INTERNATIONAL STANDARD

ISO 9361-1

First edition
1991-05-15

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

Part 1:
Dimensions of inserts without fixing hole

Plaquettes amovibles pour outils coupants — Plaquettes en céramique avec arrondi de pointe —
Partie 1: Dimensions des plaquettes sans trou de fixation

Reference number
ISO 9361-1:1991(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 9361-1 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 and B form an integral part of this part of ISO 9361. Annex C is for information only.

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

Part 1:
Dimensions of inserts without fixing hole

1 Scope

This part of ISO 9361 specifies the dimensions of indexable ceramic inserts with rounded corners, without fixing hole, and with 0° and 11° normal clearance. These inserts are primarily intended to be mounted by top 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;

— TP: triangular inserts, with 11° normal clearance;

— SN: square inserts, with 0° normal clearance;

— SP: square inserts, with 11° 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 5.

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

4 Tolerances

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

The values of the tolerances in accordance with ISO 1832 are given in table 2 to table 5 for the insert dimensions.

5 Cutting edge

5.1 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.

5.2 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 also figure 1).

NOTE 1 In the case of cutting edge condition K and P, the first chamfer $b_{\gamma 1}$, 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 5.2.

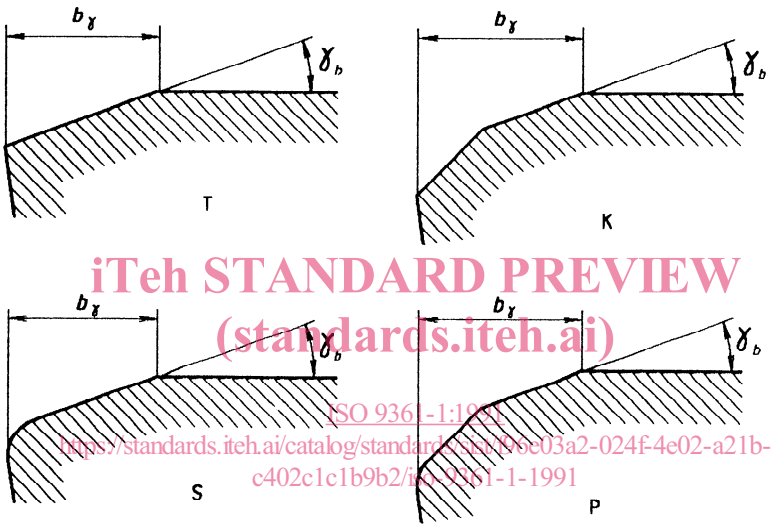

Figure 1

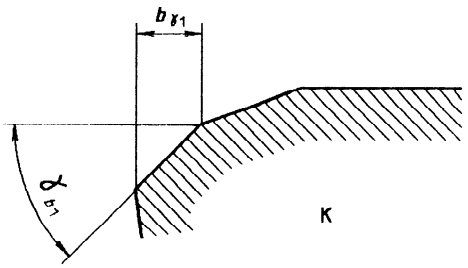

Figure 2

EXAMPLE

Chamfered cutting edge T on an insert TNGN 160412

$b_\gamma = 0{,}2$ mm

$\gamma_b = 20°$

Designation and additional information:

TNGN 160412T 02020

6 Designation and marking

6.1 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, according to 5.2;

— the commercial designation of the ceramic grade.

6.2 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.

7 Measurement

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

8 Recommended dimensions

The choice of the more common dimensions is restricted to the values given in table 2 to table 6. 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 B.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_ε, in accordance with table 1.

Table 1 — Values of r_ε used for calculation of dimension m

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

8.1 Triangular inserts

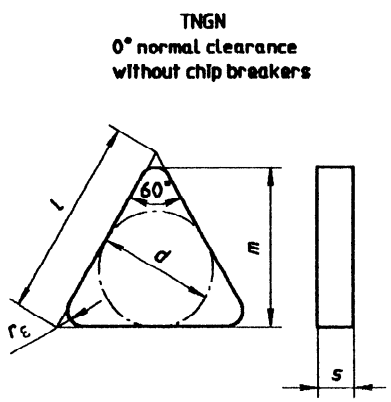

Figure 3

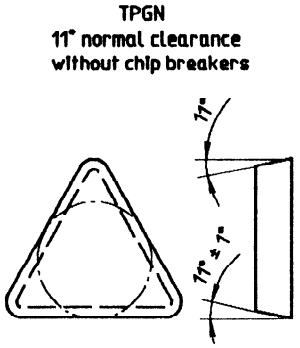

Figure 4

Table 2 — Dimensions of triangular inserts

Dimensions in millimetres

Insert		l ≈	d ± 0,025	s ± 0,13	m ± 0,025	r_ε ± 0,1
TNGN 110304	—	11	6,35	3,18	9,128	0,4
TNGN 110308	TPGN 110308				8,731	0,8
TNGN 110312	TPGN 110312				8,334	1,2
—	TPGN 160308	16,5	9,525	4,76	13,494	0,8
—	TPGN 160312				13,097	1,2
TNGN 160404	—				13,891	0,4
TNGN 160408	—				13,494	0,8
TNGN 160412	—				13,097	1,2
TNGN 160416	—				12,7	1,6
TNGN 160420	—				12,304	2
TNGN 160708	—			7,94	13,494	0,8
TNGN 160712	—				13,097	1,2
TNGN 160716	—				12,7	1,6
TNGN 160720	—				12,304	2
TNGN 160724	—				11,907	2,4
TNGN 220712	—	22	12,7		17,859	1,2
TNGN 220716	—				17,463	1,6
TNGN 220720	—				17,066	2

8.2 Square inserts

SNGN
0° normal clearance
without chip breakers

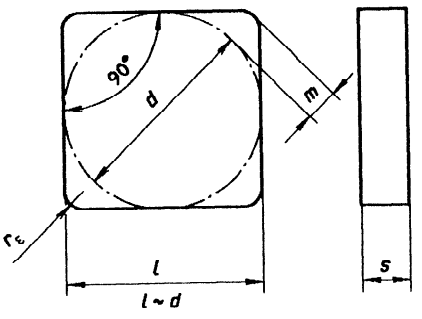

Figure 5

SPGN
11° normal clearance
without chip breakers

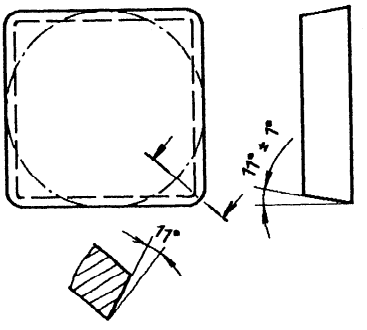

Figure 6

Table 3 — Dimensions of square inserts

Dimensions in millimetres

Insert		d ± 0,025	s ± 0,13	m ± 0,025	r_ε ± 0,1
SNGN 090304	**SPGN 090304**	9,525	3,18	1,808	0,4
SNGN 090308	**SPGN 090308**			1,644	0,8
SNGN 090404	—		4,76	1,808	0,4
SNGN 090408	—			1,644	0,8
SNGN 090412	—			1,479	1,2
—	**SPGN 120304**	12,7	3,18	2,466	0,4
—	**SPGN 120308**			2,301	0,8
—	**SPGN 120312**			2,137	1,2
SNGN 120404	—		4,76	2,466	0,4
SNGN 120408	**SPGN 120408**			2,301	0,8
SNGN 120412	**SPGN 120412**			2,137	1,2
SNGN 120416	**SPGN 120416**			1,972	1,6
SNGN 120420	—			1,808	2
SNGN 120708	—			2,301	0,8
SNGN 120712	—			2,137	1,2
SNGN 120716	—			1,972	1,6
SNGN 120720	—			1,808	2
SNGN 120724	—			1,644	2,4
SNGN 150708	—	15,875	7,94	2,959	0,8
SNGN 150712	—			2,795	1,2
SNGN 150716	—			2,63	1,6
SNGN 150720	—			2,466	2
SNGN 150724	—			2,301	2,4
SNGN 190712	—	19,05		3,452	1,2
SNGN 190716	—			3,288	1,6
SNGN 190720	—			3,123	2
SNGN 190724	—			2,959	2,4

8.3 Rhombic inserts with 80° included angle

CNGN
0° normal clearance
without chip breakers

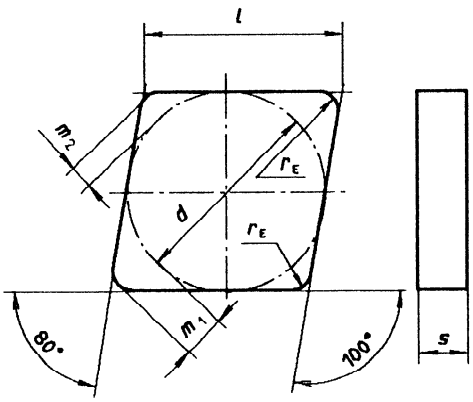

Figure 7

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

Dimensions in millimetres

Insert	l ≈	d ± 0,025	s ± 0,13	m_1 ± 0,025	m_2 ± 0,025	r_ε ± 0,1
CNGN 120404	12,9	12,7	4,76	3,308	1,818	0,4
CNGN 120408				3,088	1,697	0,8
CNGN 120412				2,867	1,576	1,2
CNGN 120416				2,647	1,455	1,6
CNGN 120708			7,94	3,088	1,697	0,8
CNGN 120712				2,867	1,576	1,2
CNGN 120716				2,646	1,454	1,6
CNGN 160708	16,1	15,875		3,97	2,182	0,8
CNGN 160712				3,749	2,061	1,2
CNGN 160716				3,529	1,939	1,6
CNGN 160720				3,308	1,818	2
CNGN 160724				3,088	1,697	2,4