symbol X shall not be used for those insert shapes which are not defined under reference ①.

5.5 Symbol for insert size — Reference ⑤

See Table 7.

Table 7

Type	Number symbol

I – II
Equilateral inserts
	— In countries using the metric system, choose the value of the side length as the symbol of designation and disregard any decimals. If the resulting symbol has only one digit, it shall be preceded by a zero.
	
	EXAMPLE Edge length: 15,5 mm
	            Symbol of designation: 15
	            Edge length: 9,525 mm
	            Symbol of designation: 09
	
	— In countries using the inch system, choose the value of the inscribed circle as the symbol of designation.
	
	The symbol is the numerator of the fraction measured in $1/8$ in.
	
	a) It is a one-digit symbol when the numerator is a whole number.
	
	EXAMPLE Diameter of inscribed circle: $1/2$ in
	            Symbol of designation: 4 ($1/2 = 4/8$)
	
	b) It is a two-digit symbol when the numerator is not a whole number.
	
	EXAMPLE Diameter of inscribed circle: $5/16$ in
	            Symbol of designation: 2,5 ($5/16 = 2{,}5/8$)
	
	NOTE Annex A gives the symbols for insert size for the usually standardized diameters of the inscribed circle of equilateral inserts.

III – IV
Non-equilateral inserts
	The symbol of designation for the insert size is always given for the major cutting edge or the longer cutting edge. The indication of other dimensions shall be made by means of a sketch or detailed explanation, indicated at position 4 by the symbol X.
	
	— In countries using the metric system, the symbol of designation is the length, disregarding any decimals.
	
	EXAMPLE Length of the main edge: 19,5 mm
	            Symbol of designation: 19
	
	— In countries using the inch system, the symbol of designation is the numerator of the fraction for the value in $1/4$ in.
	
	EXAMPLE Length of the main edge: $3/4$ in
	            Symbol of designation: 3

V Round inserts	— In countries using the metric system, choose the value of the diameter as the symbol of designation and disregarding any decimals. EXAMPLE Insert diameter: 15,875 mm Symbol of designation: 15 For inserts having rounded metric diameters, the same rule is valid, combined with a special symbol at reference ⑦ (see 5.7). — In countries using the inch system, proceed as for equilateral inserts (type I – II).

5.6 Symbol for insert thickness — Reference ⑥

See Table 8.

The thickness, *s*, of an insert is defined as the distance between the cutting edge of the corner and the opposing supporting surface of the insert; see Figures 4 a), b) and c).
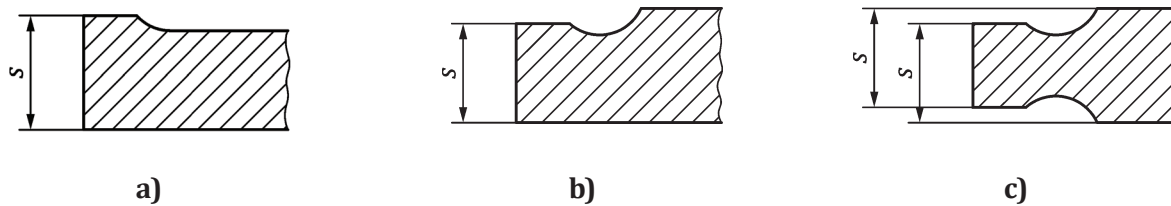
Figure 4 — Thickness of an insert

Rounded or chamfered cutting edges are considered sharp cutting edges.

Table 8

Number symbol
— In countries using the metric system, take the numerical value of the thickness as the symbol of designation for the insert thickness, disregarding any decimals. If the resulting symbol has only one digit, it shall be preceded by 0 (zero).
EXAMPLE   Insert thickness: 3,18 mm   Symbol of designation: 03
As an exception for inserts having thicknesses of 1,98 mm and 3,97 mm, in order to distinguish them from those having thicknesses of 1,59 mm (symbol 01) and 3,18 mm (symbol 03), precede the digit by the letter T.
EXAMPLE   Insert thickness: 3,97 mm   Symbol of designation: T3
— In countries using the inch system, the symbol of designation for the insert thickness is the numerator of the fraction measured in $1/16$ in.
a) It is a one-digit symbol when the numerator is a whole number.
EXAMPLE   Insert thickness: $1/8$ in   Symbol of designation: 2 ($1/8 = 2/16$)
b) It is a two-digit symbol when the numerator is a whole number.
EXAMPLE   Insert thickness: $3/32$ in   Symbol of designation: 1,5 ($3/32 = 1,5/16$)
NOTE   Annex B gives the symbols for standardized insert thicknesses.

5.7 Symbol for insert corner configuration — Reference ⑦

See Table 9.

Table 9

Number or letter symbol
a) If the inserts have rounded corners, the symbol of designation is represented

1) in countries using the metric system, by the value of the corner radius given in 0,1 mm; if the number is less than 10, it should be preceded by 0 (zero).

> EXAMPLE   Corner radius: 0,8 mm
>   Designation symbol: 08

If the corner is not rounded, use the symbol of designation 00 (zero-zero).

2) in countries using the inch system, by the following figures:

0 — Sharp corner (not rounded)
1 — Corner radius $1/64$ in
2 — Corner radius $1/32$ in
3 — Corner radius $3/64$ in
4 — Corner radius $1/16$ in
6 — Corner radius $3/32$ in
8 — Corner radius $1/8$ in
X — Any other corner radius

b) If inserts have wiper edges, use, in the order given, the following symbols of designation:

For cutting edge angel κ_r

A — 45°
D — 60°
E — 75°
F — 85°
P — 90°
Z — Any other cutting edge angle

For wiper edge normal clearance α'_n

A — 3°
B — 5°
C — 7°
D — 15°
E — 20°
F — 25°
G — 30°
N — 0°
P — 11°
Z — Any other wiper edge normal clearance

NOTE 1   The wiper edge is a part of the minor cutting edge.

Key

1 major cutting edge

2 chamfered corner

3 wiper edge

4 minor cutting edge

a Assumed direction of feed motion.

NOTE 2   Inserts with wiper edge can or cannot have chamfered corners, depending on their type. The designation for indexable inserts gives no information as to whether the inserts have or do not have chamfered corners. For standardized inserts, this information is given in dimensional standards; for non-standardized inserts, it is given in suppliers' catalogues.

c) To supplement the designation in position 7 for round inserts, countries using the metric system shall indicate

— 00 (zero-zero) if the diameter is converted from an inch value;
— M0 (M-zero) if the diameter is a metric one.

6 Optional symbols for indexable inserts

6.1 General

The compulsory designation for indexable inserts other than those specified in ISO 16462 and ISO 16463 comprises the seven symbols given in 5.1 to 5.7. As stated in Clause 4, the symbols given in 6.2 and 6.3 may be used when necessary.
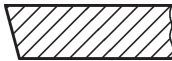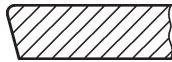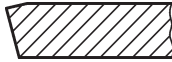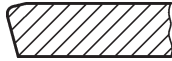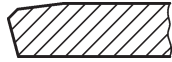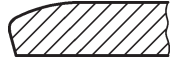
If only one symbol is needed (cutting edge condition or cutting direction), it shall occupy position 8. If both cutting edge condition and cutting direction are to be specified, the two symbols shall occupy positions 8 and 9, respectively.

Symbols given in 6.2 and 6.3 may also be used for designating tipped inserts in accordance with ISO 16462 and ISO 16463 where necessary.

6.2 Symbol for cutting edge condition — Reference ⑧

See Table 10.

Table 10

Letter symbol	Cutting edge condition	Illustration
F	Sharp cutting edges	
E	Rounded cutting edges	
T	Chamfered cutting edges	
S	Chamfered and rounded cutting edges	
K	Double chamfered cutting edge	
P	Double chamfered and rounded cutting edge	

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6.3 Symbol for the corner type and the application of the insert (direction of feed motion) — Reference ⑨

See Table 11.

Table 11

Letter symbol	Corner type	Application of the insert	Illustration
R	Right-hand insert	For non-equilateral and non-equiangular inserts and for all inserts with asymmetrical corners and/or asymmetrical chip breaker, permitting the use of the insert in only one direction of feed motion	 a Direction of feed motion.
L	Left-hand insert		 a Direction of feed motion.
N	Neutral insert	For all inserts with symmetrical corners and symmetrical chip breaker, permitting the use of the insert in both directions of feed motion	 a Direction of feed motion.

7   Additional symbols for tipped inserts

7.1   General

Number symbols ⑪ and ⑫ given in 7.3 and 7.4 shall be used for designating tipped inserts in accordance with ISO 16462 and ISO 16463. Symbol ⑩ given in 7.2 may be used when necessary. Number symbols ⑪ and ⑫ shall be separated by a dash as shown in Clause 4, example 2.

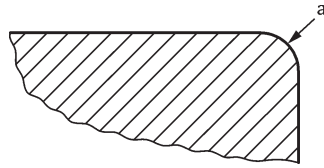### 7.2   Size of cutting edge condition — Reference ⑩

7.2.1   General

The maximum allowable shall be a five-digit number symbol, depending on the cutting edge condition. For the different kinds of cutting edge conditions, see Figures 5 to 9 and Tables 12 to 15.

7.2.2   E = rounded

There is no coding of the size.

EXAMPLE   SNMA150608E

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Key
^a Honing.

Figure 5 — Illustration of a rounded cutting edge

7.2.3 T = chamfered

Five-digit number symbol

— b_γ – T-land size in 1/100 mm: three-digit

— γ_b – T-land angle: two-digit
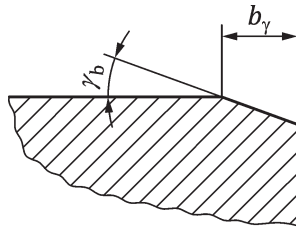
Figure 6 — Illustration of a chamfered cutting edge

Table 12

Number symbol	b_γ mm	Number symbol	γ_b
005	0,05	05	5°
010	0,10	10	10°
015	0,15	15	15°
020	0,20	**20**	**20°**
025	0,25	25	25°
030	0,30	30	30°
050	**0,50**		
070	0,70		
100	1,00		
150	1,50		
200	2,00		

EXAMPLE   SNMA150608<u>T05020</u>

7.2.4 S = chamfered and rounded

Five-digit number symbol

— b_γ – T-land size in 1/100 mm: three-digit

— γ_b – T-land angle: two-digit

— rounding: no code
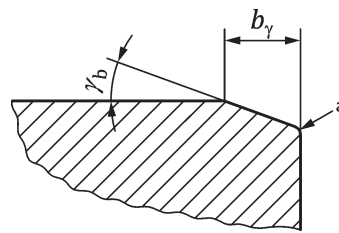
Key

a   Honing.

Figure 7 — Illustration of a chamfered and rounded cutting edge

Table 13

Number symbol	b_γ mm	Number symbol	γ_b
005	0,05	05	5°
010	0,10	10	10°
015	0,15	15	15°
020	0,20	**20**	**20°**
025	0,25	25	25°
030	0,30	30	30°
050	**0,50**		
070	0,70		
100	1,00		
150	1,50		
200	2,00		

EXAMPLE   SNMA150608<u>S05020</u>

7.2.5   K = double chamfered

Five-digit number symbol

— $b_{\gamma 1}$ – T-land size in 1/100 mm: three-digit

— γ_{b1} – T-land angle: two-digit

— $b_{\gamma 2} \times \gamma_{b2}$ dependent on $b_{\gamma 1} \times \gamma_{b1}$
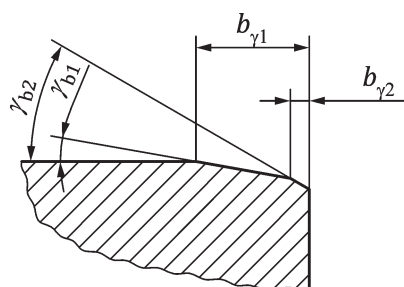
Figure 8 — Illustration of a double chamfered cutting edge

Table 14

Number symbol	$b_{\gamma1}$ mm	γ_{b1}	$b_{\gamma2}$ mm	γ_{b2}
05015	0,50	15°	0,10	30°
07015	0,70	15°	0,15	30°
10015	1,00	15°	0,20	30°
15010	**1,50**	**10°**	**0,25**	**30°**
20010	2,00	10°	0,25	30°

EXAMPLE   SNMA150608K15010

7.2.6   P = double chamfered and rounded

Five-digit number symbol

— $b_{\gamma1}$ — T-land size in 1/100 mm: three-digit

— γ_{b1} — T-land angle: two-digit

— $b_{\gamma2} \times \gamma_{b2}$ dependent on $b_{\gamma1} \times \gamma_{b1}$

— rounding: no code
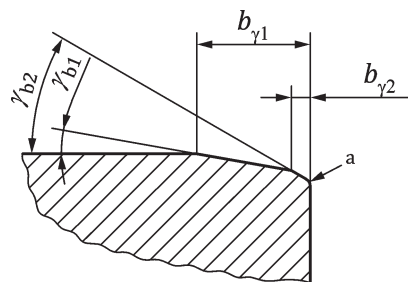
Key
a   Honing.

Figure 9 — Illustration of a double chamfered and rounded cutting edge

Table 15

Number symbol	$b_{\gamma1}$ mm	γ_{b1}	$b_{\gamma2}$ mm	γ_{b2}
05015	0,50	15°	0,10	30°
07015	0,70	15°	0,15	30°
10015	1,00	15°	0,20	30°
15010	**1,50**	**10°**	**0,25**	**30°**
20010	2,00	10°	0,25	30°

EXAMPLE   SNMA150608P15010

7.3   Style of tipped or solid cutting edge and number of tipped corners — Reference ⑪

The one-digit letter symbol is given in Table 16.

Table 16
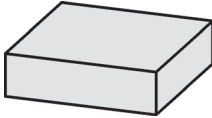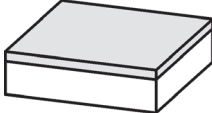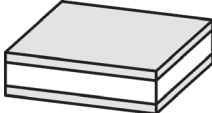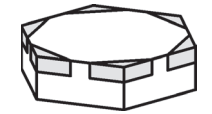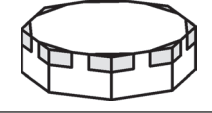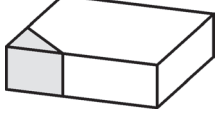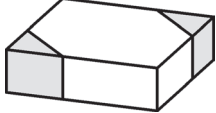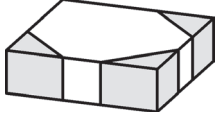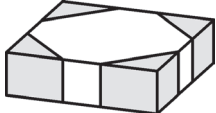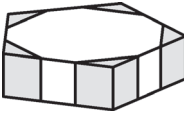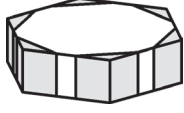
Letter symbol	Illustration	Description
S		solid
F		full face — one-sided
E		full face — two-sided
A		tipped — one-sided — one corner
B		tipped — one sided — two corners
C		tipped — one sided — three corners
D		tipped — one sided — four corners
G		tipped — one sided — five corners
H		tipped — one sided — six corners
J		tipped — one sided — eight corners
K		tipped — two sided — one corner
L		tipped — two sided — two corners
M		tipped — two sided — three corners

Table 16 *(continued)*

Letter symbol	Illustration	Description
N		tipped — two sided — four corners
P		tipped — two sided — five corners
Q		tipped — two sided — six corners
R		tipped — two sided — eight corners
T		tipped — full thickness — one corner
U		tipped — full thickness — two corners
V		tipped — full thickness — three corners
W		tipped — full thickness — four corners
X		tipped — full thickness — five corners
Y		tipped — full thickness — six corners
Z		tipped — full thickness — eight corners

EXAMPLE   SNMA150608S05020-<u>B</u>

7.4   Length of tipped cutting edge — Reference ⑫

For the one-digit letter symbol, see <u>Table 17</u>.

Table 17

Letter symbol	Description	Cutting edge length l_{1min}
L	long	
S	short	Given in ISO 16462 and ISO 16463
F	full cutting edge length	

a) Letter symbols "L" and "S"

— this symbol may appear on letter symbols A, B, C, D, G, H, J, K, L, M, N, P, Q, R, T, U, V, W, X, Y, Z, contained in Table 16;

— cutting edge length is according to standard length.

b) Letter symbol "F"

— this symbol may appear on letter symbols A, B, K, L, T, U, S, F, E, contained in Table 16.

For three-digit number symbol, if the tip length is not full cutting edge length or in conformity with the standard length, the effective tip length shall be indicated as a three-digit number symbol which gives the length in 1/10 mm. If the tip length is less than 10,0 mm, the symbol shall be prefixed by zero(s) (0) (e.g. tipped cutting edge length 4,5 mm = 045 tipped cutting edge length 10,7 mm = 107).

EXAMPLE   Insert with 90° included angle (S), normal clearance angle 0° (N), tolerance class (M), with cylindrical fixing hole and no chip breakers (A), cutting edge length 15,875 mm (15), insert thickness 6,35 mm (06), corner radius 0,8 mm (08), cutting edge condition chamfered and rounded (S), T-land size 0,5 mm (050), T-land angle 20° (20), tipped on one side with two corners (B), tip length l_1 = 3,0 mm (L)

SNMA150608S05020-BL

or

Insert with 90° included angle (S), normal clearance angle 0° (N), tolerance class (M), with cylindrical fixing hole and no chip breakers (A), cutting edge length 15,875 mm (15), insert thickness 6,35 mm (06), corner radius 0,8 mm (08), cutting edge condition chamfered and rounded (S), T-land size 0,5 mm (050), T-land angle 20° (20), tipped on one side with two corners (B), tip length l_1 = 4,5 mm (045)

SNMA150608S05020-B045

Annex A
(informative)

Symbols for insert size (reference ⑤) according to standardized inscribed circles for equilateral and round inserts

A.1 Equilateral and round inserts: "non-metric"

See Table A.1.

Table A.1

Diameter of inscribed circle d		Number symbol for insert size (reference ⑤) for insert shape											
mm	in	**H**	**O**	**P**	**S**	**T**	**C**	**D**	**E**	**M**	**V**	**W**	**R**[a]
3,97		—	—	—	03	06	—	04	—	—	06	02	—
	5/32	1,2											
4,76		—	—	—	04	08	04	05	04	04	08	L3	—
	3/16	1,5											
5,56		—	—	—	05	09	05	06	05	05	09	03	—
	7/32	1,8											
6,35		03	02	04	06	11	06	07	06	06	11	04	06
	1/4	2											
7,94		04	03	05	07	13	08	09	08	07	13	05	07
	5/16	2,5											
9,525		05	04	07	09	16	09	11	09	09	16	06	09
	3/8	3											
12,7		07	05	09	12	22	12	15	13	12	22	08	12
	1/2	4											
15,875		09	06	11	15	27	16	19	16	15	27	10	15
	5/8	5											
19,05		11	07	13	19	33	19	23	19	19	33	13	19
	3/4	6											
25,4		14	10	18	25	44	25	31	26	25	44	17	25
	1	8											

Table A.1 *(continued)*

31,75		18	13	23	31	54	32	38	32	31	54	21	31
	1 1⁄4	10											

NOTE The edge length, *l*, can be calculated by means of the following formulae:

— for equiangular inserts (shape H, O, P, S, T):

$$l = d \cdot \tan \frac{180°}{n}$$

where *n* is the number of sides of the polygon;

— for the rhombic inserts (shape C, D, E, M, V) and for inserts shape W:

$$l = \frac{d}{2}\left(\cot \frac{\varepsilon_{r1}}{2} + \cot \frac{\varepsilon_{r2}}{2} \right)$$

where ε_{r1} and ε_{r2} are the included angles at the sharp and obtuse corners.

[a] See list item c) of Table 9. For "metric" round inserts, see A.2.

If these symbols are used with significance other than that given in Table A.1, the symbol at reference ④ shall be X.

A.2 Round inserts: "metric"

See Table A.2.

Table A.2

Diameter of insert *d*		Number symbol for insert size for "metric" round insert (shape R)[a]
mm	in	
6		06
	0,236	—
8		08
	0,315	—
10		10
	0,394	—
12		12
	0,472	—
16		16
	0,63	—
20		20
	0,787	—
25		25
	0,984	—
32		32
	1,26	—
[a] See list item c) of Table 9.		

Annex B
(informative)

Symbols for standardized insert thicknesses (reference ⑥)

Table B.1

Insert thickness s		Number symbol for insert thickness	
mm	in	metric	Imperial (inch)
1,59	1/16	01	1
1,98	5/64	T1	1,2
2,38	3/32	02	1,5
3,18	1/8	03	2
3,97	5/32	T3	2,5
4,76	3/16	04	3
5,56	7/32	05	3,5
6,35	1/4	06	4
7,94	5/16	07	5
9,52	3/8	09	6
12,7	1/2	12	8

If these symbols are used with a meaning other than that given in Table B.1, the symbol at reference ④ shall be X.

Annex C
(informative)

Relationship between designations in this document and the ISO 13399 series

C.1 Relationship between designations

For the relationship between the designations in this document and preferred symbols according to the ISO 13399 series, see Table C.1.

Table C.1 — Relationship between designations in this document and the ISO 13399 series

Symbol in this document	Reference in this document	Property name in the ISO 13399 series	Symbol in the ISO 13399 series	Reference in the ISO 13399 series
—	5.1 symbol 1	Insert shape code	SC	ISO/TS 13399-2, 71CE7A9F0C79F
α_n	5.2 symbol 2	Clearance angle major	AN	ISO/TS 13399-2, 71DD70308D3E3
—	5.3 symbol 3	Tolerance class insert	TCINS	ISO/TS 13399-2, 71CE7AA215888
d	5.3, Tables 3, 4, 5	Diameter of inscribed circle	IC	—
—	5.4 symbol 4	Insert mounting style code	IFS	ISO/TS 13399-2, 71CE-7A97711B8
	5.5 symbol 5	Cutting edge length	L	ISO/TS 13399-2, 71DD6C95DA49B
S	5.6 symbol 6	Insert thickness	S	ISO/TS 13399-2, 71CE7A9F5308C
—	5.7 symbol 7	Rounded corner: corner radius wiper edge: wiper edge length	RE BS	ISO/TS 13399-2, 71DD6C8ACA503 71CE7AA249F88
—	6.2 symbol 8	Cutting edge condition code	CECC	ISO/TS 13399-2, 71DD6C90953D8
—	6.3 symbol 9	Insert hand	IH	ISO/TS 13399-2, 71CF-29872F0AB
$b_\gamma + \gamma_b$	7.2 symbol 10	Face land size code	FLSC	ISO/TS 13399-2, 71DD6C9371B86
—	7.3 symbol 11	Tipped cutting edge code	TCE	ISO/TS 13399-2, 71CE7AA1E3D75
—	7.4 symbol 12	Coded letter symbol: N.N coded number symbol: cutting edge effective length	N.N LE	ISO/TS 13399-2 N.N 71DD6C958C615

Bibliography

[1]   ISO 13399 (all parts), *Cutting tool data representation and exchange*

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected