
Polycrystalline diamond inserts, tipped — Dimensions, types

Plaquettes brasées en diamant polycristallin — Dimensions, types

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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).

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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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 29, *Small Tools*, Subcommittee SC 9, *Tools with cutting edges made of hard cutting materials*.

This second edition cancels and replaces the first edition (ISO 16463:2004), of which it constitutes a minor revision.

Polycrystalline diamond inserts, tipped — Dimensions, types

1 Scope

This International Standard applies to inserts with insert shapes in accordance with ISO 883 and ISO 6987, tipped with polycrystalline diamond (DP).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 883, *Indexable hardmetal (carbide) inserts with rounded corners, without fixing hole — Dimensions*

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

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

ISO 6987, *Indexable hard material inserts with rounded corners, with partly cylindrical fixing hole — Dimensions*

3 Insert shapes and design

3.1 Insert shapes

Triangular (T), square (S), rhombic 80° (C), 55° (D), and 35° (V) and trigon (W).

3.2 Normal clearance, α_n

Normal clearance 5° (B), 7° (C), 11° (P), and 20° (E).

3.3 Cutting edge corner

Inserts for turning with corner radius r_E 0,2 mm, 0,4 mm, 0,8 mm, 1,2 mm, and 1,6 mm.

Inserts for milling with wiper edge.

NOTE The design of non-tipped corners is optional.

3.4 Tolerance class

Tolerance class in accordance with ISO 1832 shall be applied. In [Tables 1 to 10](#), this position is shown with a dot (•).

3.5 Design of cutting edges

Any design shall be indicated in the designation (see ISO 1832).

3.6 Insert type

The styles of tipped cutting edges in accordance with ISO 1832 shall be applied.

4 Designation

4.1 General

The designation of inserts tipped with polycrystalline diamond (DP) is based on ISO 1832. The letter symbol for the cutting edge condition and the letter symbol for the insert type shall be indicated in the designation in each case.

Designations contained in 4.2 and 4.3 are examples of use of designations in accordance with ISO 1832.

4.2 Designation of a tipped insert for turning

Designation of a rhombic insert with included angle $\varepsilon_r = 55^\circ$ (D), normal clearance $\alpha_n = 7^\circ$ (C), with tolerance class G, without chip breakers and with fixing hole (W), with side length $l = 11,6$ mm (11), thickness $s = 3,97$ mm (T3), corner radius $r_\varepsilon = 0,8$ mm (08), with sharp cutting edges (F), tipped — one sided — one corner (A), long (L), cutting material in accordance with ISO 513 (e.g. DP05):

Insert DCGW 11T308F — AL — DP05 — ...

NOTE DP05 is optional in accordance with ISO 1832, designation symbol 13.

4.3 Designation of a tipped insert for milling

Designation of a square insert (S) with normal clearance $\alpha_n = 11^\circ$ (P), with tolerance class G, without chip breakers and with fixing hole (W), with side length $l = 12,7$ mm (12), thickness $s = 4,76$ mm (04), cutting edge angle $\kappa_r = 75^\circ$ (E), normal clearance at wiper edge $\alpha = 15^\circ$ (D), right-hand type (R), tipped — one sided — one corner (A), long (L), cutting material in accordance with ISO 513 (e.g. DP05):

Insert SPGW 1204EDR — AL — DP05 — ...

NOTE DP05 is optional in accordance with ISO 1832, designation symbol 13.

5 Dimensions

5.1 Insert shape T with fixing hole (inserts for turning)

See Figure 1 and Table 1.

NOTE For the dimensions of l_1 , see Table 11.

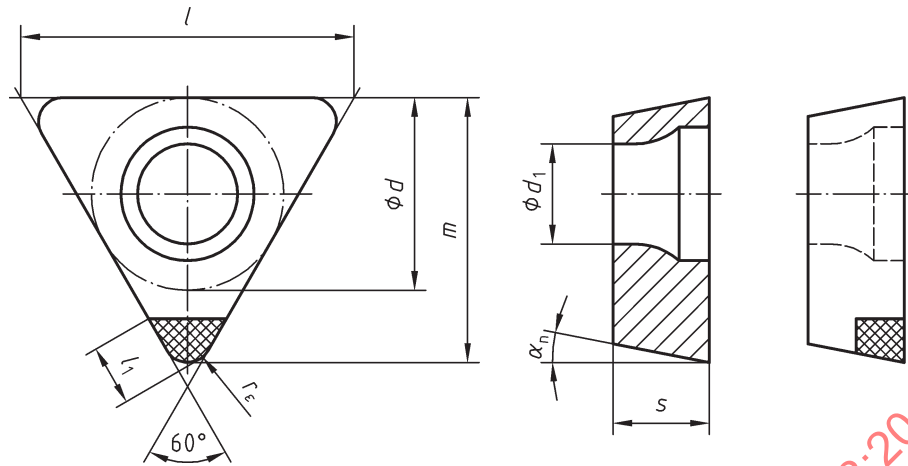


Figure 1

Table 1

Designation	d	d_1	l $\approx$	m	s	α_n	r_ε
TC•W 09 02 02F	5,56	2,5	9,63	8,137	2,38	7°	0,2
TC•W 09 02 04F	5,56	2,5	9,63	7,943	2,38	7°	0,4
TC•W 09 02 08F	5,56	2,5	9,63	7,541	2,38	7°	0,8
TC•W 11 02 02F	6,35	2,8	11,0	9,322	2,38	7°	0,2
TC•W 11 02 04F	6,35	2,8	11,0	9,128	2,38	7°	0,4
TC•W 11 02 08F	6,35	2,8	11,0	8,731	2,38	7°	0,8
TC•W 11 03 02F	6,35	2,8	11,0	9,327	3,18	7°	0,2
TC•W 11 03 04F	6,35	2,8	11,0	9,128	3,18	7°	0,4
TC•W 11 03 08F	6,35	2,8	11,0	8,731	3,18	7°	0,8
TC•W 16 T3 02F	9,525	4,4	16,5	14,084	3,97	7°	0,2
TC•W 16 T3 04F	9,525	4,4	16,5	13,891	3,97	7°	0,4
TC•W 16 T3 08F	9,525	4,4	16,5	13,494	3,97	7°	0,8
TC•W 16 T3 12F	9,525	4,4	16,5	13,097	3,97	7°	1,2
TC•W 16 T3 16F	9,525	4,4	16,5	12,700	3,97	7°	1,6
TC•W 22 04 04F	12,7	5,5	22,0	18,653	4,76	7°	0,4
TC•W 22 04 08F	12,7	5,5	22,0	18,256	4,76	7°	0,8
TC•W 22 04 12F	12,7	5,5	22,0	17,859	4,76	7°	1,2
TC•W 22 04 16F	12,7	5,5	22,0	17,462	4,76	7°	1,6
TP•W 09 02 02F	5,56	2,5	9,63	8,137	2,38	11°	0,2
TP•W 09 02 04F	5,56	2,5	9,63	7,943	2,38	11°	0,4
TP•W 09 02 08F	5,56	2,5	9,63	7,541	2,38	11°	0,8
TP•W 11 02 02F	6,35	2,8	11,0	9,322	2,38	11°	0,2
TP•W 11 02 04F	6,35	2,8	11,0	9,128	2,38	11°	0,4
TP•W 11 02 08F	6,35	2,8	11,0	9,322	2,38	11°	0,8
TP•W 11 03 02F	6,35	3,3	11,0	9,327	3,18	11°	0,2
TP•W 11 03 04F	6,35	3,3	11,0	9,128	3,18	11°	0,4

Table 1

Designation	d	d_1	l $\approx$	m	s	α_n	r_ε
TP•W 11 03 08F	6,35	3,3	11,0	8,731	3,18	11°	0,8
TP•W 13 03 02F	7,938	3,4	13,7	11,708	3,18	11°	0,2
TP•W 13 03 04F	7,938	3,4	13,7	11,509	3,18	11°	0,4
TP•W 13 03 08F	7,938	3,4	13,7	11,112	3,18	11°	0,8
TP•W 16 T3 04F	9,525	4,4	16,5	13,891	3,97	11°	0,4
TP•W 16 T3 08F	9,525	4,4	16,5	13,494	3,97	11°	0,8
TP•W 16 T3 12F	9,525	4,4	16,5	13,097	3,97	11°	1,2
TP•W 16 T3 16F	9,525	4,4	16,5	12,700	3,97	11°	1,6

5.2 Insert shape T without fixing hole (inserts for turning)

See Figure 2 and Table 2.

NOTE For the dimensions of l_1 , see Table 11.

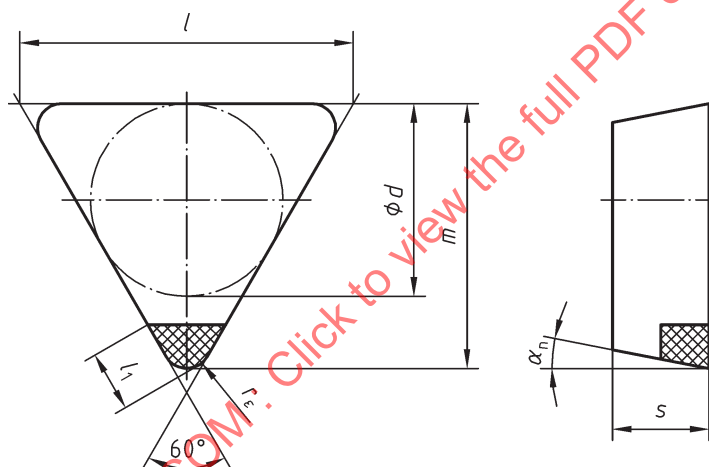


Figure 2

Table 2

Designation	d	l $\approx$	m	s	α_n	r_ε
TP•N 09 02 02F	5,556	9,62	8,136	2,38	11°	0,2
TP•N 09 02 04F	5,556	9,62	7,938	2,38	11°	0,4
TP•N 09 02 08F	5,556	9,62	7,541	2,38	11°	0,8
TP•N 11 03 02F	6,35	11,0	9,327	3,18	11°	0,2
TP•N 11 03 04F	6,35	11,0	9,128	3,18	11°	0,4
TP•N 11 03 08F	6,35	11,0	8,731	3,18	11°	0,8
TP•N 16 03 02F	9,525	16,5	14,089	3,18	11°	0,2
TP•N 16 03 04F	9,525	16,5	13,891	3,18	11°	0,4
TP•N 16 03 08F	9,525	16,5	13,494	3,18	11°	0,8

5.3 Insert shape S with fixing hole (inserts for turning)

See [Figure 3](#) and [Table 3](#).

NOTE For the dimensions of l_1 , see [Table 11](#).

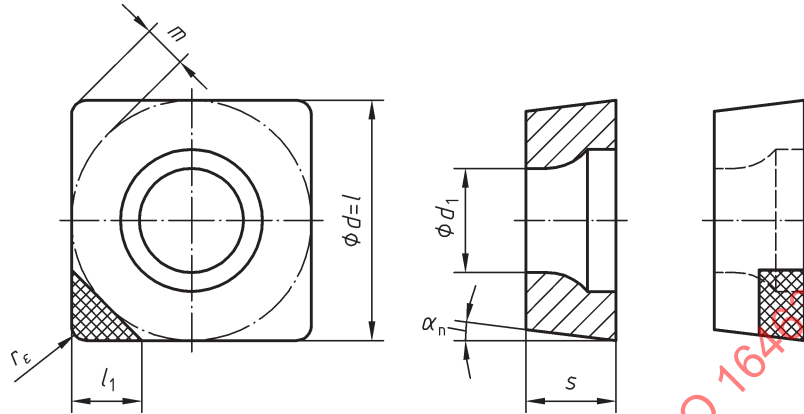


Figure 3

Table 3

Designation	d	d_1	l $\approx$	m	s	α_n	r_ϵ
SC•W 09 T3 04F	9,525	4,4	9,525	1,808	3,97	7°	0,4
SC•W 09 T3 08F	9,525	4,4	9,525	1,644	3,97	7°	0,8
SC•W 09 T3 12F	9,525	4,4	9,525	1,479	3,97	7°	1,2
SC•W 12 04 04F	12,7	5,5	12,7	2,466	4,76	7°	0,4
SC•W 12 04 08F	12,7	5,5	12,7	2,301	4,76	7°	0,8
SC•W 12 04 12F	12,7	5,5	12,7	2,137	4,76	7°	1,2
SC•W 12 04 16F	12,7	5,5	12,7	1,973	4,76	7°	1,6
SP•W 09 T3 02F	9,525	4,4	9,525	1,889	3,97	11°	0,2
SP•W 09 T3 04F	9,525	4,4	9,525	1,808	3,97	11°	0,4
SP•W 09 T3 08F	9,525	4,4	9,525	1,644	3,97	11°	0,8
SP•W 09 T3 12F	9,525	4,4	9,525	1,479	3,97	11°	1,2
SP•W 12 04 04F	12,7	5,5	12,7	2,466	4,76	11°	0,4
SP•W 12 04 08F	12,7	5,5	12,7	2,301	4,76	11°	0,8
SP•W 12 04 12F	12,7	5,5	12,7	2,137	4,76	11°	1,2
SP•W 12 04 16F	12,7	5,5	12,7	1,973	4,76	11°	1,6

5.4 Insert shape S without fixing hole (inserts for turning)

See [Figure 4](#) and [Table 4](#).

NOTE For the dimensions of l_1 , see [Table 11](#).

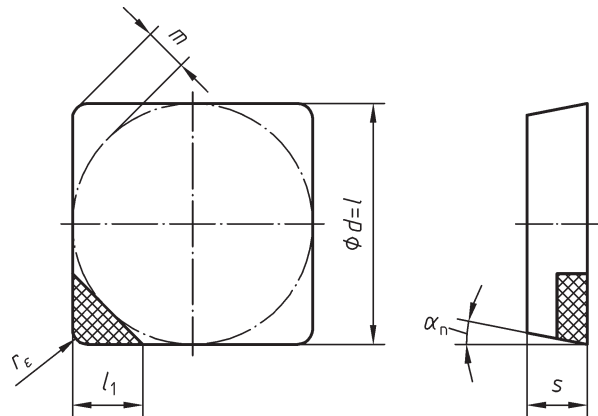


Figure 4

Table 4

Designation	d	l ≈	m	s	α _n	r _ε
SP•N 09 03 02F	9,525	9,5	1,890	3,18	11°	0,2
SP•N 09 03 04F	9,525	9,5	1,808	3,18	11°	0,4
SP•N 09 03 08F	9,525	9,5	1,644	3,18	11°	0,8
SP•N 12 03 02F	12,7	12,7	2,548	3,18	11°	0,2
SP•N 12 03 04F	12,7	12,7	2,466	3,18	11°	0,4
SP•N 12 03 08F	12,7	12,7	2,301	3,18	11°	0,8

5.5 Insert shape C with fixing hole (inserts for turning)

See [Figure 5](#) and [Table 5](#).

NOTE For the dimensions of l₁, see [Table 11](#).

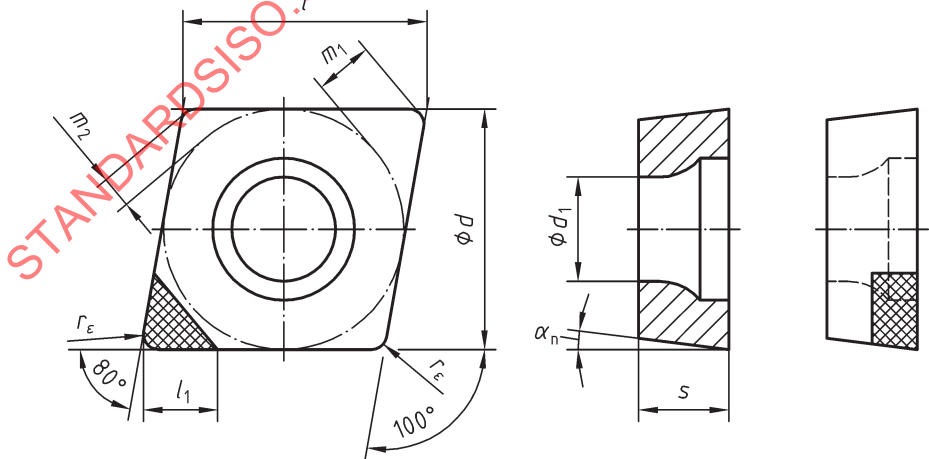


Figure 5

Table 5

Designation	d	d_1	l $\approx$	m_1	m_2	s	α_n	r_ε
CC•W 05 02 02F	5,56	2,5	5,64	1,432	0,787	2,38	7°	0,2
CC•W 05 02 04F	5,56	2,5	5,64	1,324	0,728	2,38	7°	0,4
CC•W 06 02 02F	6,35	2,8	6,45	1,652	0,908	2,38	7°	0,2
CC•W 06 02 04F	6,35	2,8	6,45	1,544	0,848	2,38	7°	0,4
CC•W 06 02 08F	6,35	2,8	6,45	1,323	0,727	2,38	7°	0,8
CC•W 08 03 02F	7,938	3,4	8,06	2,093	1,150	3,18	7°	0,2
CC•W 08 03 04F	7,938	3,4	8,06	1,986	1,091	3,18	7°	0,4
CC•W 08 03 08F	7,938	3,4	8,06	1,764	0,970	3,18	7°	0,8
CC•W 08 03 12F	7,938	3,4	8,06	1,544	0,848	3,18	7°	1,2
CC•W 09 T3 04F	9,525	4,4	9,67	2,426	1,333	3,97	7°	0,4
CC•W 09 T3 08F	9,525	4,4	9,67	2,206	1,212	3,97	7°	0,8
CC•W 09 T3 12F	9,525	4,4	9,67	1,985	1,091	3,97	7°	1,2
CC•W 12 04 04F	12,7	5,5	12,9	3,308	1,818	4,76	7°	0,4
CC•W 12 04 08F	12,7	5,5	12,9	3,088	1,697	4,76	7°	0,8
CC•W 12 04 12F	12,7	5,5	12,9	2,867	1,576	4,76	7°	1,2
CC•W 12 04 16F	12,7	5,5	12,9	2,647	1,455	4,76	7°	1,6
CP•W 05 02 02F	5,56	2,5	5,64	1,432	0,787	2,38	11°	0,2
CP•W 05 02 04F	5,56	2,5	5,64	1,324	0,728	2,38	11°	0,4
CP•W 06 02 02F	6,35	2,8	6,45	1,652	0,908	2,38	11°	0,2
CP•W 06 02 04F	6,35	2,8	6,45	1,544	0,848	2,38	11°	0,4
CP•W 06 02 08F	6,35	2,8	6,45	1,323	0,727	2,38	11°	0,8
CP•W 08 03 02F	7,938	3,4	8,06	2,093	1,150	3,18	11°	0,2
CP•W 08 03 04F	7,938	3,4	8,06	1,986	1,091	3,18	11°	0,4
CP•W 08 03 08F	7,938	3,4	8,06	1,764	0,970	3,18	11°	0,8
CP•W 08 03 12F	7,938	3,4	8,06	1,544	0,848	3,18	11°	1,2
CP•W 09 03 02F	9,525	4,4	9,67	2,534	1,392	3,18	11°	0,2
CP•W 09 03 04F	9,525	4,4	9,67	2,426	1,333	3,18	11°	0,4
CP•W 09 03 08F	9,525	4,4	9,67	2,206	1,212	3,18	11°	0,8
CP•W 09 03 12F	9,525	4,4	9,67	1,985	1,091	3,18	11°	1,2
CP•W 09 T3 02F	9,525	4,4	9,67	2,426	1,333	3,97	11°	0,2
CP•W 09 T3 04F	9,525	4,4	9,67	2,426	1,333	3,97	11°	0,4
CP•W 09 T3 08F	9,525	4,4	9,67	2,206	1,212	3,97	11°	0,8
CP•W 09 T3 12F	9,525	4,4	9,67	1,985	1,091	3,97	11°	1,2
CP•W 12 04 04F	12,7	5,5	12,9	3,088	1,818	4,76	11°	0,4
CP•W 12 04 08F	12,7	5,5	12,9	3,308	1,697	4,76	11°	0,8
CP•W 12 04 12F	12,7	5,5	12,9	2,867	1,576	4,76	11°	1,2
CP•W 12 04 16F	12,7	5,5	12,9	2,647	1,455	4,76	11°	1,6

5.6 Insert shape D with fixing hole (inserts for turning)

See [Figure 6](#) and [Table 6](#).

NOTE For the dimensions of l_1 , see [Table 11](#).

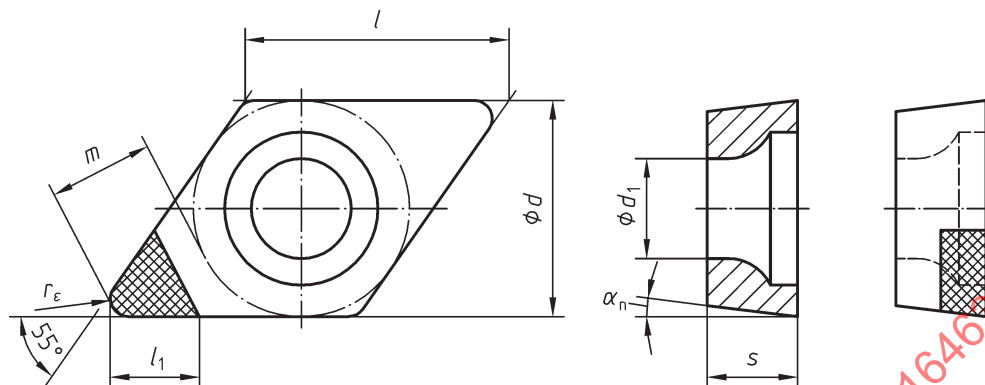


Figure 6

Table 6

Designation	d	d_1	l $\approx$	m	s	α_n	r_ϵ
DC•W 07 02 02F	6,35	2,8	7,75	3,464	2,38	7°	0,2
DC•W 07 02 04F	6,35	2,8	7,75	3,238	2,38	7°	0,4
DC•W 07 02 08F	6,35	2,8	7,75	2,776	2,38	7°	0,8
DC•W 11 T3 02F	9,525	4,4	11,6	5,320	3,97	7°	0,2
DC•W 11 T3 04F	9,525	4,4	11,6	5,089	3,97	7°	0,4
DC•W 11 T3 08F	9,525	4,4	11,6	4,626	3,97	7°	0,8
DC•W 11 T3 12F	9,525	4,4	11,6	4,164	3,97	7°	1,2
DP•W 07 02 02F	6,35	2,8	7,75	3,464	2,38	11°	0,2
DP•W 07 02 04F	6,35	2,8	7,75	3,238	2,38	11°	0,4
DP•W 11 T3 04F	9,525	4,4	11,6	5,089	3,97	11°	0,4
DP•W 11 T3 08F	9,525	4,4	11,6	4,626	3,97	11°	0,8

5.7 Insert shape V with fixing hole (inserts for turning)

See [Figure 7](#) and [Table 7](#).

NOTE For the dimensions of l_1 , see [Table 11](#).

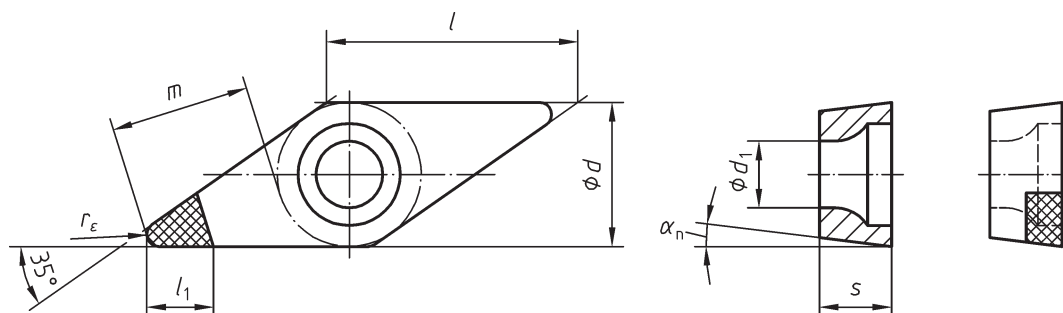


Figure 7

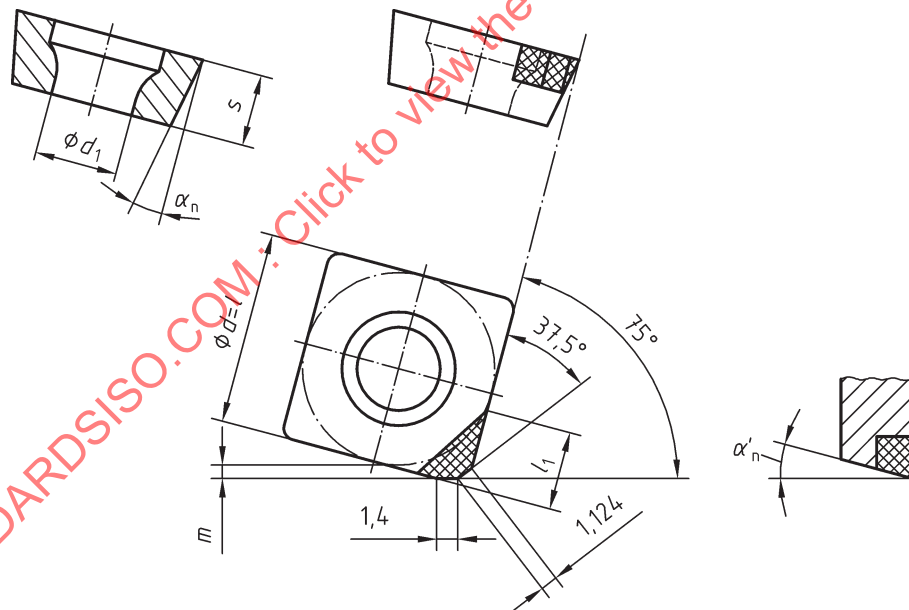
Table 7

Designation	d	d_1	l $\approx$	m	s	α_n	r_ε
VB•W 16 04 02F	9,525	4,4	16,6	10,603	4,76	5°	0,2
VB•W 16 04 04F	9,525	4,4	16,6	10,152	4,76	5°	0,4
VB•W 16 04 08F	9,525	4,4	16,6	9,229	4,76	5°	0,8
VB•W 16 04 12F	9,525	4,4	16,6	8,306	4,76	5°	1,2
VC•W 11 03 02F	6,35	2,8	11,1	6,911	3,18	7°	0,2
VC•W 11 03 04F	6,35	2,8	11,1	6,460	3,18	7°	0,4
VC•W 11 03 08F	6,35	2,8	11,1	5,537	3,18	7°	0,8
VC•W 16 04 02F	9,525	4,4	16,6	10,603	4,76	7°	0,2
VC•W 16 04 04F	9,525	4,4	16,6	10,154	4,76	7°	0,4
VC•W 16 04 08F	9,525	4,4	16,6	9,231	4,76	7°	0,8
VC•W 16 04 12F	9,525	4,4	16,6	8,308	4,76	7°	1,2

5.8 Insert shape S with fixing hole (inserts for milling)

See [Figure 8](#) and [Table 8](#).

NOTE For the dimensions of l_1 , see [Table 11](#).



NOTE Right-hand type is shown in the figure (R).

Figure 8

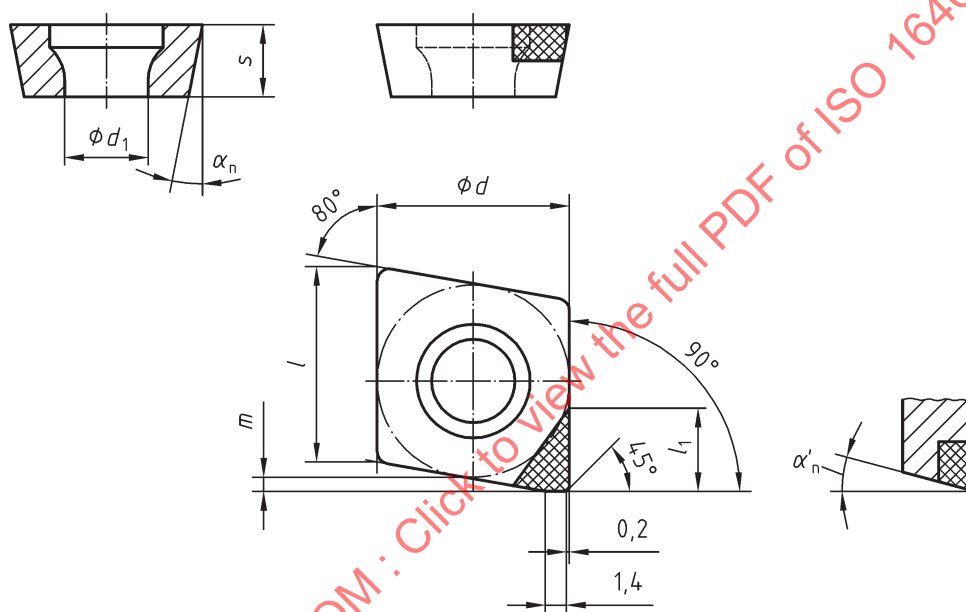
Table 8

Designation	d	d_1	l $\approx$	m	s	α_n	α'_n
SE•W 09 T3 EER	9,525	4,4	9,525	0,543	3,97	20°	20°
SE•W 09 T3 EEL	9,525	4,4	9,525	0,543	3,97	20°	20°
SP•W 12 04 EDR	12,7	5,5	12,7	0,900	4,76	11°	15°
SP•W 12 04 EDL	12,7	5,5	12,7	0,900	4,76	11°	15°

5.9 Insert shape C with fixing hole (inserts for milling)

See [Figure 9](#) and [Table 9](#).

NOTE For the dimensions of l_1 , see [Table 11](#).



NOTE Right-hand type shown in the figure (R).

Figure 9

Table 9

Designation	d	d_1	l $\approx$	m	s	α_n	α'_n
CE•W 09 T3 PEL	9,525	4,4	9,67	0,631	3,97	20°	20°
CE•W 09 T3 PER	9,525	4,4	9,67	0,631	3,97	20°	20°
CP•W 12 04 PDL	12,7	5,5	12,9	0,936	4,76	11°	15°
CP•W 12 04 PDR	12,7	5,5	12,9	0,936	4,76	11°	15°

5.10 Insert shape W with fixing hole (inserts for turning)

See [Figure 10](#) and [Table 10](#).

NOTE For the dimensions of l_1 , see [Table 11](#).

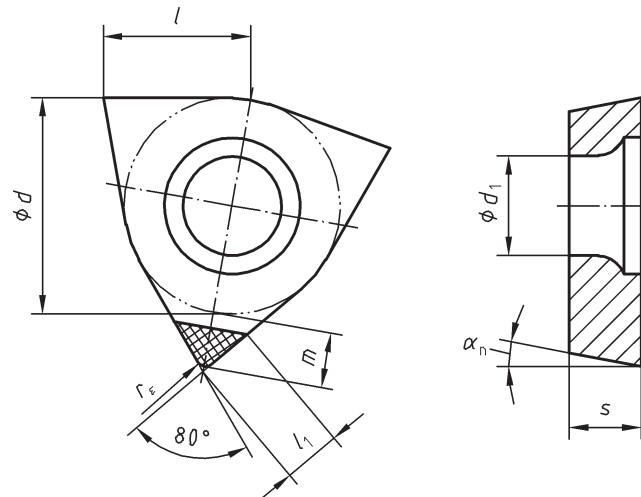


Figure 10

Table 10

Designation	d	d_1	l $\approx$	m	s	α_n	r_ϵ
WC•W040202F	6,35	2,8	4,3	1,655	2,38	7°	0,2
WC•W040204F	6,35	2,8	4,3	1,543	2,38	7°	0,4
WC•W06T304F	9,525	4,4	6,5	2,426	3,97	7°	0,4
WC•W06T308F	9,525	4,4	6,5	2,203	3,97	7°	0,8
WP•W040201F	6,35	2,8	4,3	1,710	2,38	11°	0,1
WP•W040202F	6,35	2,8	4,3	1,654	2,38	11°	0,2
WP•W040204F	6,35	2,8	4,3	1,543	2,38	11°	0,4
WP•W060302F	9,525	4,4	6,5	2,537	3,18	11°	0,2
WP•W060304F	9,525	4,4	6,5	2,426	3,18	11°	0,4

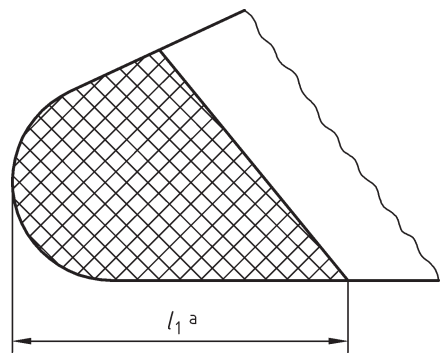
6 Cutting edge length, l_1 , of tipped inserts

6.1 General

l_1 is defined as the length along the major cutting edge from the end of the tip to the furthest point perpendicular to the major cutting edge.

6.2 Inserts with radius

See [Figure 11](#).

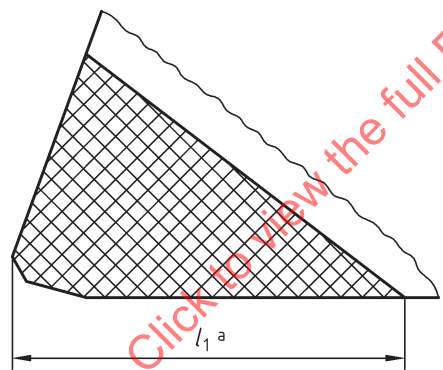


Key
a For the dimensions of l_1 , see [Table 11](#).

Figure 11

6.3 Inserts with wiper edge

See [Figure 12](#).



Key
a For the dimensions of l_1 , see [Table 11](#).

Figure 12

Table 11

Cutting edge length	
l_1	
short	long
0,8	3,0

7 Base material, cutting material

Base material is selected at the manufacturer’s option or upon agreement.
Cutting edges made of DP are in accordance with ISO 513.