
**Indexable hardmetal (carbide) inserts
with rounded corners, with cylindrical
fixing hole — Dimensions**

*Plaquettes amovibles en métaux-durs (carbures métalliques) avec
arrondi de pointe et trou de fixation cylindrique — Dimensions*



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Foreword

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3364 was prepared by Technical Committee ISO/TC 29, *Small Tools*, Subcommittee SC 9, *Tools with cutting edges made of hard cutting materials*.

This fourth edition cancels and replaces the third edition (ISO 3364:1997), which has been technically revised.

Indexable hardmetal (carbide) inserts with rounded corners, with cylindrical fixing hole — Dimensions

1 Scope

This International Standard specifies the dimensions of indexable hardmetal (carbide) inserts with rounded corners, with cylindrical fixing hole and with 0° normal clearance. These inserts are primarily intended to be mounted by top and hole clamping or by hole clamping alone on turning and boring tools.

2 Normative references

The following referenced documents are indispensable for the application 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 1832, *Indexable inserts for cutting tools — Designation*

3 Types of insert

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

- TN: triangular inserts, with 0° normal clearance;
- SN: square inserts, with 0° normal clearance;
- CN: rhombic inserts, with 0° normal clearance and 80° included angle;
- DN: rhombic inserts, with 0° normal clearance and 55° included angle;
- WN: hexagonal (trigon) inserts, with 0° normal clearance and 80° included angle;
- VN: rhombic inserts, with 0° normal clearance and 35° included angle.

Inserts covered by this International Standard are standardized with chip breakers on both faces, with chip breakers on one face only and with no chip breakers at all.

Neither the shape nor the dimensions of chip breakers are standardized. Thus, if necessary, special features shall be explained by means of a diagram or additional specifications.

Table B.1 gives the range of sizes for these inserts.

4 Interchangeability

4.1 Tolerances

Indexable hard metal (carbide) inserts specified in this International Standard are provided in tolerance classes in accordance with ISO 1832.

Other tolerances are given, either in Table 1 for hole dimensions, or in Tables 2 to 7 for insert dimensions.

4.2 Thickness, s , of inserts with chip breakers

The thickness, s , of inserts with chip breakers is defined as the distance between the cutting edge at the corner and the opposing supporting surface of the insert; see Figure 1 a) and b) for inserts with chip breakers on one face only and Figure 1 c) for inserts with chip breakers on both faces.

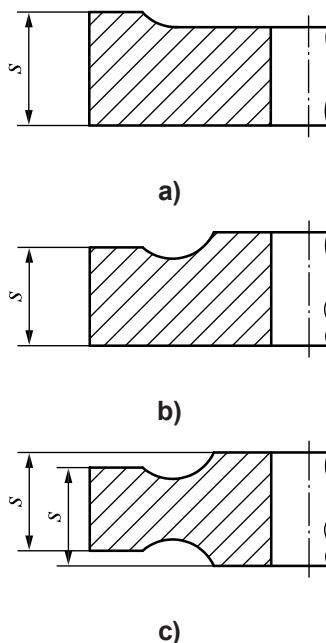


Figure 1 — Thickness of inserts with chip breakers

In order to guarantee interchangeability when mounting the insert, the diameter, d_1 , of the fixing hole is related to the diameter, d , of the inscribed circle of the insert according to Table 1.

Table 1 — Fixing hole

		Dimensions in millimetres					
d		6,35	9,525	12,7	15,875	19,05	25,4
d_1	$\pm 0,08$	2,26	3,81	5,16	6,35	7,94	9,12

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 symbols, at least, shall be marked on the insert itself (except where this is 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

7.1 General

The choice of the more common dimensions is restricted to the specifications given in Tables 2 to 7. It is strongly recommended that these standard inserts be used wherever possible (first preference). Where other inserts are specially required, insert dimensions shall be selected from the non-shaded portions of Table B.1 (second preference). Inserts corresponding to dimensions represented by the shaded portions of this table are not recommended.

7.2 Triangular inserts

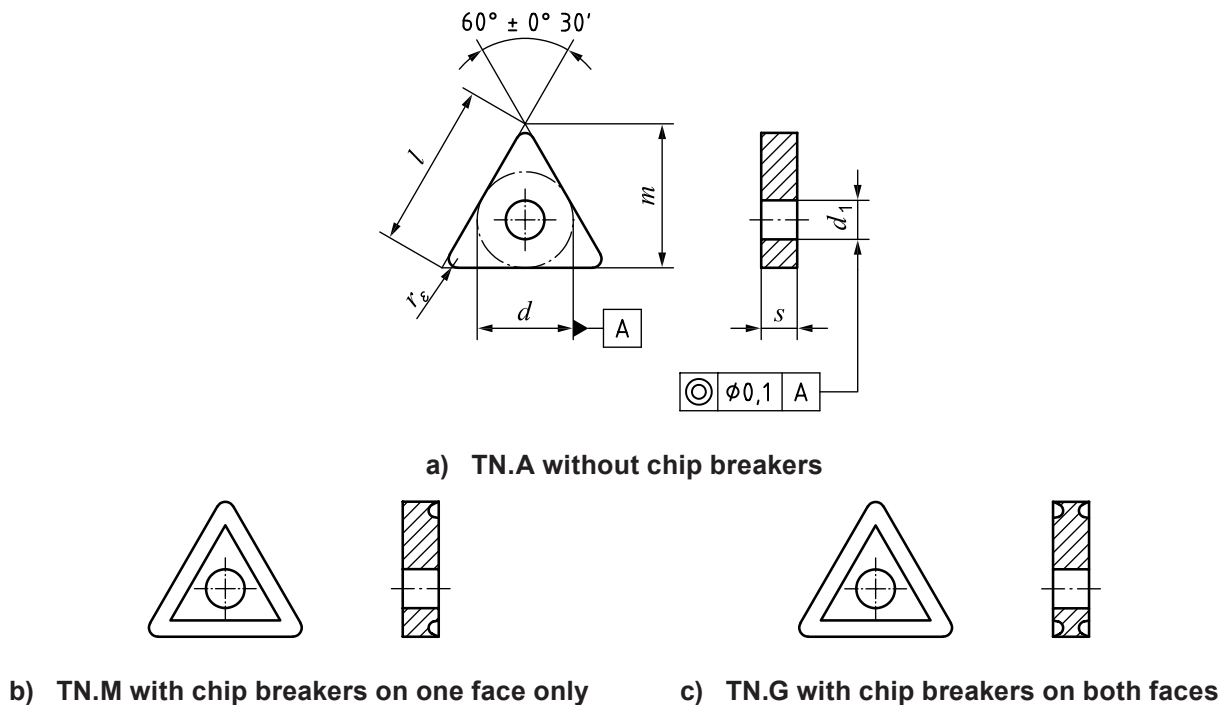


Figure 2 — Triangular inserts

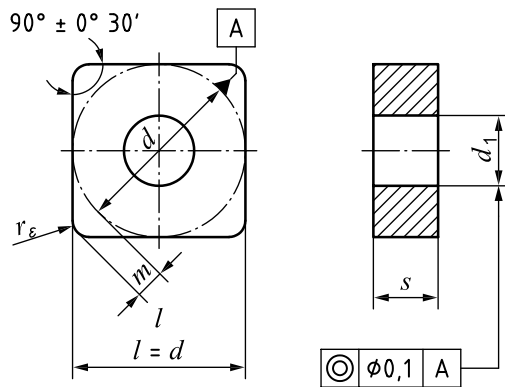
Table 2 — Dimensions of triangular inserts

Dimensions in millimetres

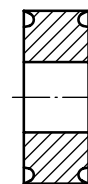
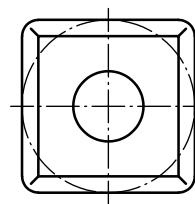
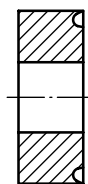
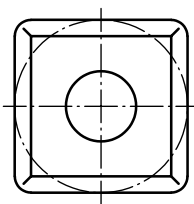
Insert			l \approx	d^a	s^a	m^a	r_ε $\pm 0,1$	d_1 $\pm 0,08$
TN.A160404	—	TN.G160404	16,5	9,525	4,76	13,891	0,4	3,81
TN.A160408	TN.M160408	TN.G160408				13,494	0,8	
TN.A160412	TN.M160412	TN.G160412				13,097	1,2	
TN.A220408	TN.M220408	TN.G220408	22	12,7	4,76	18,256	0,8	5,16
TN.A220412	TN.M220412	TN.G220412				17,859	1,2	
TN.A220416	TN.M220416	TN.G220416				17,463	1,6	
—	TN.M270612	—	27,5	15,875	6,35	22,622	1,2	6,35
—	TN.M270616	—				22,225	1,6	

^a Tolerances in accordance with ISO 1832.

7.3 Square inserts



a) SN.A without chip breakers



b) SN.M with chip breakers on one face only

c) SN.G with chip breakers on both faces

Figure 3 — Square inserts

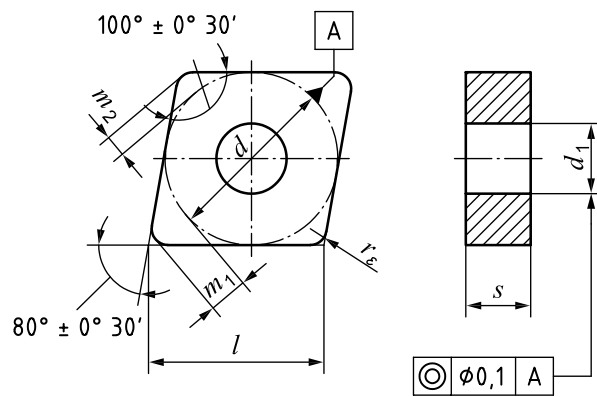
Table 3 — Dimensions of square inserts

Dimensions in millimetres

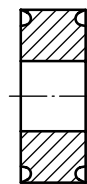
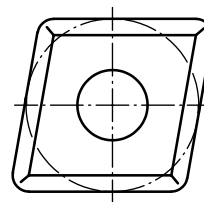
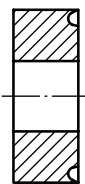
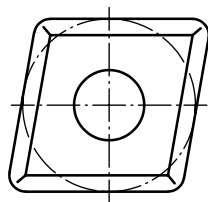
Insert			d^{ab}	s^a	m^a	r_ϵ $\pm 0,1$	d_1 $\pm 0,08$
—	SN.M090304	SN.G090304	9,525	3,18	1,808	0,4	3,81
—	SN.M090308	SN.G090308			1,644	0,8	
—	—	SN.G120404	12,7	4,76	2,466	0,4	5,16
SN.A120408	SN.M120408	SN.G120408			2,301	0,8	
SN.A120412	SN.M120412	SN.G120412			2,137	1,2	
—	SN.M150608	SN.G150608	15,875	6,35	2,959	0,8	6,35
—	SN.M150612	SN.G150612			2,795	1,2	
SN.A190612	SN.M190612	SN.G190612	19,05	6,35	3,452	1,2	7,94
SN.A190616	SN.M190616	SN.G190616			3,288	1,6	
SN.A250724	SN.M250724	SN.G250724	25,4	7,94	4,274	2,4	9,12

^a Tolerances in accordance with ISO 1832.
^b $d = l$.

7.4 Rhombic inserts with 80° included angle



a) CN.A without chip breakers



b) CN.N with chip breakers on one face only

c) CN.G with chip breakers on both faces

Figure 4 — Rhombic inserts with 80° includes angle

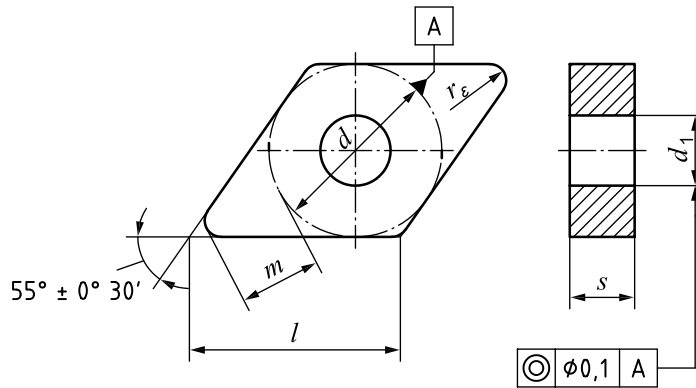
Table 4 — Dimensions of rhombic inserts with 80° included angle

Dimensions in millimetres

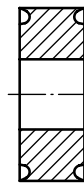
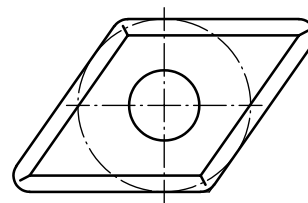
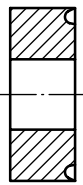
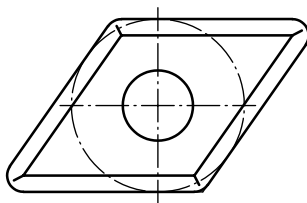
Insert			l ≈	d^a	s^a	m_1^a	m_2^a	r_ϵ ± 0,1	d_1 ± 0,08
—	—	CN.G120404	12,9	12,7	4,76	3,308	1,818	0,4	5,16
CN.A120408	CN.M120408	CN.G120408				3,088	1,697	0,8	
CN.A120412	CN.M120412	CN.G120412				2,867	1,576	1,2	
—	CN.M160608	CN.G160608	16,1	15,875	6,35	3,97	2,182	0,8	6,35
—	CN.M160612	CN.G160612				3,479	2,061	1,2	
—	—	CN.G190608	19,3	19,05	6,35	4,852	2,667	0,8	7,94
CN.A190612	CN.M190612	CN.G190612				4,632	2,545	1,2	
CN.A190616	CN.M190616	CN.G190616				4,411	2,424	1,6	

^a Tolerances in accordance with ISO 1832.

7.5 Rhombic inserts with 55° included angle



a) DN.A inserts without chip breakers



b) DN.M with chip breakers on one face only

c) DN.G with chip breakers on both faces

Figure 5 — Rhombic inserts with 55° included angle

Table 5 — Dimensions of rhombic inserts with 55° included angle

Dimensions in millimetres

Insert			l ≈	d^a	s^a	m^a	r_ϵ ± 0,1	d_1 ± 0,08
DN.A150604	—	DN.G150604	15,5	12,7	6,35	6,939	0,4	5,16
DN.A150608	DN.M150608	DN.G150608				6,477	0,8	
DN.A150612	DN.M150612	DN.G150612				6,014	1,2	
DN.A150616	DN.M150616	DN.G150616				5,552	1,6	

^a Tolerances in accordance with ISO 1832.

7.6 Hexagonal (trigon) inserts with 80° included angle

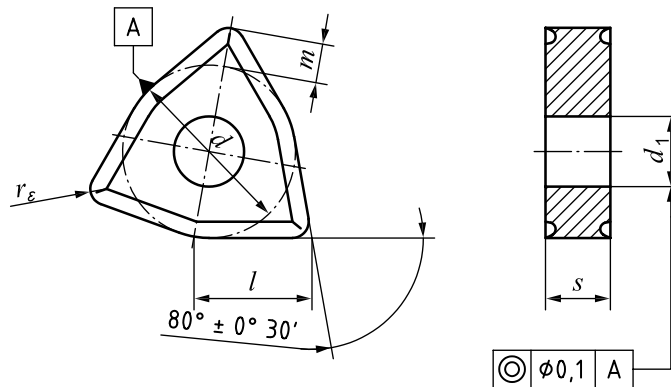


Figure 6 — WN.G with chip breakers on both faces

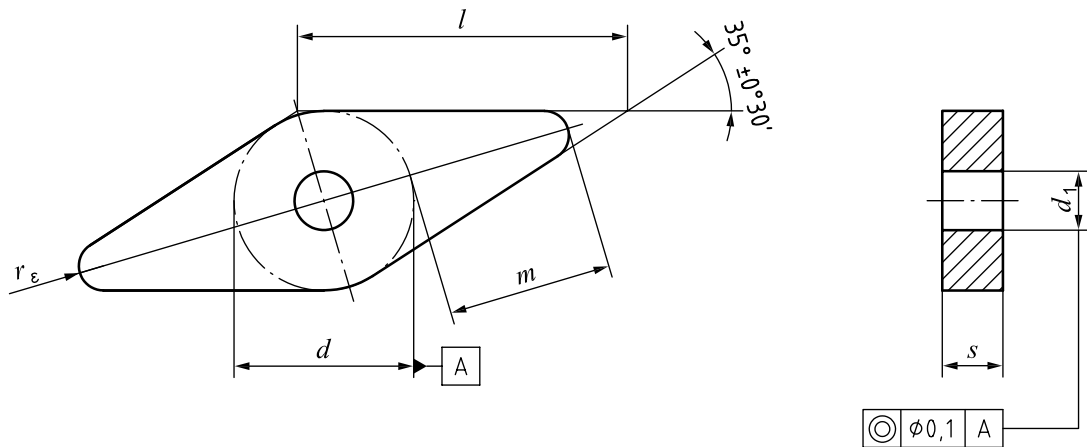
Table 6 — Dimensions of hexagonal or trigon inserts with 80° included angle

Dimensions in millimetres

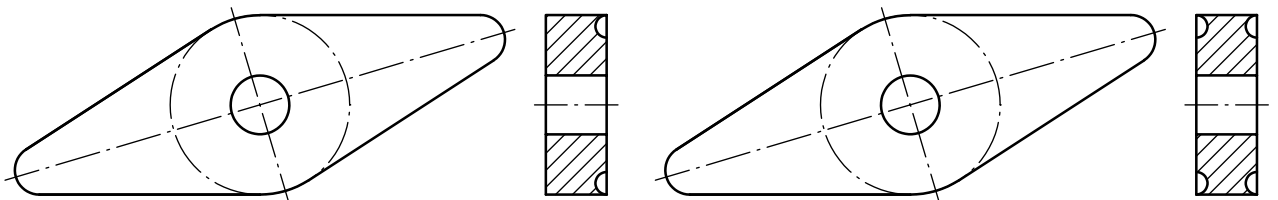
Insert	l ≈	d^a	s^a	m^a	r_ϵ ± 0,1	d_1 ± 0,08
WN.G060404	6,5	9,525	4,76	2,426	0,4	3,81
WN.G060408				2,205	0,8	
WN.G080404	8,7	12,7	4,76	3,308	0,4	5,16
WN.G080404				3,087	0,8	
WN.G080412				2,867	1,2	

^a Tolerances in accordance with ISO 1832.

7.7 Rhombic inserts with 35° included angle



a) VN.A inserts without chip breakers



b) VN.M inserts with chip breakers on one face only c) VN.G inserts with chip breakers on both faces

Figure 7 — Rhombic inserts with 35° included angle

Table 7 — Dimensions of Rhombic inserts with 35° included angle

Dimensions in millimetres

Insert			l ≈	d	s	m	r_ϵ ± 0,1	d_1 ± 0,08
—	—	VN.G160402	16,6	9,525	4,76	10,66	0,2	3,81
VN.A160404	VN.M160404	VN.G160404				10,152	0,4	
VN.A160408	VN.M160408	VN.G160408				9,229	0,8	
VN.A160412	—	VN.G160412				8,285	1,2	
—	—	VN.G220404	22,1	12,7	4,76	13,837	0,4	5,16
VN.A220408	—	VN.G220408				12,907	0,8	
VN.A220412	—	VN.G220412				11,976	1,2	
VN.A220416	—	VN.G220416				11,046	1,6	

Annex A (normative)

Methods of measurement of m dimension

A.1 Triangular inserts

Dimension m is related to the side opposite the corner which is being measured. The insert shall be placed on a surface plate as shown in Figure A.1 and checked by means of a dial gauge zeroed with the aid of a gauge block corresponding to dimension m . The dial gauge then gives a reading of the error when applied to the insert to be measured.

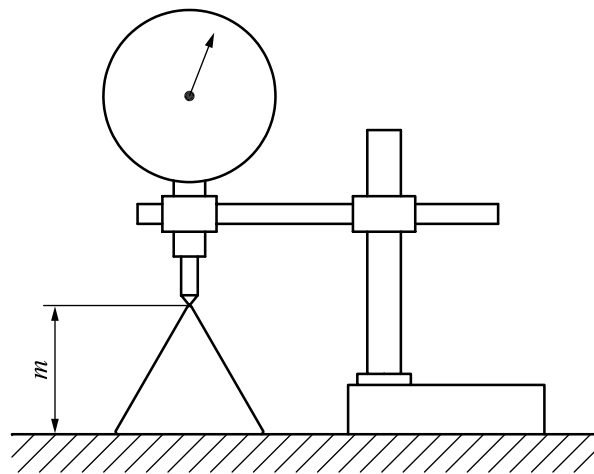


Figure A.1 — Triangular insert

A.2 Square inserts

Dimension m shall be checked with 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 shall be mounted on a 90° V-block as shown in Figure A.2 and checked by means of a dial gauge which shall be zeroed to dimension m by means of a roller with the aid of a gauge block. The dial gauge gives a direct reading of the error when applied to the inserts being measured. The roller has a tolerance of $\pm 0,002$ mm.

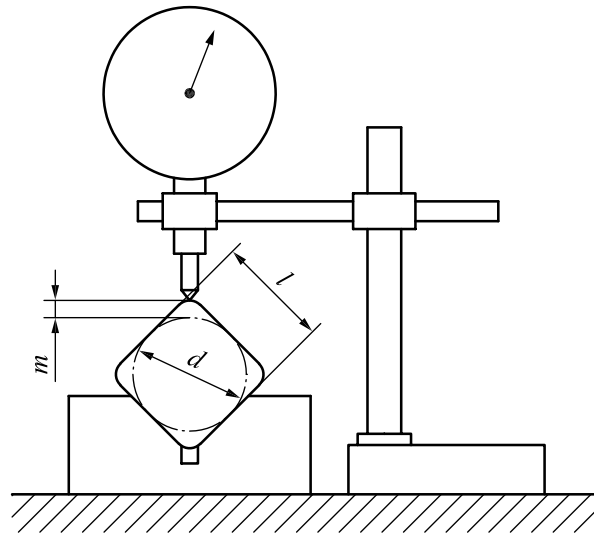


Figure A.2 — Square insert

A.3 Rhombic inserts

Dimension m , m_1 or m_2 shall be checked with reference to the diameter, d , of a precision roller, where d corresponds to the nominal size of the inscribed circle of the insert. The insert shall be mounted on a 35°, 55°, 80° or 100° V-block, as shown in Figure A.3, and checked by means of a dial gauge which shall be zeroed to dimension m , m_1 or m_2 by means of a roller with the aid of a gauge block. The dial then gives a direct reading of the error when applied to the inserts to be measured. The roller has a tolerance of $\pm 0,002$ mm.

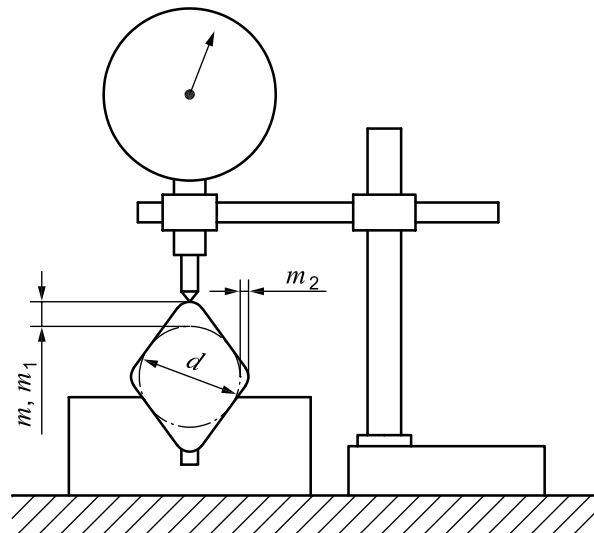


Figure A.3 — Rhombic insert

A.4 Round inserts

Diameter, d , shall be measured with a micrometer or similar device.

A.5 Hexagonal inserts

Dimension m shall be checked with reference to the diameter, d , of a precision roller, where d corresponds to the nominal size of the inscribed circle of the insert. The insert shall be mounted on a 160° V-block, as shown

in Figure A.4, and checked by means of a dial gauge which shall be zeroed to dimension m by means of a roller with the aid of a gauge block. The dial then gives a direct reading of the error when applied to the inserts being measured. The roller has a tolerance of $\pm 0,002$ mm.

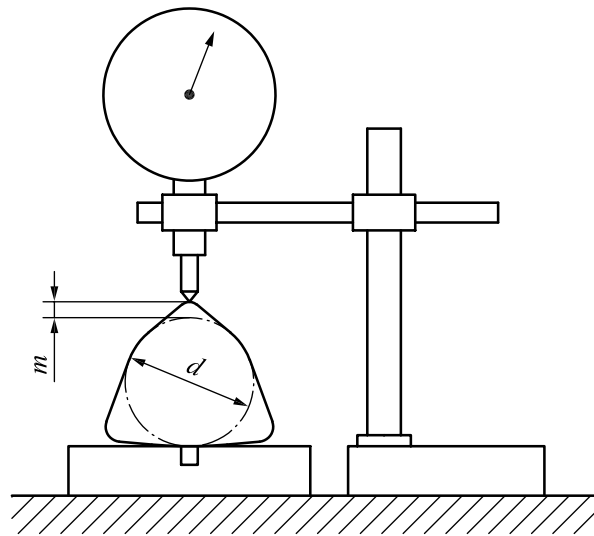


Figure A.4 — Hexagonal insert

Annex B (normative)

Range of sizes of inserts with rounded corners with cylindrical fixing hole, with shapes covered by this International Standard

Table B.1 — Range of sizes

Dimensions in millimetres

d	Without chip breakers (A)						With chip breakers on one face only (M)					With chip breakers on both faces (G)								
	Designation	Corner radius, r _ε						Designation	Corner radius, r _ε					Designation	Corner radius, r _ε					
		d/2	0,4	0,8	1,2	1,6	2,4		0,4	0,8	1,2	1,6	2,4		d/2	0,4	0,8	1,2	1,6	2,4
6,35	TN.A1103						TN.M1103						TN.G1103							
9,525	TN.A1603						TN.M1603						TN.G1603							
	TN.A1604	+	+	+			TN.M1604		+	+			TN.G1604	+	+	+				
12,7	TN.A2204		+	+	+		TN.M2204		+	+	+		TN.G2204		+	+	+			
15,875	TN.A2706						TN.M2706			+	+		TN.G2706							
19,05	TN.A3309						TN.M3309						TN.G3309							
9,525	SN.A0903						SN.M0903	+	+				SN.G0903	+	+					
12,7	SN.A1203						SN.M1203						SN.G1203							
	SN.A1204		+	+			SN.M1204		+	+			SN.G1204	+	+	+				
15,875	SN.A1504						SN.M1504						SN.G1504							
	SN.A1506						SN.M1506		+	+			SN.G1506		+	+				
19,05	SN.A1906			+	+		SN.M1906			+	+		SN.G1906			+	+			
25,4	SN.A2507					+	SN.M2507					+	SN.G2507					+		
	SN.A2509						SN.M2509						SN.G2509							
12,7	CN.A1204		+	+			CN.M1204		+	+			CN.G1204	+	+	+				
15,875	CN.A1606						CN.M1606		+	+			CN.G1606		+	+				
19,05	CN.A1906			+	+		CN.M1906			+	+		CN.G1906		+	+	+			
25,4	CN.A2509						CN.M2509						CN.G2509							
12,7	DN.A1504						DN.M1504						DN.G1504							
	DN.A1506	+	+	+	+		DN.M1506		+	+	+		DN.G1506	+	+	+	+			
15,875	DN.A1906						DN.M1906						DN.G1906							
9,525												WN.G0604		+	+					
12,7												WN.G0804		+	+	+				
9,525	VN.A1604								+	+			VN.G1604		+	+	+			
12,7	VN.A2204									+	+		VN.G2204			+	+	+		



First preference in this International Standard (see Tables 2 to 7).



Non-shaded squares: second preference; not covered by this International Standard.



Shaded squares: inserts not recommended.

Annex C (informative)

Relationship between designations in this International Standard and the ISO 13399 series

C.1 Relationship between designations

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

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

Symbol in International Standard (ISO 3364)	Reference in International Standard (ISO 3364)	Property name in the ISO 13399 series	Symbol in the ISO 13399 series	Reference in the ISO 13399 series
—	Clause 3	Insert shape code	SC	ISO/TS 13399-2 71CE7A9F0C79F
d	Tables 2, 3, 4, 5, 6, 7	Inscribed circle diameter	IC	ISO/TS 13399-2 71CE7A96D9F7D
d_1	Tables 2, 3, 4, 5, 6, 7	Fixing hole diameter	D1	ISO/TS 13399-2 71CE7A968C8FE
l	Tables 2, 3, 4, 5, 6, 7	Cutting edge length	L	ISO/TS 13399-2 71DD6C95DA49B
m	Tables 2, 3, 5, 6, 7	m-dimension	M	ISO/TS 13399-2 71CE7AA0972DB
m_1	Table 4	m-dimension	M	ISO/TS 13399-2 71CE7AA0972DB
m_2	Table 4	m2-dimension	M2	ISO/TS 13399-2 71CE7AA05C819
r_ϵ	Tables 2, 3, 4, 5, 6, 7	Corner radius	RE	ISO/TS 13399-2 71DD6C8ACA503
s	Tables 2, 3, 4, 5, 6, 7	Insert thickness	S	ISO/TS 13399-2 71CE7A9F5308C

Bibliography

- [1] ISO 883, *Indexable hardmetal (carbide) inserts with rounded corners, without fixing hole — Dimensions*
- [2] ISO 3365, *Indexable hardmetal (carbide) inserts with wiper edges, without fixing hole — Dimensions*
- [3] ISO 13399 (all parts), *Cutting tool data representation and exchange*

ICS 25.100.01

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