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**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

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 9, *Tools with defined cutting edges, cutting items*.

This fifth edition cancels and replaces the fourth edition (ISO 3364:2011), which has been technically revised and contains the following changes:

- the specifications of inserts, especially the designations given in [Tables 2 to 8](#), have been revised;
- the recommendations in [Annex B](#) have been modified;
- [Annex C](#) has been revised.

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

## 1 Scope

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

## 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 1832, *Indexable inserts for cutting tools — Designation*

## 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 Types of insert

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

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

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

At present, neither the shape nor the dimensions of chip breakers are standardized. Thus, if necessary, special features have to be explained by means of a diagram or additional specifications.

[Table B.1](#) gives the range of sizes for these inserts.

## 5 Interchangeability

### 5.1 Tolerances

Indexable hard metal (carbide) inserts specified in this document 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 8](#) for insert dimensions.

### 5.2 Thickness, $s$ , of inserts with chip breakers

The thickness,  $s$ , of inserts with chip breakers is defined as the distance between the cutting edge of 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.

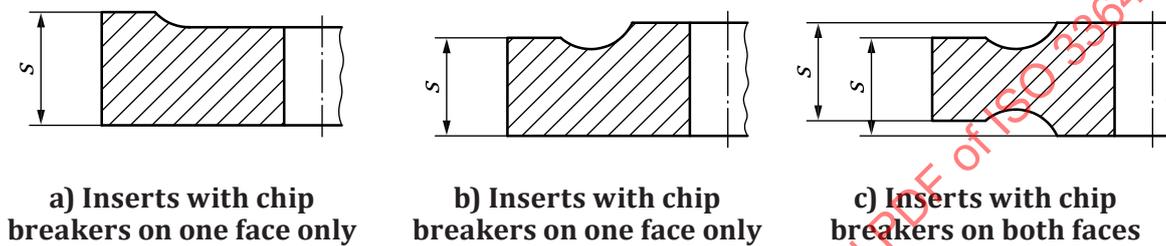


Figure 1 — Inserts with chip breakers

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

## 6 Designation and marking

### 6.1 Designation

The designation of the indexable hardmetal (carbide) inserts complying with this document 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, according to ISO 513;
- the commercial designation of the hardmetal (carbide) grade.

For the relationship between designations in this document and ISO 13399, see [Annex C](#).

### 6.2 Marking

The following symbols, 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.

## 7 Measurement

Measuring the dimension  $m$  of the indexable inserts covered by this document shall be carried out as specified in [Annex A](#).

## 8 Recommended dimensions

### 8.1 General

The choice of the more common dimensions is restricted to the specifications given in [Tables 2 to 8](#). It is strongly recommended that these standard inserts be used wherever possible (first preference). For the full range of sizes of inserts and recommendations, see [Annex B](#). When 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.

[Figures 2 to 8](#) show the different shapes of inserts according to this document.

### 8.2 Triangular inserts

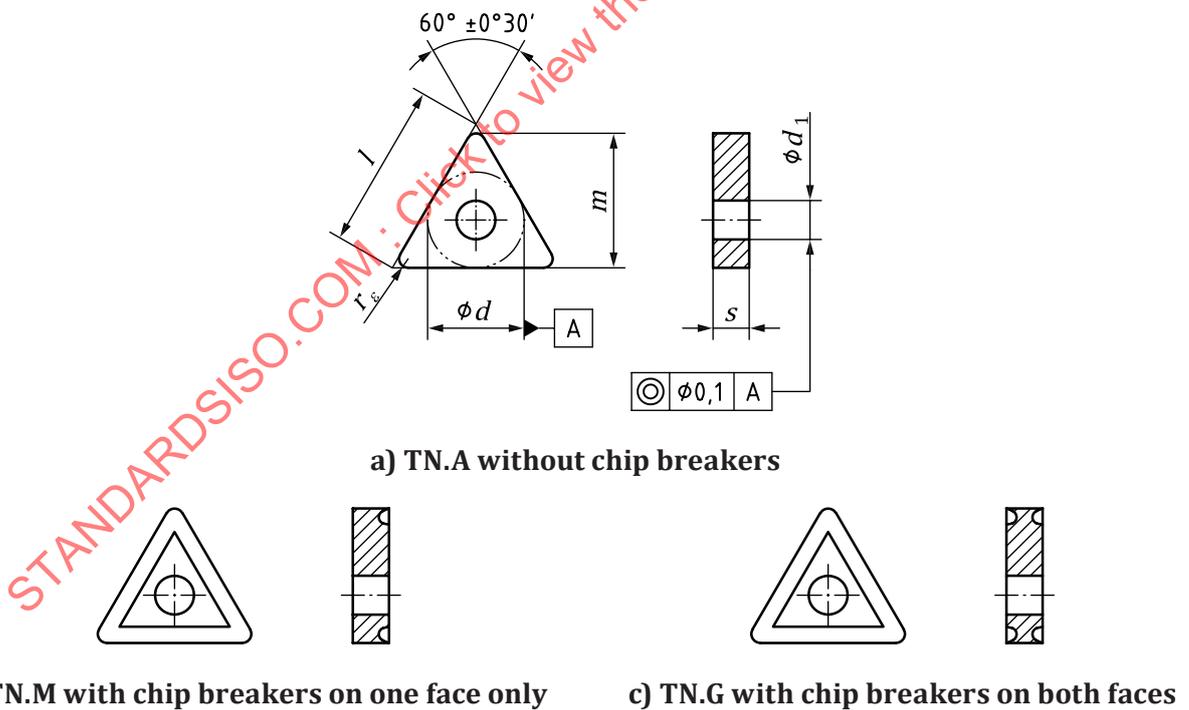


Figure 2 — Triangular inserts

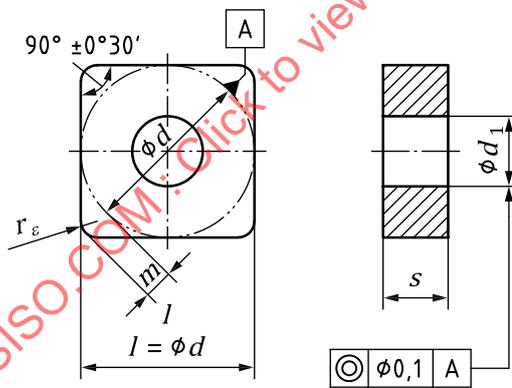
Table 2 — Dimensions of triangular inserts

Dimensions in millimetres

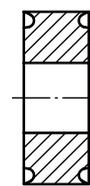
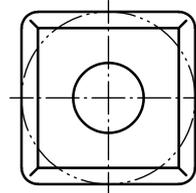
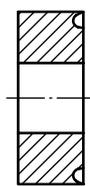
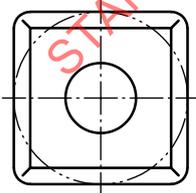
Insert			$l$ $\approx$	$d^a$	$s^a$	$m^a$	$r_\varepsilon$ $\pm 0,1$	$d_1$ $\pm 0,08$
TN.A110202	TN.M110202	TN.G110202	11	6,35	2,38	9,322	0,2	2,26
TN.A110204	TN.M110204	TN.G110204				9,128	0,4	
TN.A110208	TN.M110208	TN.G110208				8,731	0,8	
TN.A160304	TN.M160304	TN.G160304	16,5	9,525	3,18	13,891	0,4	3,81
TN.A160308	TN.M160308	TN.G160308				13,494	0,8	
TN.A160312	TN.M160312	TN.G160312				13,097	1,2	
TN.A160404	—	TN.G160404			4,76	13,891	0,4	
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	

<sup>a</sup> Tolerances in accordance with ISO 1832. See Annex A.

8.3 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

Inserts			$d_{a,b}$	$s^a$	$m^a$	$r_\epsilon$ $\pm 0,1$	$d_1$ $\pm 0,08$
—	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.A120416	SN.M120416	SN.G120416			1,972	1,6	
—	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	

<sup>a</sup> Tolerances in accordance with ISO 1832. See Annex A.  
<sup>b</sup>  $d = l$ .

8.4 Rhombic inserts with 80° included angle

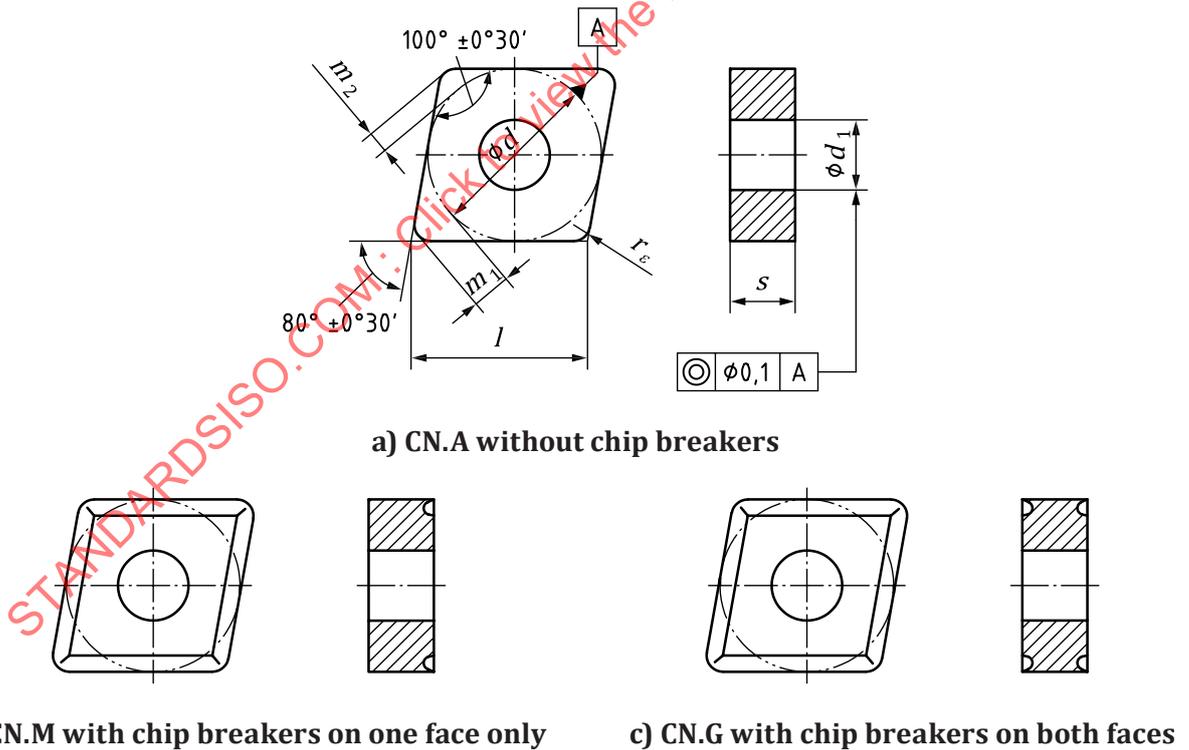


Figure 4 — Rhombic inserts with 80° included angle

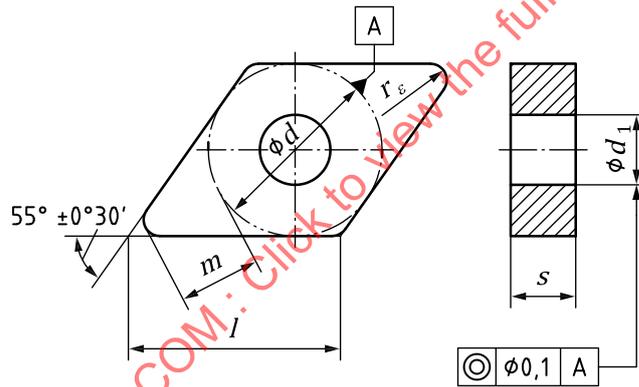
**Table 4 — Dimensions of rhombic inserts with 80° included angle**

Dimensions in millimetres

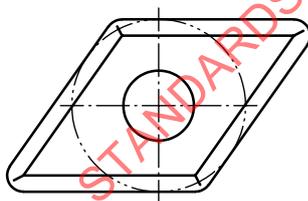
Insert			$l$ $\approx$	$d^a$	$s^a$	$m_1^a$	$m_2^a$	$r_\epsilon$ $\pm 0,1$	$d_1$ $\pm 0,08$
CN.A090304	CN.M090304	CN.G090304	9,7	9,525	3,18	2,426	1,333	0,4	3,81
CN.A090308	CN.M090308	CN.G090308				2,206	1,212	0,8	
—	—	CN.G120404	12,9	12,7	4,76	3,308	1,818	0,4	5,16
CN.A120408	CN.M120408	CN.G120408				3,088	1,697	0,8	
CN.A120412	CN.M120412	CN.G120412				2,867	1,576	1,2	
CN.A120416	CN.M120416	CN.G120416				2,647	1,455	1,6	
—	CN.M160608	CN.G160608	16,1	15,875	6,35	3,97	2,182	0,8	6,35
—	CN.M160612	CN.G160612				3,744	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	

<sup>a</sup> Tolerances in accordance with ISO 1832. See Annex A.

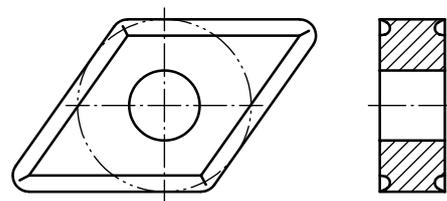
**8.5 Rhombic inserts with 55° included angle**



**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			$l$ $\approx$	$d^a$	$s^a$	$m^a$	$r_\epsilon$ $\pm 0,1$	$d_1$ $\pm 0,08$
DN.A110304	DN.M110304	DN.G110304	11,6	9,525	3,18	5,089	0,4	3,81
DN.A110308	DN.M110308	DN.G110308				4,626	0,8	
DN.A110312	DN.M110312	DN.G110312				4,164	1,2	
DN.A150408	DN.M150408	DN.A150408	15,4	12,7	4,76	6,478	0,8	5,16
DN.A150412	DN.M150412	DN.A150412	6,015			1,2		
DN.A150604	—	DN.G150604	15,5			6,35	6,939	
DN.A150608	DN.M150608	DN.G150608		6,478	0,8			
DN.A150612	DN.M150612	DN.G150612		6,015	1,2			
DN.A150616	DN.M150616	DN.G150616		5,552	1,6			

<sup>a</sup> Tolerances in accordance with ISO 1832. See Annex A.

8.6 Hexagonal (trigon) inserts with 80° included angle

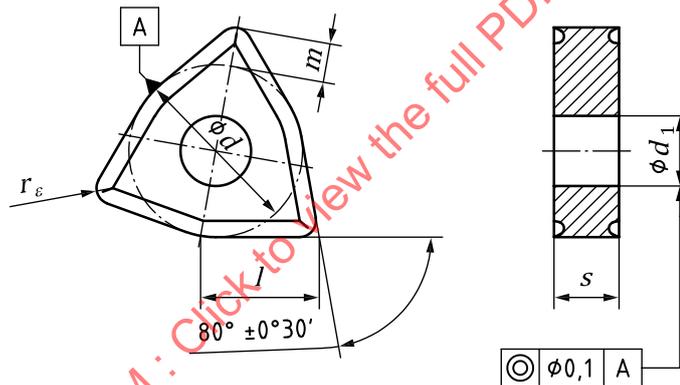


Figure 6 — WN.G with chip breakers on both faces

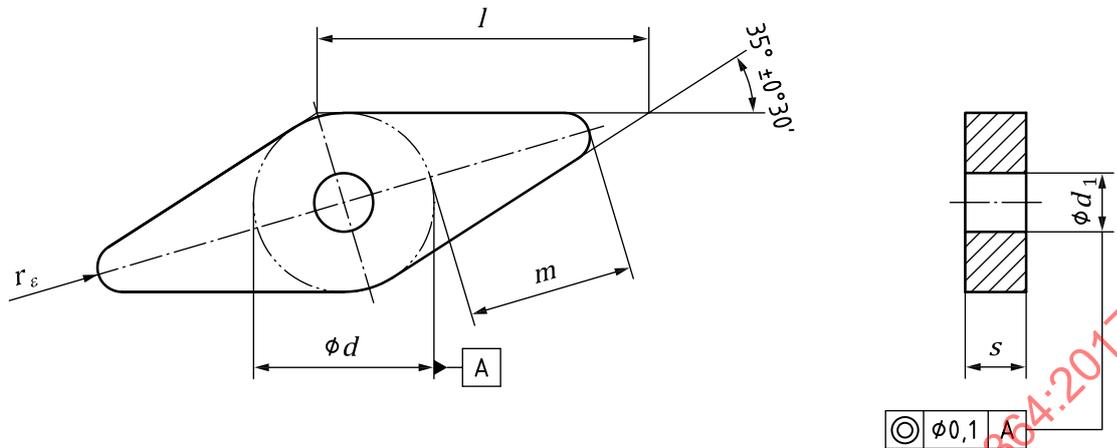
Table 6 — Dimensions of hexagonal (trigon inserts) with 80° included angle

Dimensions in millimetres

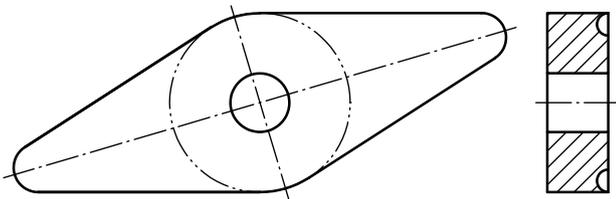
Insert	$l$ $\approx$	$d^a$	$s^a$	$m^a$	$r_\epsilon$ $\pm 0,1$	$d_1$ $\pm 0,08$
WN.G060404	6,5	9,525	4,76	2,426	0,4	3,81
WN.G060408				2,205	0,8	
WN.G080404	8,7	12,7	4,76	3,308	0,4	5,16
WN.G080408				3,087	0,8	
WN.G080412				2,867	1,2	

<sup>a</sup> Tolerances in accordance with ISO 1832. See Annex A.

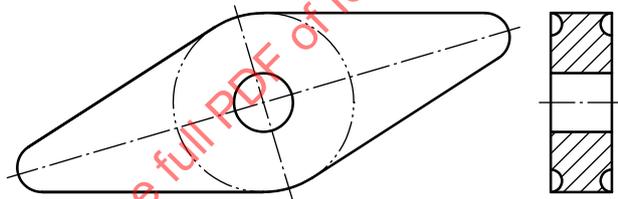
8.7 Rhombic inserts with 35° included angle



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				$l$ $\approx$	$d$	$s$	$m$	$r_\epsilon$ $\pm 0,1$	$d_1$ $\pm 0,08$
—	—	VN.G160402		16,6	9,525	4,76	10,610	0,2	3,81
VN.A160404	VN.M160404	VN.G160404					10,145	0,4	
VN.A160408	VN.M160408	VN.G160408					9,215	0,8	
VN.A160412	—	VN.G160412					8,285	1,2	
—	—	VN.G220404	—	22,1	12,7		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	

## 8.8 Round inserts

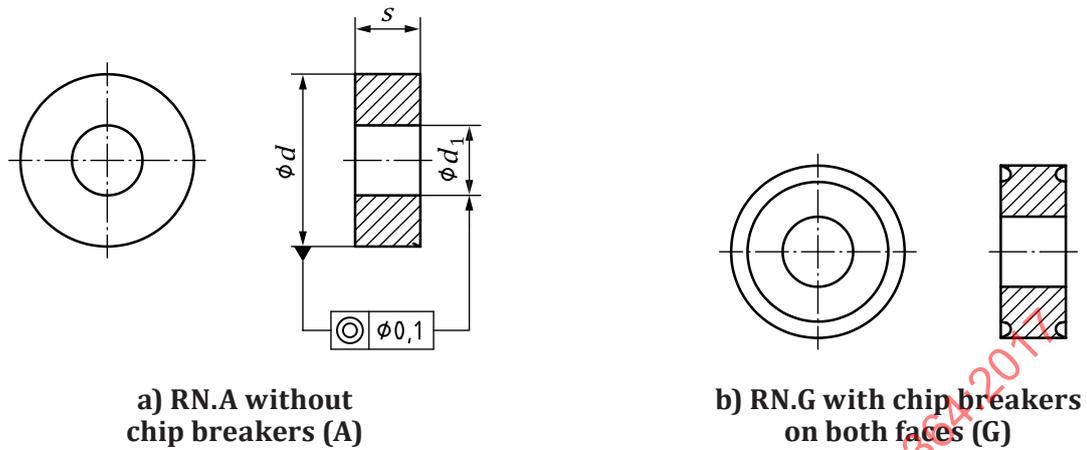


Figure 8 — Round inserts

Table 8 — Dimensions of round inserts

Dimensions in millimetres

Insert		$d$		$s$ $\pm 0,13$	$d_1$ $\pm 0,08$
RN.A 090300	RN.G 090300	9,525	$\pm 0,05$	3,18	3,81
RN.A 120400	RN.G 120400	12,7	$\pm 0,08$	4,76	5,16
RN.A 150600	RN.G 150600	15,875	$\pm 0,10$	6,35	6,35
RN.A 190600	RN.G 190600	19,05			7,94
RN.A 250900	RN.G 250900	25,4	$\pm 0,13$	9,52	9,12

## Annex A (normative)

### Methods of measurement of “ $m$ ” dimension

#### A.1 Triangular inserts

Dimension  $m$  is related to the side opposite the corner that is to be measured. The insert is 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.

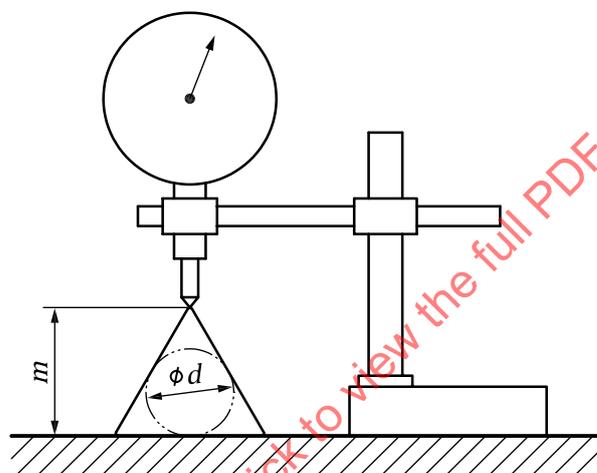


Figure A.1 — Triangular insert

#### A.2 Square inserts

Dimension  $m$  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  $90^\circ$  V-block as shown in [Figure A.2](#) and checked by means of 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  $\pm 0,002$  mm.

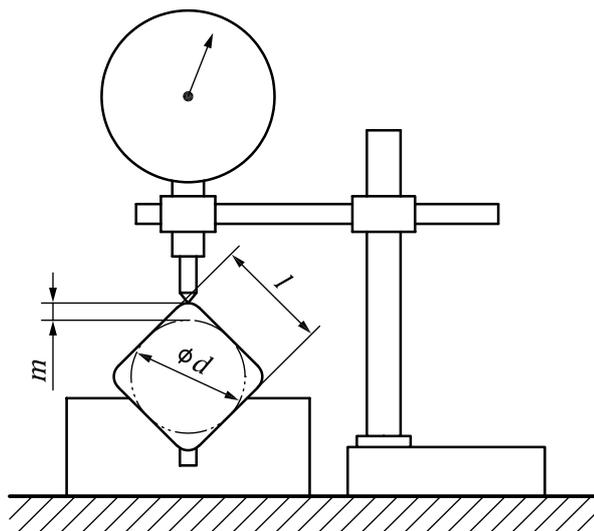


Figure A.2 — Square insert

### A.3 Rhombic inserts

Dimension  $m$ ,  $m_1$  or  $m_2$  is checked by 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 is 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 has been 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.

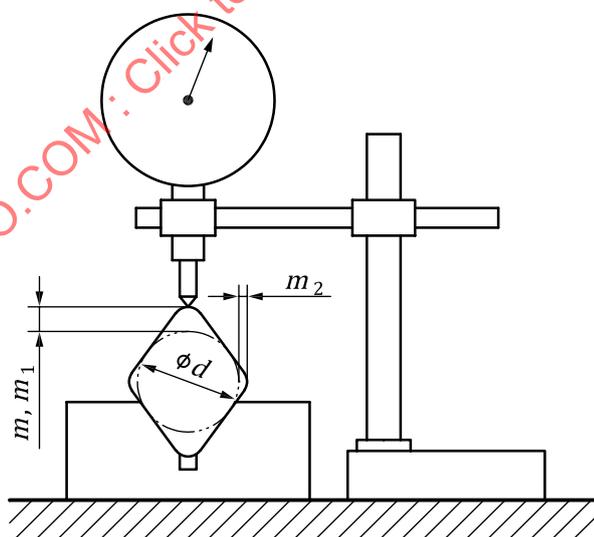


Figure A.3 — Rhombic insert

### A.4 Round inserts

Diameter  $d$  is measured with a micrometer or a similar device.

## A.5 Hexagonal inserts

Dimension  $m$  is checked by 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 is mounted on a  $160^\circ$  V-block as shown in [Figure A.4](#) 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 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.

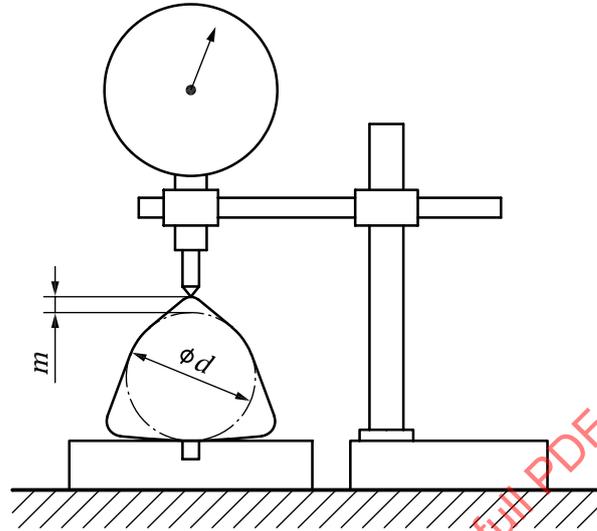


Figure A.4 — Hexagonal insert

## Annex B (informative)

### Range of sizes of inserts with rounded corners with cylindrical fixing hole, with shapes covered by this document

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 $r_\epsilon$					Designation	Corner radius $r_\epsilon$					Designation	Corner radius $r_\epsilon$				
		0,4	0,8	1,2	1,6	2,4		0,4	0,8	1,2	1,6	2,4		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		+	+	+	
9,525	RN.A090300			+									RN.G090300			+		
12,7	RN.A120400			+									RN.G120400			+		
15,875	RN.A150600			+									RN.G150600			+		
19,05	RN.A190600			+									RN.G190600			+		
25,4	RN.A250900			+									RN.G250900			+		