TC 29

International Standard ISO 6987/1

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Indexable hardmetal (carbide) inserts with rounded corners, with partly cylindrical fixing hole — Part 1: Dimensions of inserts with 7° normal clearance

Plaquettes amovibles en métaux-durs (carbures métalliques) avec arrondi de pointe et trou de fixation partiellement cylindrique — Partie 1: Dimensions des plaquettes à dépouille normale 7°

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Descriptors : tools, cutting tools, carbide tools, designation, marking.

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6987/1 was developed by Technical Committee ISO/TC 29, *Small tools*, and was circulated to the member bodies in July 1982.

It has been approved by the member bodies of the following countries:

Australia	India	Sweden
Austria	Israel	Switzerland
Belgium	Italy	Thailand
Brazil	Netherlands	United Kingdom
Czechoslovakia	Poland	USA
Egypt, Arab Rep. of	Romania	USSR
France	South Africa, Rep. of	
Hungary	Spain	

The member bodies of the following countries expressed disapproval of the document on technical grounds:

Germany, F.R.
Japan

Printed in Switzerland

Indexable hardmetal (carbide) inserts with rounded corners, with partly cylindrical fixing hole — Part 1: Dimensions of inserts with 7° normal clearance

1 Scope and field of application

This part of ISO 6987 specifies the dimensions of indexable hardmetal (carbide) inserts with rounded corners, and with a partly cylindrical fixing hole. These inserts are primarily intended to be mounted on turning and boring tools by a countersunk head screw or any other fixing element, such as a pin lock.

2 References

ISO 513, *Application of hardmetals (carbides) for machining by chip removal — Designation of the main groups of chip removal and groups of application.*[1]

ISO 883, *Indexable hardmetal (carbide) inserts with rounded corners, without fixing hole — Dimensions.*[2]

ISO 1832, *Indexable inserts for cutting tools — Designation.*[3]

ISO 3364, *Indexable hardmetal (carbide) inserts with rounded corners, with cylindrical fixing hole — Dimensions.*[4]

ISO 3365, *Indexable hardmetal (carbide) inserts with wiper edges, without fixing hole — Dimensions.*[5]

3 Types of inserts

The types of indexable hardmetal (carbide) inserts specified in this part of ISO 6987 are the following:

— TC: triangular inserts, with 7° normal clearance;

— SC: square inserts, with 7° normal clearance;

— CC: rhombic inserts, with 7° normal clearance and 80° included angle;

— DC: rhombic inserts, with 7° normal clearance and 55° included angle;

— RC: round inserts, with 7° normal clearance.

Inserts dealt with in this part of ISO 6987 are standardized with chip breakers on the face and without chip breakers.

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

Table 8 gives the ranges of sizes for these inserts.

4 Interchangeability

4.1 Tolerances

Indexable hardmetal (carbide) inserts specified in this part of ISO 6987 are provided in tolerance class M according to ISO 1832.

The values of the tolerances according to ISO 1832 are given in annex A.

Other tolerances are included in table 1 for hole dimensions, and in tables 2 to 6 for the insert dimensions.

1) At present at the stage of draft. (Revision of ISO 513-1977.)

2) At present at the stage of draft. (Revision of ISO 883-1977.)

3) At present at the stage of draft. (Revision of ISO 1832-1977.)

4) At present at the stage of draft. (Revision of ISO 3364-1977.)

5) At present at the stage of draft. (Revision of ISO 3365/1-1977 and ISO 3365/2-1980.)

4.2 Thickness s of inserts with chip breaker

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).

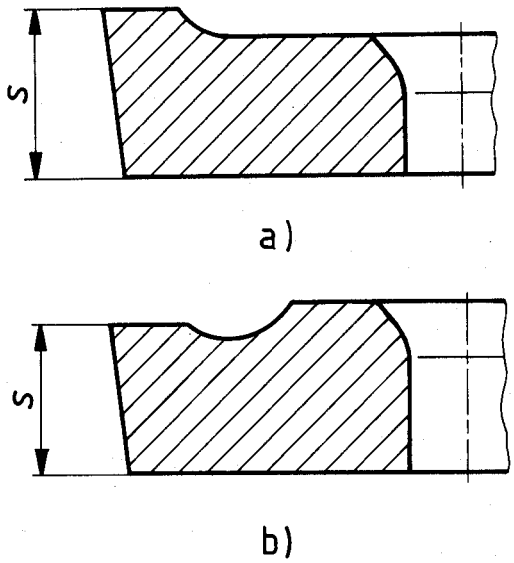


Figure 1

4.3 Fixing hole

In order to guarantee interchangeability when mounting the insert by a countersunk head screw having a head taper angle between 40° and 60°, the form of the hole is partly cylindrical and its dimensions are related to the diameter of the inscribed circle of the insert. Figure 2 and table 1 give the elements of definition of the fixing hole.

The point P is defined by diameter d_2 given in table 1 and t, measured from the cutting edge, at the corner, and given by the condition

$$0{,}05\ d_1 < t < 0{,}3\ d_1$$

The diameter d_1 of the cylindrical part is given in table 1.

The part of the profile between P and d_1 is left to the manufacturers' option but shall satisfy the following requirements:

— the use of screws with head taper angle β between 40° and 60°;

— the angle of the tangent theoretical taper at point P has value $\varphi > 65°$;

— the distance between the contact line with a screw having 40° head taper angle and the contact line with a screw having 60° head taper angle shall be as small as possible.

The part of the profile above point P is left to the manufacturers' option.

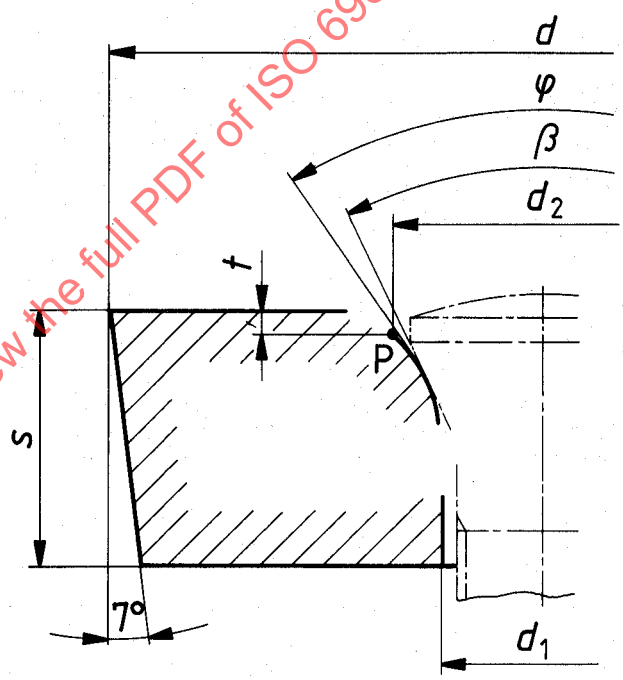


Figure 2

Table 1

Values in millimetres

d	for insert shape	T, S, C, D	5,56	6,35	7,94	9,525	12,7	15,875	19,05	25,4	—
		R	—	6	8	10/12	—	16	20	25	32
d_1 J_s13			2,5	2,8	3,4	4,4	5,5	5,5	6,5	8,6	8,6
d_2 J_s13			3,3	3,75	4,5	6	7,5	7,5	9	12	12

5 Designation and marking

5.1 Designation

The designation of the indexable hardmetal (carbide) inserts complying with this part of ISO 6987 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.

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) grad (or both, if possible, on large inserts).

6 Measurement

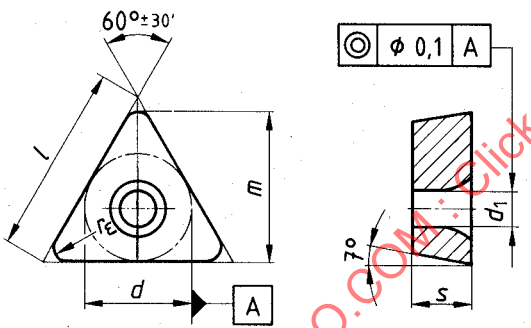
Annex B indicates the methods of measuring the dimension m of the indexable inserts covered by this part of ISO 6987.

7 Recommended dimensions

The choice of the more common dimensions is restricted to the specifications given in tables 2 to 6. It is strongly recommended that these standard inserts be used wherever possible. When other inserts are specially required, insert dimensions shall be selected from the non-shaded portions of the table given in annex C. Dimensions represented by the shaded portions of this table are not to be used.

7.1 Triangular inserts

TCMW
without chip breakers



TCMT
with chip breakers

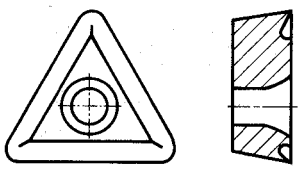


Table 2

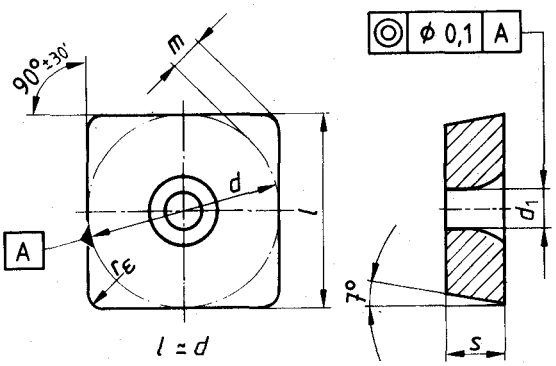
Values in millimetres

Inserts		l ≈	d 1)	s 1)	m 1)	r_ε ± 0,10	d_1 J_s13
TCMW 090204	TCMT 090204	9,6	5,56	2,38	7,943	0,4	2,5
TCMW 110202	TCMT 110202	11,0	6,35		9,322	0,2	2,8
TCMW 110204	TCMT 110204				9,128	0,4	
TCMW 130304	TCMT 130304	13,6	7,94	3,18	11,510	0,4	3,4
TCMW 130308	TCMT 130308				11,113	0,8	
TCMW 16T304	TCMT 16T304	16,5	9,525	3,97	13,891	0,4	4,4
TCMW 16T308	TCMT 16T308				13,494	0,8	
TCMW 16T312	TCMT 16T312				13,097	1,2	
TCMW 220404	TCMT 220404	22,0	12,70	4,76	18,653	0,4	5,5
TCMW 220408	TCMT 220408				18,256	0,8	
TCMW 220412	TCMT 220412				17,859	1,2	
TCMW 220416	TCMT 220416				17,463	1,6	

1) Tolerance on d, s and m according to ISO 1832. See annex A.

7.2 Square inserts

SCMW
without chip breakers



SCMT
with chip breakers

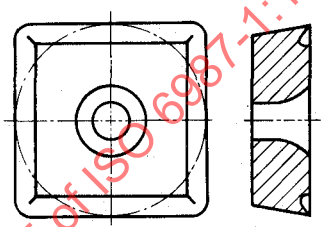


Table 3

Values in millimetres

Inserts		d 1)	s 1)	m 1)	r_ε ± 0,10	d_1 J_s13
SCMW 09T304	SCMT 09T304	9,525	3,97	1,808	0,4	4,4
SCMW 09T308	SCMT 09T308			1,644	0,8	
SCMW 120404	SCMT 120404	12,70	4,76	2,466	0,4	5,5
SCMW 120408	SCMT 120408			2,301	0,8	
SCMW 120412	SCMT 120412			2,137	1,2	
SCMW 150512	SCMT 150512	15,875	5,56	2,795	1,2	5,5
SCMW 150516	SCMT 150516			2,630	1,6	
SCMW 190612	SCMT 190612	19,05	6,35	3,452	1,2	6,5
SCMW 190616	SCMT 190616			3,288	1,6	
SCMW 190624	SCMT 190624			2,959	2,4	

1) Tolerance on d, s and m according to ISO 1832. See annex A.

7.3 Rhombic inserts with 80° included angle

CCMW
without chip breakers

CCMT
with chip breakers

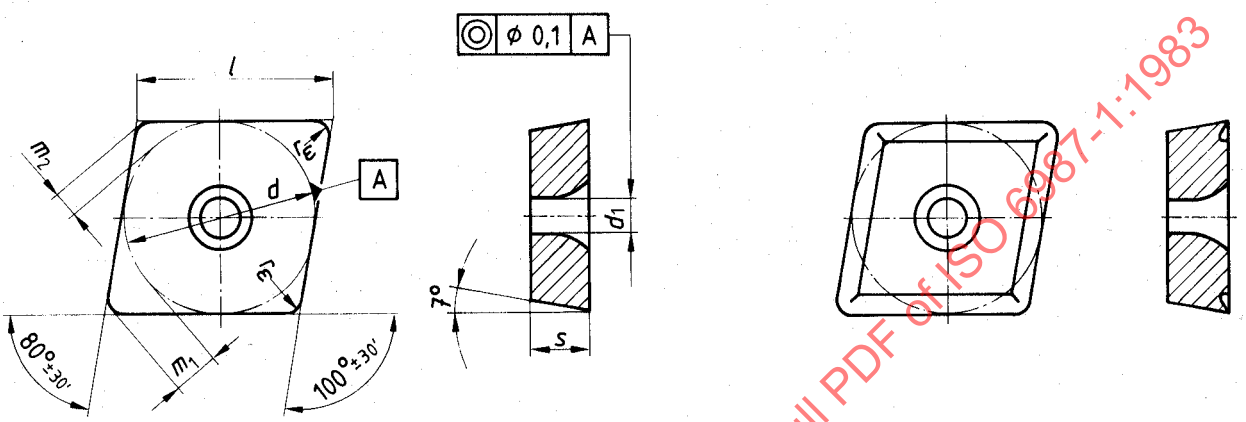


Table 4

Values in millimetres

Inserts		l ≈	d 1)	s 1)	m_1 1)	m_2 1)	r_ε ± 0,10	d_1 J_s13
CCMW 060202	CCMT 060202	6,4	6,35	2,38	1,652	0,908	0,2	2,8
CCMW 060204	CCMT 060204				1,544	0,848	0,4	
CCMW 080304	CCMT 080304	8,1	7,94	3,18	1,986	1,091	0,4	3,4
CCMW 080308	CCMT 080308				1,765	0,970	0,8	
CCMW 09T304	CCMT 09T304	9,7	9,525	3,97	2,426	1,333	0,4	4,4
CCMW 09T308	CCMT 09T308				2,206	1,212	0,8	
CCMW 120404	CCMT 120404	12,9	12,70	4,76	3,308	1,818	0,4	5,5
CCMW 120408	CCMT 120408				3,088	1,697	0,8	
CCMW 120412	CCMT 120412				2,867	1,576	1,2	
CCMW 160512	CCMT 160512	16,1	15,875	5,56	3,749	2,061	1,2	5,5
CCMW 160516	CCMT 160516				3,529	1,939	1,6	
CCMW 190612	CCMT 190612	19,3	19,05	6,35	4,632	2,545	1,2	6,5
CCMW 190616	CCMT 190616				4,411	2,424	1,6	
CCMW 190624	CCMT 190624				3,970	2,182	2,4	

1) Tolerance on d, s, m_1 and m_2 according to ISO 1832. See annex A.

7.4 Rhombic inserts with 55° included angle

DCMW
without chip breakers

DCMT
with chip breakers

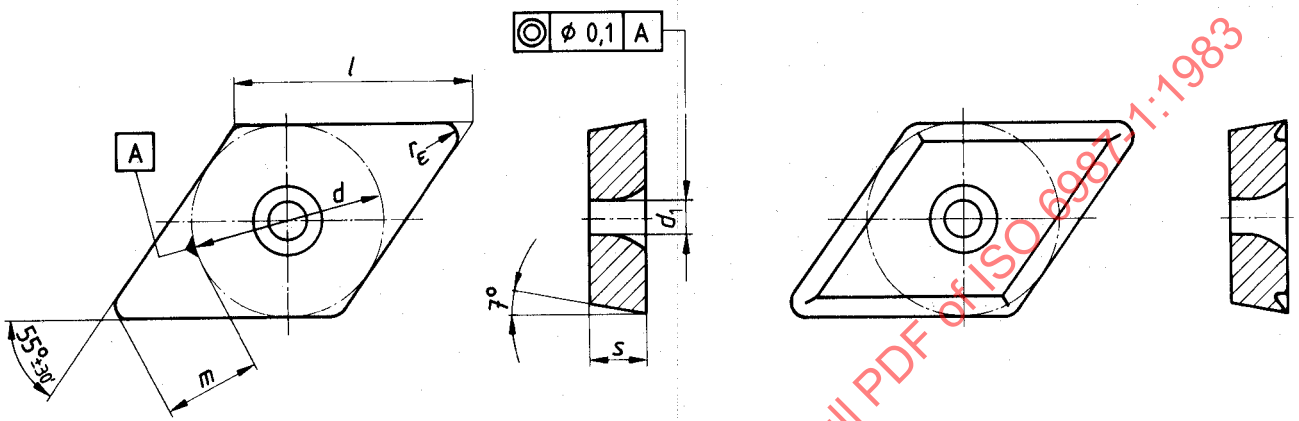


Table 5

Values in millimetres

Inserts		l ≈	d 1)	s 1)	m 1)	r_ε ± 0,10	d_1 J_s13
DCMW 070202	DCMT 070202	7,75	6,35	2,38	3,464	0,2	2,8
DCMW 070204	DCMT 070204				3,238	0,4	
DCMW 11T304	DCMT 11T304	11,6	9,525	3,97	5,089	0,4	4,4
DCMW 11T308	DCMT 11T308				4,626	0,8	
DCMW 11T312	DCMT 11T312				4,164	1,2	
DCMW 150404	DCMT 150404	15,5	12,70	4,76	6,939	0,4	5,5
DCMW 150408	DCMT 150408				6,477	0,8	
DCMW 150412	DCMT 150412				6,014	1,2	
DCMW 150416	DCMT 150416				5,552	1,6	

1) Tolerance on d, s and m according to ISO 1832. See annex A.

7.5 Round inserts

RCMT
with chip breakers

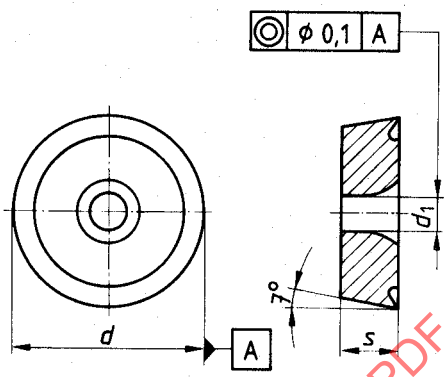


Table 6

Values in millimetres

Insert	d 1)	s 1)	d_1 J_s13
RCMT 0602MO	6	2,38	2,8
RCMT 0803MO	8	3,18	3,4
RCMT 10T3MO	10	3,97	4,4
RCMT 1204MO	12	4,76	4,4
RCMT 1605MO	16	5,56	5,5
RCMT 2006MO	20	6,35	6,5
RCMT 2507MO	25	7,94	8,6
RCMT 3209MO	32	9,52	8,6

1) Tolerance on d and s according to ISO 1832. See annex A.