

INTERNATIONAL STANDARD

ISO
9361-2

First edition
1991-05-15

Indexable inserts for cutting tools — Ceramic inserts with rounded corners —

Part 2:

Dimensions of inserts with cylindrical fixing hole
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*Plaquettes amovibles pour outils coupants — Plaquettes en céramique
avec arrondi de pointe*
Partie 2: Dimensions des plaquettes avec trou de fixation cylindrique

INTERNATIONAL

ISO



Reference number
ISO 9361-2:1991(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9361-2 was prepared by Technical Committee ISO/TC 29, *Small tools*.

ISO 9361 consists of the following parts, under the general title *Indexable inserts for cutting tools — Ceramic inserts with rounded corners*.

- Part 1: *Dimensions of inserts without fixing hole*
- Part 2: *Dimensions of inserts with cylindrical fixing hole*

Annexes A, B and C form an integral part of this part of ISO 9361. Annex D is for information only.

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ISO 9361-2:1991
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Indexable inserts for cutting tools — Ceramic inserts with rounded corners —

Part 2:

Dimensions of inserts with cylindrical fixing hole

1 Scope

This part of ISO 9361 specifies the dimensions of indexable ceramic inserts with rounded corners, with cylindrical fixing hole, with 0° normal clearance. These inserts are primarily intended to be mounted by top and hole, or hole alone, clamping on turning and boring tools.

Ceramic cutting materials consist of a variety of oxides, nitrides and carbides. In contrast with hardmetals (including cermets) ceramics do not have a metallic binding matrix. Such ceramic materials are, for example, oxide ceramics (consisting primarily of aluminium oxide Al_2O_3), carboxide ceramics (consisting generally of a mixture of aluminium oxide and other materials such as titanium carbide TiC) and nitride ceramics (consisting generally of a mixture of silicon nitride and other materials, such as yttrium oxide Y_2O_3 and aluminium oxide).

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 9361. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9361 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1832:1991, *Indexable inserts for cutting tools — Designation*.

3 Types of inserts

The types of indexable ceramic inserts specified in this part of ISO 9361 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;
- RN: round inserts, with 0° normal clearance.

Inserts dealt with in this part of ISO 9361 are standardized without chip breakers.

In general, the inserts are used with chamfered or rounded cutting edges, see clause 6.

Table C.1 gives the range of sizes for the inserts (see annex C).

4 Tolerances

The indexable ceramic inserts which are the subject of this part of ISO 9361 are provided in tolerance classes G and M, in accordance with ISO 1832.

The values of the tolerances in accordance with ISO 1832 are given in table A.1. Other tolerances are given in table 3 to table 7.

5 Fixing hole

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	9,525	12,7	15,875	19,05
$d_1 \pm 0,08$	3,81	5,16	6,35	7,94

6 Cutting edge

6.1 Cutting edge condition

The cutting edge condition of the indexable ceramic inserts specified in this part of ISO 9361 is to be selected from those specified in ISO 1832:1991, 5.1.

6.2 Additional information

The dimensions of chamfered cutting edges T, S, K or P may be specified, following the letter symbol on cutting edge condition in the manufacturer's catalogue. Such information on cutting edge dimensions, if specified, shall have the form of a five-digit number, the first three digits being the value of b_γ in units of 0,01 mm and the last two digits being the value of γ_b , in degrees (see figure 1).

NOTE 1 In the case of cutting edge condition K and P, the first chamfer b_{γ_1} , defined in accordance with figure 2, is at the manufacturer's choice and is not part of the additional information (five-digit number) as described in 6.2.

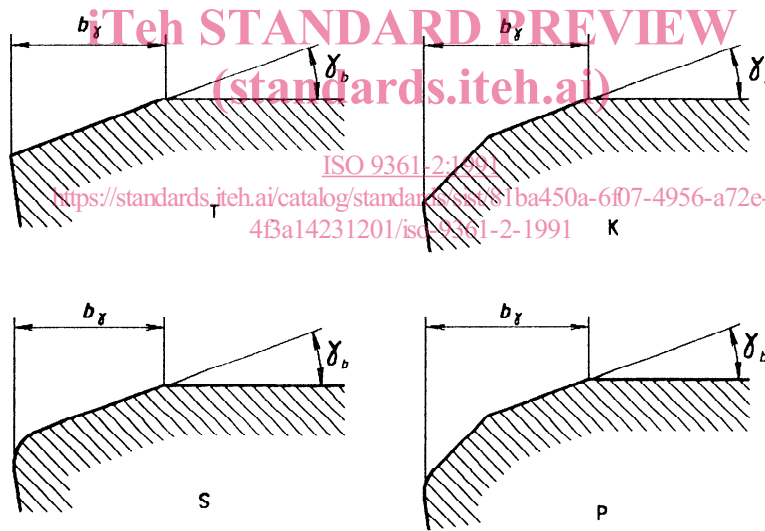


Figure 1

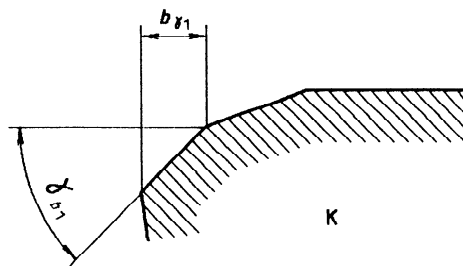


Figure 2

EXAMPLE

Chamfered cutting edge T on an insert TNGA 160412

$$b_y = 0,2 \text{ mm}$$

$$\gamma_b = 20^\circ$$

Designation and additional information:

TNGA 160412T 02020

7 Designation and marking**7.1 Designation**

The designation of the indexable ceramic inserts which form the subject of this part of ISO 9361 shall conform to ISO 1832.

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

- the number symbol for the additional information on cutting edge dimensions, in accordance with 6.2;
- the commercial designation of the ceramic grade.

7.2 Marking

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

- symbol of the commercial designation of the ceramic grade.

8 Measurement

Annex B indicates the methods of measuring the dimension m of the indexable inserts covered by this part of ISO 9361.

9 Recommended dimensions

The choice of the more common dimensions is restricted to the values given in table 3 to table 7. It is strongly recommended that these standard inserts be used each time wherever possible (first preference). When other inserts are required, their dimensions shall be selected from the non-shaded areas of table C.1 (second preference). Inserts corresponding to the dimensions given in the shaded areas of this table are not recommended.

NOTE 2 The m -dimensions are calculated using the exact values, rounded off to the third decimal point, of the corner radius r_s in accordance with table 2.

Table 2 — Values of r_s used for calculation of dimension m

Designation of r_s	04	08	12	16	20	24
Calculation value of r_s , mm	0,397	0,794	1,191	1,588	1,984	2,381

9.1 Triangular inserts

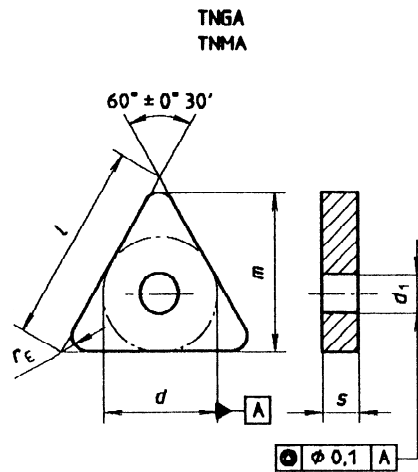


Figure 3

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Table 3 – Dimensions of triangular inserts

Dimensions in millimetres

Inserts		l ≈	d 1)	m 1)	r_e ± 0,1	d_1 ± 0,08
TNGA 160404	TNMA 160404	16,5	9,525	4,76	13,891	3,81
TNGA 160408	TNMA 160408				13,494	
TNGA 160412	TNMA 160412				13,097	
TNGA 160416	TNMA 160416				12,7	
TNGA 220608	TNMA 220608	22	12,7	6,35	18,256	5,16
TNGA 220612	TNMA 220612				17,859	
TNGA 220616	TNMA 220616				17,463	
TNGA 220620	TNMA 220620				17,066	

1) Tolerances in accordance with those specified in ISO 1832, annex A.

9.2 Square inserts

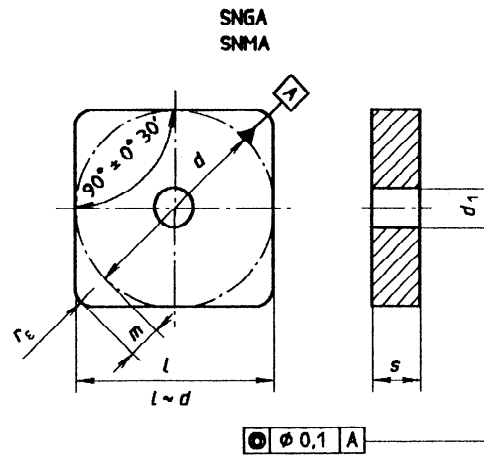


Figure 4

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Table 4 Dimensions of square inserts

Dimensions in millimetres

Inserts		d 1)	s 1)	m 1)	r_t $\pm 0,1$	d_1 $\pm 0,08$
SNGA 120404	SNMA 120404	12,7	4,76	2,466	0,4	5,16
SNGA 120408	SNMA 120408			2,301	0,8	
SNGA 120412	SNMA 120412			2,137	1,2	
SNGA 120416	SNMA 120416			1,972	1,6	
SNGA 120608	SNMA 120608	12,7	6,35	2,301	0,8	5,16
SNGA 120612	SNMA 120612			2,137	1,2	
SNGA 120616	SNMA 120616			1,972	1,6	
SNGA 120620	SNMA 120620			1,808	2	
SNGA 150612	SNMA 150612	15,875	6,35	2,795	1,2	6,35
SNGA 150616	SNMA 150616			2,63	1,6	
SNGA 150620	SNMA 150620			2,466	2	

1) Tolerances in accordance with those specified in ISO 1832, annex A.

9.3 Rhombic inserts with 80° included angle

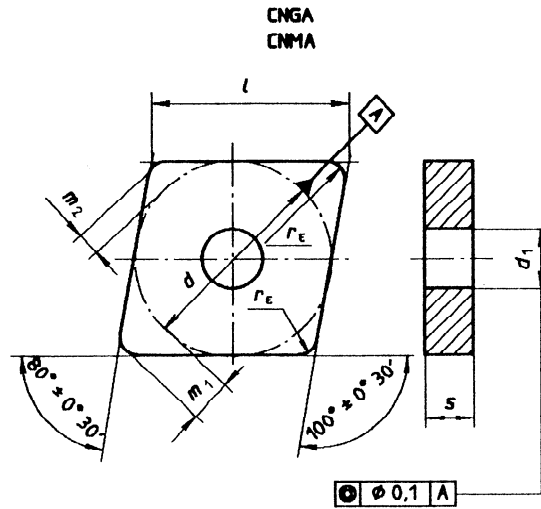


Figure 5

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Table 5 — Dimensions of rhombic inserts with 80° included angle

ISO 9361-2:1991

Dimensions in millimetres

Inserts		l	d	s	m_1	m_2	r_f ± 0,1	d_1 ± 0,08
CNGA 120404	CNMA 120404	12,9	12,7	4,76	3,308	1,818	0,4	5,16
CNGA 120408	CNMA 120408				3,088	1,697	0,8	
CNGA 120412	CNMA 120412				2,867	1,576	1,2	
CNGA 120416	CNMA 120416				2,647	1,455	1,6	
CNGA 120608	CNMA 120608	12,9	12,7	6,35	3,088	1,697	0,8	5,16
CNGA 120612	CNMA 120612				2,867	1,576	1,2	
CNGA 120616	CNMA 120616				2,647	1,455	1,6	
CNGA 120620	CNMA 120620				2,426	1,334	2	
CNGA 160612	CNMA 160612	16,1	15,875	6,35	3,749	2,061	1,2	6,35
CNGA 160616	CNMA 160616				3,529	1,939	1,6	
CNGA 160620	CNMA 160620				3,308	1,818	2	

1) Tolerances in accordance with those specified in ISO 1832, annex A.

9.4 Rhombic inserts with 55° included angle

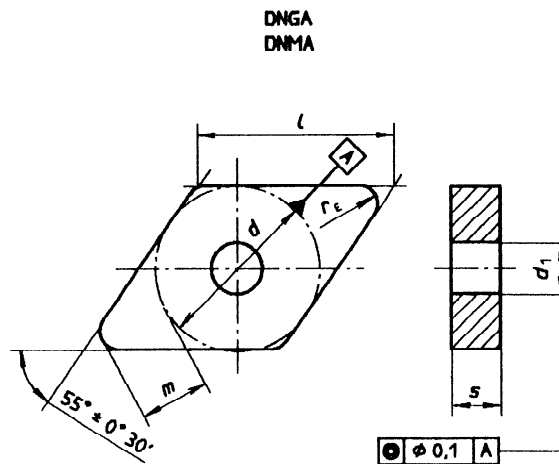


Figure 6

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Table 6 — Dimensions of rhombic inserts with 55° included angle

ISO 9361-2:1991

Dimensions in millimetres

Inserts		l	d	m	r_{ϵ}	d_1
		\approx	$\pm 0,1$	$\pm 0,1$	$\pm 0,1$	$\pm 0,08$
DNGA 150408	DNMA 150408	15,5	12,7	4,76	6,478	5,16
DNGA 150412	DNMA 150412				6,015	
DNGA 150416	DNMA 150416				5,552	
DNGA 150608	DNMA 150608	15,5	12,7	6,35	6,478	5,16
DNGA 150612	DNMA 150612				6,015	
DNGA 150616	DNMA 150616				5,552	
DNGA 150620	DNMA 150620				5,09	

1) Tolerances in accordance with those specified in ISO 1832, annex A.