BS ISO 3365:2016

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Indexable hardmetal (carbide) inserts with wiper edges, without fixing hole — Dimensions

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National foreword

This British Standard is the UK implementation of ISO 3365:2016. It supersedes BS 4193-15:1986 which is withdrawn.

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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BS ISO 3365:2016

INTERNATIONAL STANDARD

ISO 3365

Third edition
2016-03-01

Indexable hardmetal (carbide) inserts with wiper edges, without fixing hole — Dimensions

Plaquettes amovibles en métaux-durs (carbures métalliques) avec arêtes de planage, sans trou de fixation — Dimensions

Reference number
ISO 3365:2016(E)

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Foreword

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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 defined cutting edges, cutting items*.

This third edition cancels and replaces the second edition (ISO 3365:1985), of which it constitutes a minor revision.

INTERNATIONAL STANDARD **ISO 3365:2016(E)**

Indexable hardmetal (carbide) inserts with wiper edges, without fixing hole — Dimensions

1 Scope

This International Standard specifies the dimensions of indexable hardmetal (carbide) inserts with wiper edges, without fixing hole. These inserts are primarily intended to be mounted on milling cutters by top or wedge clamping.

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 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 1832, *Indexable inserts for cutting tools — Designation*

3 Types of inserts

The types of indexable hardmetal (carbide) inserts specified in this International Standard are the following:

— TP … PPN

symmetrical triangular inserts with 11° normal clearance, 90° cutting edge angle, and 11° wiper edge normal clearance;

— TP … PDR; TP … PDL

asymmetrical triangular inserts with chamfered corners, 11° normal clearance, 90° cutting edge angle, and 15° wiper edge normal clearance;

— TE … PER; TE … PEL

asymmetrical triangular inserts with chamfered corners, 20° normal clearance, 90° cutting edge angle, and 20° wiper edge normal clearance;

— SN … ENN

symmetrical square insert with chamfered corners, 0° normal clearance, 75° cutting edge angle, and 0° wiper edge normal clearance;

— SP … EDR; SP … EDL

asymmetrical square insert with chamfered corners, 11° normal clearance, 75° cutting edge angle, and 15° wiper edge normal clearance;

— SN … ANN

symmetrical square insert with 0° normal clearance, 45° cutting edge angle, and 0° wiper edge normal clearance;

— SE…. EER; SE…. EEL

asymmetrical square insert with 20° normal clearance, 75° cutting edge angle, and 20° wiper edge normal clearance.

Inserts with wiper edges, without fixing hole, are standardized only without chip breakers.

4 Interchangeability

4.1 Tolerances

Indexable hardmetal (carbide) inserts specified in this International Standard are provided in the following tolerance classes in accordance with ISO 1832:

a) inserts with 0° and 11° normal clearance (TP, SN, and SP)

tolerance classes A, C, and K, where class C is used mainly for coated inserts;

b) inserts with 20° normal clearance (TE and SE)

tolerance class C.

The values of the tolerances in accordance with ISO 1832 are given in Annex A.

Other tolerances are included in the diagrams and tables with the insert dimensions in Clause 7.

4.2 Dimensions *m*

Dimension *m* specified in the tables refers to a theoretically perfect insert. In practice, as the points on which the inserts are located in both manufacturing and measuring may be different, the nominal value of dimension *m* may vary from one manufacturer to another within a range of ± 0,05 mm. Nevertheless, for inserts of the same manufacturer, dimension *m* shall comply with the tolerances in accordance with ISO 1832 (see Annex A).

5 Designation and marking

5.1 Designation

The designation of the indexable hardmetal (carbide) inserts complying with this International Standard shall conform to ISO 1832.

In addition to this designation, one or both of the following may be indicated:

— the symbol of the group of application, in accordance with ISO 513;

— the commercial designation of the hardmetal (carbide) grade.

5.2 Marking

The following symbol, at least, shall be marked on the insert itself (except when this would be difficult on the smaller inserts):

— symbol of the group of application or commercial designation of the hardmetal (carbide) grade (or both, if possible, on large inserts).

6 Measurement

Annex B indicates the methods of measuring the dimension *m* of the indexable inserts covered by this International Standard.

7 Recommended dimensions

The choice of the more common dimensions is restricted to the specifications given in Tables 1 to 12. It is strongly recommended that these standard inserts be used wherever possible.

7.1 Triangular inserts

7.1.1 Symmetrical triangular inserts with 90° cutting edge angle, 11° normal clearance, and 11° wiper edge normal clearance

TPAN ... PPN

TPCN ... PPN

TPKN ... PPN

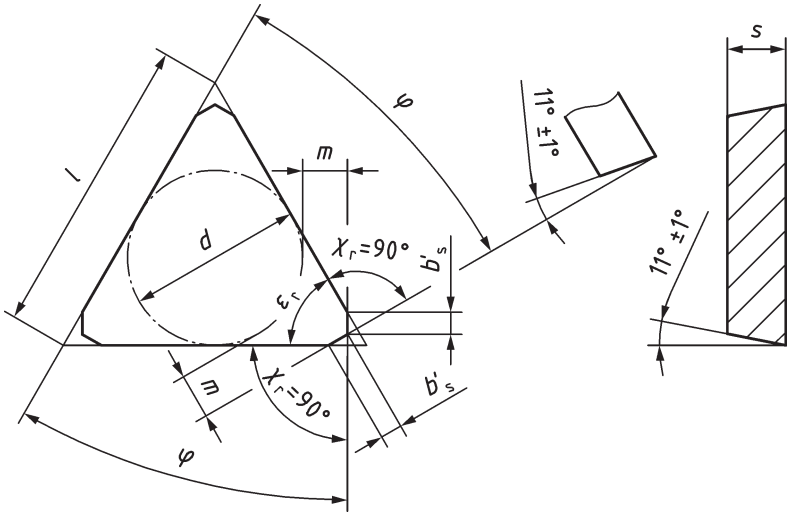

Figure 1

Table 1

Values in millimetres

Insert			l ≈	d^a	s^a	m^a	b'_s ≈	ε_r	φ
TPAN1103 PPN	**TPCN1103 PPN**	**TPKN1103 PPN**	11,0	6,35	3,175	1,72	0,7	60°	30°
TPAN1603 PPN	**TPCN1603 PPN**	**TPKN1603 PPN**	16,5	9,525		2,45	1,2		
TPAN2204 PPN	**TPCN2204 PPN**	**TPKN2204 PPN**	22,0	12,70	4,76	3,55	1,3		

[a] Tolerances in accordance with ISO 1832. See Annex A.

Table 2

Tolerance class	Tolerances on	
	ε_r	φ
A	±8′	$^{+15'}_{0}$
C		
K	±30′	$^{+30'}_{0}$

7.1.2 Asymmetrical triangular inserts with chamfered corners, 90° cutting edge angle, 11° normal clearance, and 15° wiper edge normal clearance

TPAN ... PD.

TPCN ... PD.

TPKN ... PD.

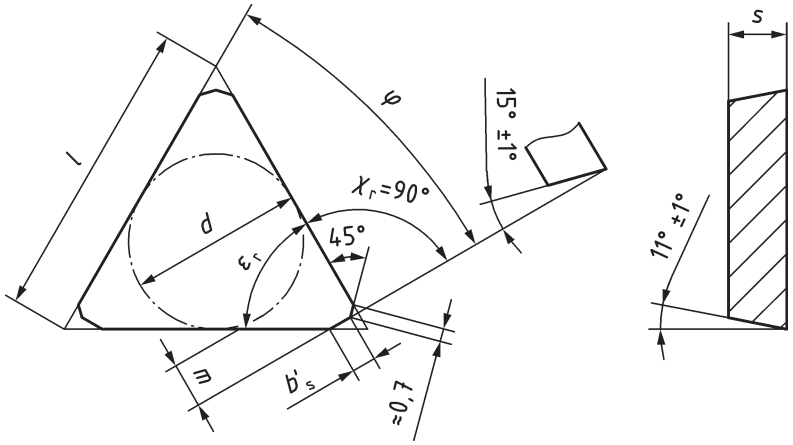

Figure 2

Table 3

Values in millimetres

Insert			l ≈	d^a	s^a	m^a	b'_s ≈	ε_r	φ
TPAN1603 PDR	**TPCN1603 PDR**	**TPKN1603 PDR**	16,5	9,525	3,175	2,45	1,3	60°	30°
TPAN1603 PDL	**TPCN1603 PDL**	**TPKN1603 PDL**							
TPAN2204 PDR	**TPCN2204 PDR**	**TPKN2204 PDR**	22,0	12,70	4,76	3,55	1,4		
TPAN2204 PDL	**TPCN2204 PDL**	**TPKN2204 PDL**							

[a] Tolerances in accordance with ISO 1832. See Annex A.

Table 4

Tolerance class	Tolerances on	
	ε_r	φ
A	±8′	$^{+15'}_{0}$
C		
K	±30′	$^{+30'}_{0}$

7.1.3 Asymmetrical triangular inserts with chamfered corners, 90° cutting edge angle, 20° normal clearance, and 20° wiper edge normal clearance

TECN ... PE.

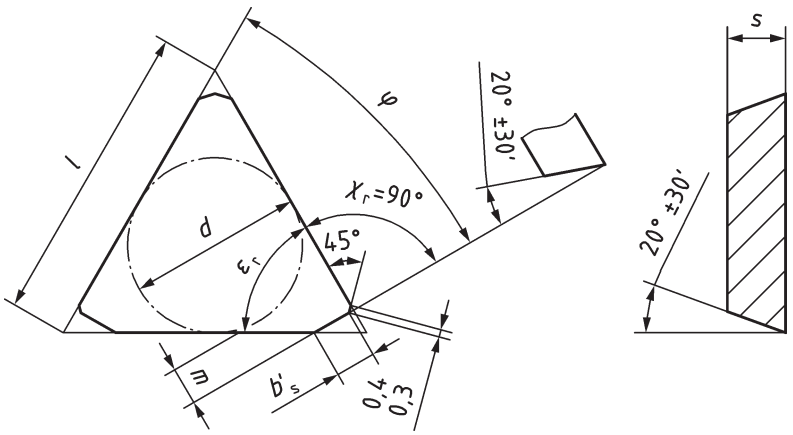

Figure 3

Table 5

Values in millimetres

Insert	l ≈	d^a	s^a	m^a	b'_s ≈	ε_r ±8′	φ $^{+15'}_{0}$
TECN1603 PER TECN1603 PEL	16,5	9,525	3,175	2,19	2,0	60°	30°

[a] Tolerances in accordance with ISO 1832. See Annex A.

7.2 Square inserts

7.2.1 Symmetrical square inserts with chamfered corner, 75° cutting edge angle, 0° normal clearance, and 0° wiper edge normal clearance

SNAN ... ENN

SNCN ... ENN

SNKN ... ENN

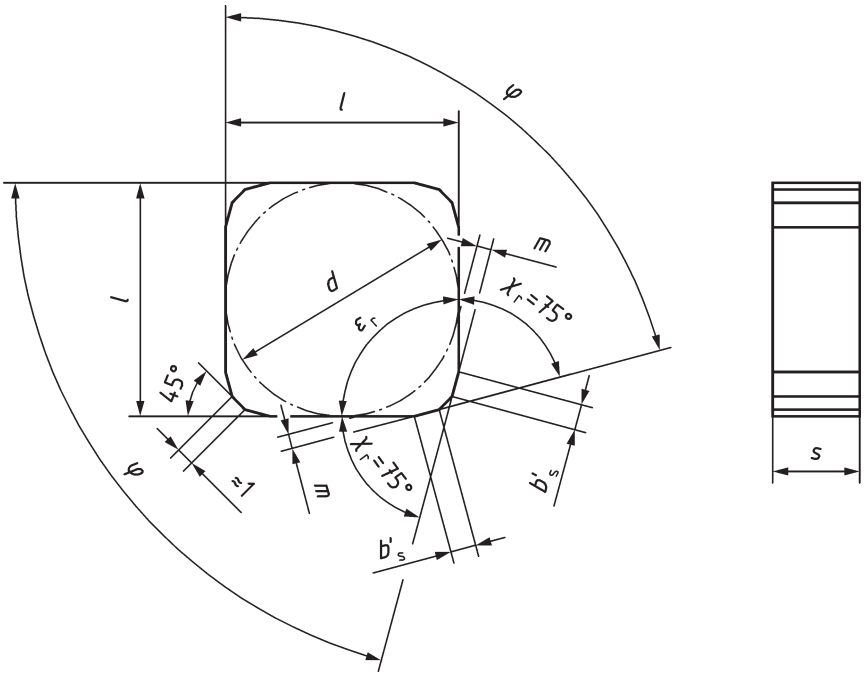

Figure 4

Table 6

Values in millimetres

Insert			d^a	s^a	m^a	b'_s ≈	ε_r	φ
SNAN1204 ENN	**SNCN1204 ENN**	**SNKN1204 ENN**	12,70	4,76	0,80	1,4	90°	75°
SNAN1504 ENN	**SNCN1504 ENN**	**SNKN1504 ENN**	15,875		1,50			
SNAN1904 ENN	**SNCN1904 ENN**	**SNKN1904 ENN**	19,05	4,76[b]	1,30	2,0		

[a] Tolerances in accordance with ISO 1832. See Annex A.

[b] For national standards, a thickness of 5,56 mm (SN. N1905 ENN) may be used as an alternative to that of 4,76 mm.

Table 7

Tolerance class	Tolerances on	
	ε_r	φ
A	±8′	$^{+15'}_{0}$
C		
K	±30′	$^{+30'}_{0}$

7.2.2 Asymmetrical square inserts with chamfered corner, 75° cutting edge angle, 11° normal clearance, and 15° wiper edge normal clearance

SPAN ... ED.

SPCN ... ED.

SPKN ... ED.

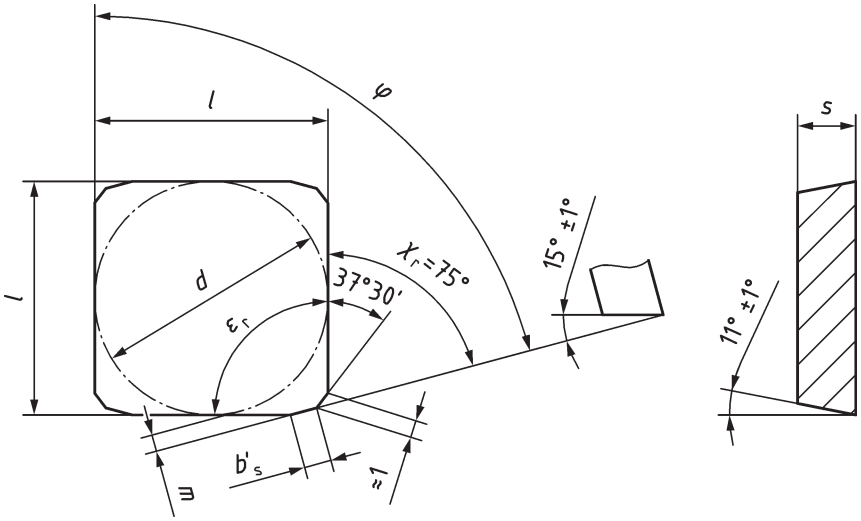

Figure 5

Table 8

Values in millimetres

Insert			d^a	s^a	m^a	b'_s ≈	ε_r	φ
SPAN1203 EDR	**SPCN1203 EDR**	**SPKN1203 EDR**	12,70	3,175	0,90	1,4	90°	75°
SPAN1203 EDL	**SPCN1203 EDL**	**SPKN1203 EDL**						
SPAN1504 EDR	**SPCN1504 EDR**	**SPKN1504 EDR**	15,875	4,76	1,25			
SPAN1504 EDL	**SPCN1504 EDL**	**SPKN1504 EDL**						

[a] Tolerances in accordance with ISO 1832. See Annex A.

Table 9

Tolerance class	Tolerances on	
	ε_r	φ
A	±8′	$^{+15'}_{0}$
C		
K	±30′	$^{+30'}_{0}$

7.2.3 Symmetrical square inserts with 45° cutting edge angle, 0° normal clearance, and 0° wiper edge normal clearance

SNAN ... ANN

SNCN ... ANN

SNKN ... ANN

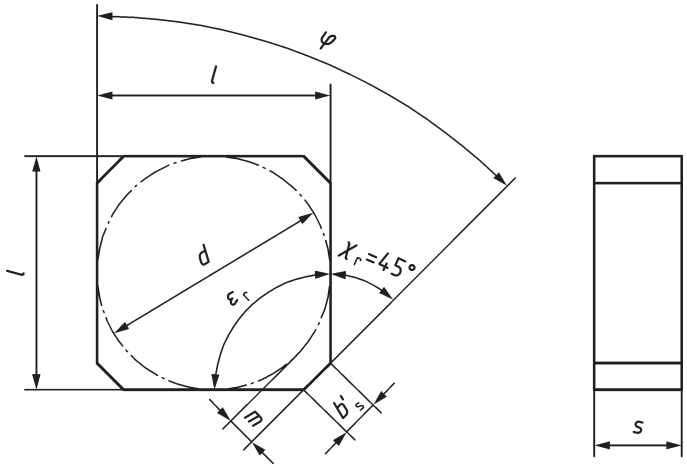

Figure 6

Table 10

Values in millimetres

Insert			d^a	s^a	m^a	b'_s ≈	ε_r	φ
SNAN1204 ANN	**SNCN1204 ANN**	**SNKN1204 ANN**	12,70	4,76	1,60	2,0	90°	45°
SNAN1504 ANN	**SNCN1504 ANN**	**SNKN1504 ANN**	15,875		2,00	2,5		
SNAN1904 ANN	**SNCN1904 ANN**	**SNKN1904 ANN**	19,05	4,76[b]	2,50	3,0		

[a] Tolerances in accordance with ISO 1832. See Annex A.

[b] For national standards, a thickness of 5,56 mm (SN. M1905 ANN) may be used as an alternative to that of 4,76 mm.

Table 11

Tolerance class	Tolerances on	
	ε_r	φ
A	±8′	±8′
C		
K	±30′	±15′

7.2.4 Asymmetrical square inserts without chamfered corner, 75° cutting edge angle, 20° normal clearance, and 20° wiper edge normal clearance

SECN ... EE.

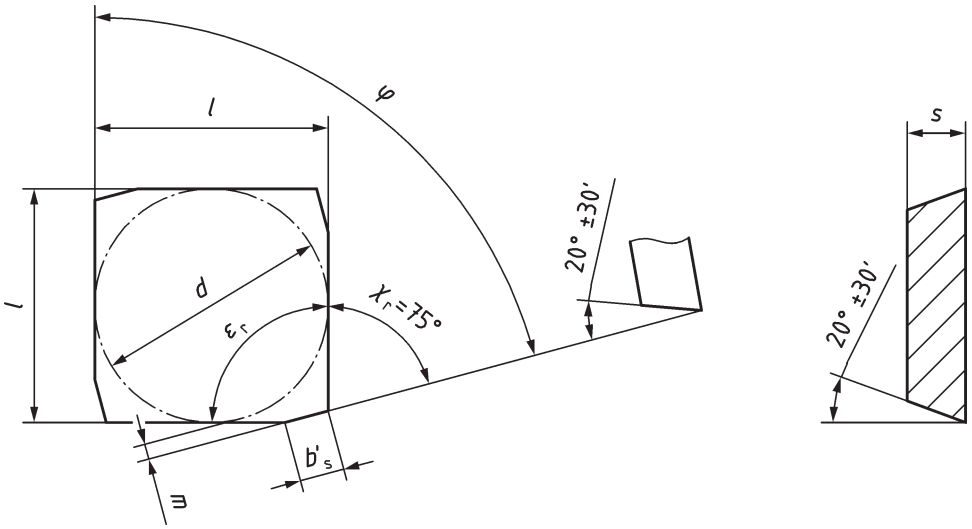

Figure 7

Table 12

Values in millimetres

Insert	d^a	s^a	m^a	b'_s ≈	ε_r ±8′	φ $+^{15'}_{0}$
SECN1203 EER SECN1203 EEL	12,70	3,175	0,8	2,5	90°	75°
a Tolerances in accordance with ISO 1832. See Annex A.						

Annex A
(normative)

Tolerances for *d, m,* and *s*

A.1 Tolerance class A

Table A.1

Values in millimetres

Tolerance for	*d*	±0,025
	m	±0,005
	s	±0,025

A.2 Tolerance class C

Table A.2

Values in millimetres

Tolerance for	*d*	±0,025
	m	±0,013
	s	±0,025

A.3 Tolerance class K

Table A.3

Values in millimetres

Insert		**Tolerances for**		
Designation	*d*	*d*	*m*	*s*
T ... 11	6,35	±0,05	±0,013	±0,025
T ... 16	9,525	±0,05		
T ... 22	12,70	±0,08		
S ... 12				
S ... 15	15,875	±0,10		
S ... 19	19,05	±0,10		

Annex B
(normative)

Method of measurement of "*m*" dimension

B.1 Triangular inserts

Dimension *m* is checked by reference to the diameter *d* of a precision roller, where *d* corresponds to the nominal diameter of the inscribed circle of the insert. The insert is mounted on a 60° vee-block as shown in Figure B.1 and checked by means of a dial gauge which has been zeroed to dimension *m* by means of a roller with the aid of a gauge block. The dial gauge then gives a direct reading of the error when applied to the inserts to be measured. The roller has a tolerance of ± 0,002 mm.

B.2 Square inserts

Dimension *m* is checked by reference to the diameter *d* of a precision roller, where *d* corresponds to the nominal diameter of the inscribed circle of the insert. The insert is mounted on a 90° vee-block as shown in Figure B.2 a) for inserts with κ_r = 75° (SN ... ENN, SP ... ED, and SE ... EE) and in Figure B.2 b) for inserts with κ_r = 45° (SN ... ANN) and checked by means of a dial gauge which has been zeroed to dimension *m* by means of a roller with the aid of a gauge block. The dial gauge then gives a direct reading of the error when applied to the inserts to be measured. The roller has a tolerance of ± 0,002 mm.

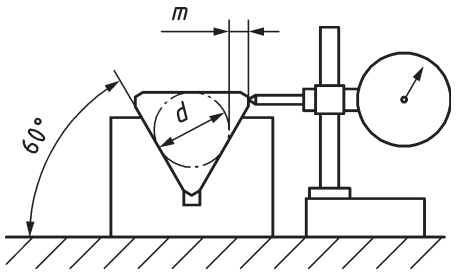

Figure B.1

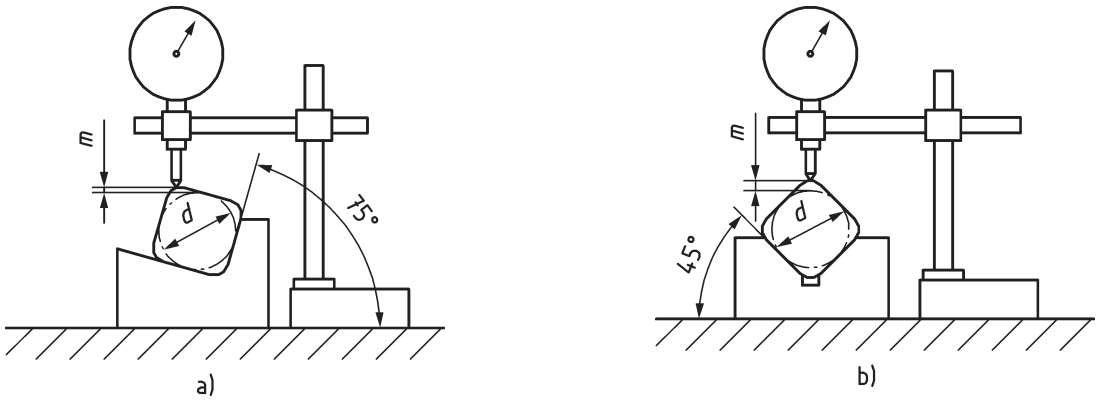

Figure B.2

Three positioning points of the insert can be useful in the block measuring dimension *m*. In this case, two such points should be on the clearance that is angle φ from the wiper edge normal clearance.

Annex C
(normative)

Range of sizes for inserts with wiper edges, without fixation hole

See Table C.1.

Table C.1

Normal clearance	Wiper edge normal clearance	Tolerance classes								
			A			C			K	
		Cutting edge angle κ_r								
α_n	α'_n	90°	75°	45°	90°	75°	45°	90°	75°	45°
0°	0°	—	SNAN1204 ENN	SNAN1204 ANN	—	SNCN1204 ENN	SNCN1204 ANN	—	SNKN1204 ENN	SNKN1204 ANN
			SNAN1504 ENN	SNAN1504 ANN		SNCN1504 ENN	SNCN1504 ANN		SNKN1504 ENN	SNKN1504 ANN
			SNAN1904 ENN	SNAN1904 ANN		SNCN1904 ENN	SNCN1904 ANN		SNKN1904 ENN	SNKN1904 ANN
11°	11°	TPAN1103 PPN	—	—	TPCN1103 PPN	—	—	TPKN1103 PPN	—	—
		TPAN1603 PPN			TPCN1603 PPN			TPKN1603 PPN		
		TPAN2204 PPN			TPCN2204 PPN			TPKN2204 PPN		
11°	15°	TPAN1603 PDR	SPAN1203 EDR	—	TPCN1603 PDR	SPCN1203 EDR	—	TPKN1603 PDR	SPKN1203 EDR	—
		TPAN1603 PDL	SPAN1203 EDL		TPCN1603 PDL	SPCN1203 EDL		TPKN1603 PDL	SPKN1203 EDL	
		TPAN2204 PDR	SPAN1504 EDR		TPCN2204 PDR	SPCN1504 EDR		TPKN2204 PDR	SPKN1504 EDR	
		TPAN2204 PDL	SPAN1504 EDL		TPCN2204 PDL	SPCN1504 EDL		TPKN2204 PDL	SPKN1504 EDL	
20°	20°	—	—	—	TECN1603 PER	SECN1203 EER	—	—	—	—
					TECN1603 PEL	SECN1203 EEL				

Annex D
(informative)

Relationship between designations in this International Standard and ISO 13399

D.1 Relationship between designations

For relationship between designations in this International Standard and preferred symbols according to ISO 13399, see Table D.1.

Table D.1 — Relationship between designations in this International Standard and ISO 13399 series

Symbol in ISO 3365	Reference in ISO 3365	Property name in ISO 13399	Symbol in ISO 13399	Reference in ISO 13399
N.N.	Clause 3	insert shape code	SC	ISO/TS 13399-2 71CE7A9F0C79F
N.N.	Clause 4	tolerance class insert	TCINS	ISO/TS 13399-2 71CE7AA215888
N.N.	7.1.1, 7.1.2, 7.1.3, 7.2.1, 7.2.2, 7.2.3, 7.2.4	clearance angle major	AN	ISO/TS 13399-2 71DD70308D3E3
N.N.	7.1.1, 7.1.2, 7.1.3, 7.2.1, 7.2.2, 7.2.3, 7.2.4	clearance angle wiper edge	AS	ISO/TS 13399-2 71DD7031A98E9
b'_s	Tables 1, 3, 5, 6, 8, 10, 12	wiper edge length	BS	ISO/TS 13399-2 71CE7AA249F88
d	Tables 1, 3, 5, 6, 8, 10, 12	inscribed circle diameter	IC	ISO/TS 13399-2 71CE7A96D9F7D
ε_r	Tables 1, 3, 5, 6, 8, 10, 12	insert included angle	EPSR	ISO/TS 13399-2 71CE7A96BC122
κ_r	Figures 1, 2, 3, 4, 5, 6 and 7	tool cutting edge angle	KAPR	ISO/TS 13399-2 71F683C9B
m	4.2 Tables 1, 3, 5, 6, 8, 10, 12	m-dimension	M	ISO/TS 13399-2 71CE7AA0972DB
l	Tables 1, 3, 5 Figures 4, 5, 6 and 7	cutting edge length	L	ISO/TS 13399-2 71DD6C95DA49B
s	Tables 1, 3, 5, 6, 8, 10, 12	insert thickness	S	ISO/TS 13399-2 71CE7A9F5308C
≈ 0,7 mm; 0,3 mm to 0,4 mm; ≈ 1 mm	Figures 2, 3, 4 and 5	corner chamfer length	BCH	ISO/TS 13399-2 71DD6C895C25B
45°, 37°30′	Figures 2, 3, 4 and 5	corner chamfer angle	KCH	ISO/TS 13399-2 71DD6C88F9210

Bibliography

[1] ISO 883, *lndexable hardmetal (carbide) inserts with rounded corners, without fixing hole — Dimensions*

[2] ISO 3364, *Indexable hardmetal (carbide) inserts with rounded corners, with cylindrical fixing hole — Dimensions*

[3] ISO/TS 13399-2:2014, *Cutting tool data representation and exchange — Part 2: Reference dictionary for the cutting items*

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