INTERNATIONAL STANDARD

ISO 5610-1

First edition
2010-08-01

Tool holders with rectangular shank for indexable inserts —

Part 1: General survey, correlation and determination of dimensions

Porte-plaquette à queue rectangulaire pour plaquettes amovibles —

Partie 1: Vue d'ensemble, corrélation et détermination des dimensions

Reference number
ISO 5610-1:2010(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 5610-1 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 9, *Tools with cutting edges made of hard cutting materials*.

This first edition of ISO 5610-1, together with ISO 5610-2, ISO 5610-3, ISO 5610-4, ISO 5610-5, ISO 5610-6, ISO 5610-7, ISO 5610-8, ISO 5610-9, ISO 5610-10, ISO 5610-11, ISO 5610-12, ISO 5610-13, ISO 5610-14 and ISO 5610-15, cancels and replaces ISO 5610:1998.

ISO 5610 consists of the following parts, under the general title *Tool holders with rectangular shank for indexable inserts*:

— *Part 1: General survey, correlation and determination of dimensions*

— *Part 2: Style A*

— *Part 3: Style B*

— *Part 4: Style D*

— *Part 5: Style F*

— *Part 6: Style G*

— *Part 7: Style J*

— *Part 8: Style K*

— *Part 9: Style L*

— *Part 10: Style N*

— *Part 11: Style R*

— *Part 12: Style S*

— *Part 13: Style T*

— *Part 14: Style H*

— *Part 15: Style V*

Tool holders with rectangular shank for indexable inserts —

Part 1:
General survey, correlation and determination of dimensions

1 Scope

This part of ISO 5610 specifies tool holders with rectangular shank for indexable inserts and specifies their styles in relation to their dimensions according to ISO 5610-2, ISO 5610-3, ISO 5610-4, ISO 5610-5, ISO 5610-6, ISO 5610-7, ISO 5610-8, ISO 5610-9, ISO 5610-10, ISO 5610-11, ISO 5610-12, ISO 5610-13, ISO 5610-14 and ISO 5610-15.

These tool holders are primarily intended for indexable inserts made of hardmetal, ceramic or other cutting materials intended to be mounted by clamping and used for turning operations. This part of ISO 5610 is general and is intended to be used with ISO 5610-2, ISO 5610-3, ISO 5610-4, ISO 5610-5, ISO 5610-6, ISO 5610-7, ISO 5610-8, ISO 5610-9, ISO 5610-10, ISO 5610-11, ISO 5610-12, ISO 5610-13, ISO 5610-14 and ISO 5610-15.

2 Normative references

The following referenced documents are indispensable for the application 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 5608, *Turning and copying tool holders and cartridges for indexable inserts — Designation*

ISO 5610-2, *Tool holders with rectangular shank for indexable inserts — Part 2: Style A*

ISO 5610-3, *Tool holders with rectangular shank for indexable inserts — Part 3: Style B*

ISO 5610-4, *Tool holders with rectangular shank for indexable inserts — Part 4: Style D*

ISO 5610-5, *Tool holders with rectangular shank for indexable inserts — Part 5: Style F*

ISO 5610-6, *Tool holders with rectangular shank for indexable inserts — Part 6: Style G*

ISO 5610-7, *Tool holders with rectangular shank for indexable inserts — Part 7: Style J*

ISO 5610-8, *Tool holders with rectangular shank for indexable inserts — Part 8: Style K*

ISO 5610-9, *Tool holders with rectangular shank for indexable inserts — Part 9: Style L*

ISO 5610-10, *Tool holders with rectangular shank for indexable inserts — Part 10: Style N*

ISO 5610-11, *Tool holders with rectangular shank for indexable inserts — Part 11: Style R*

ISO 5610-12, *Tool holders with rectangular shank for indexable inserts — Part 12: Style S*

ISO 5610-13, *Tool holders with rectangular shank for indexable inserts — Part 13: Style T*

ISO 5610-14, *Tool holders with rectangular shank for indexable inserts — Part 14: Style H*

ISO 5610-15, *Tool holders with rectangular shank for indexable inserts — Part 15: Style V*

3 Survey

The survey of the tool holders with rectangular shank cross-section shall be as given in Table 1. The tool holders with rectangular shank cross-section and their corresponding letter symbols and shank sizes shall be in accordance with ISO 5610-2, ISO 5610-3, ISO 5610-4, ISO 5610-5, ISO 5610-6, ISO 5610-7, ISO 5610-8, ISO 5610-9, ISO 5610-10, ISO 5610-11, ISO 5610-12, ISO 5610-13, ISO 5610-14 and ISO 5610-15.

The designation code shall be as given in ISO 5608.

Table 1 — Tool holders with rectangular shanks

Dimensions in millimetres

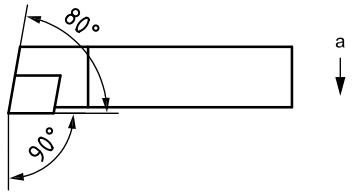
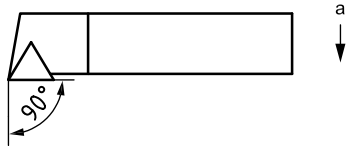
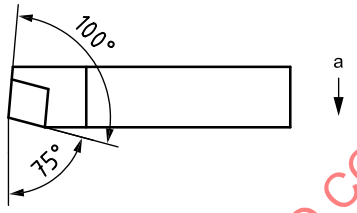
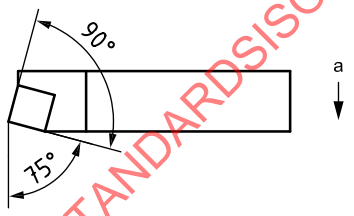
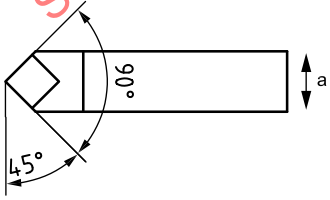
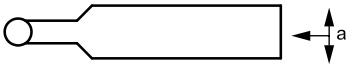
Style of tool holder	Illustration	Symbols for the cross-section $h_2 \times b$											Dimensions in
		0808	1010	1212	1616	2020	2525	3225	3232	4032	4040	5050	
A			•										ISO 5610-2
				•	•	•	•	•	•		•		
B		•	•										ISO 5610-3
				•	•	•	•	•	•		•	•	
D			•	•	•	•	•	•					ISO 5610-4
		•	•	•	•	•	•	•	•		•		

Table 1 (*continued*)

Style of tool holder	Illustration	Symbols for the cross-section $h_2 \times b$											Dimensions in
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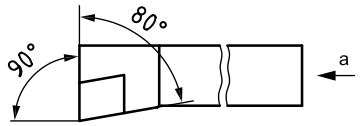
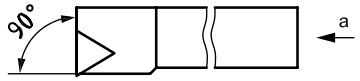
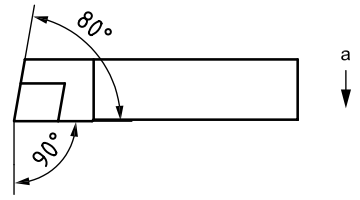
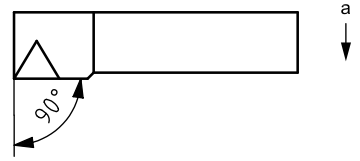
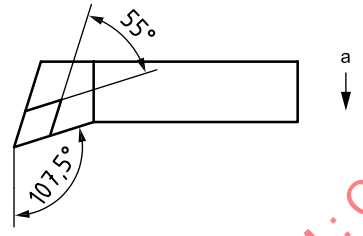
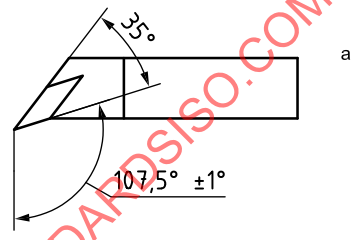
F		•	•										ISO 5610-5
				•	•	•	•	•	•		•		
G		•	•										ISO 5610-6
				•	•	•	•	•	•		•	•	
H		•	•	•	•	•	•	•					ISO 5610-14
				•	•	•	•	•					

Table 1 (*continued*)

Style of tool holder	Illustration	Symbols for the cross-section $h_2 \times b$											Dimensions in
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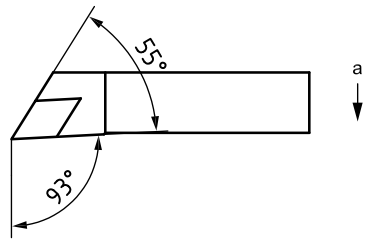
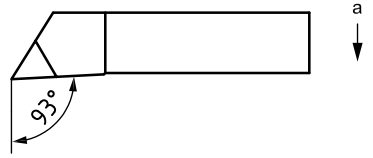
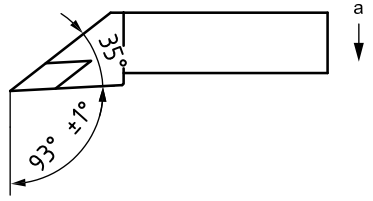
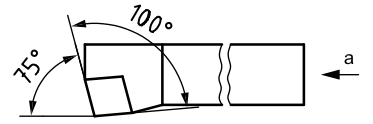
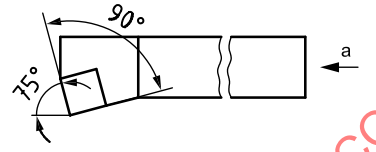
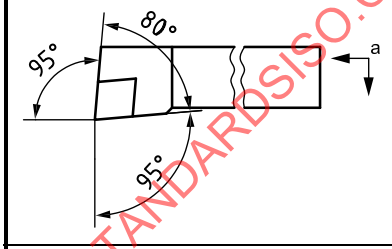
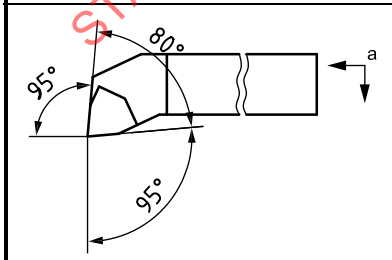
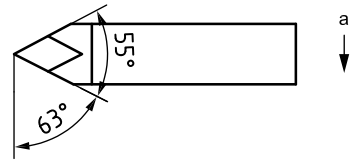
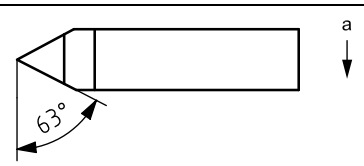
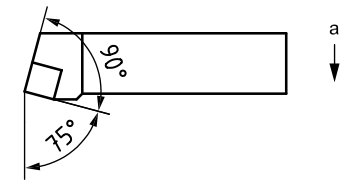
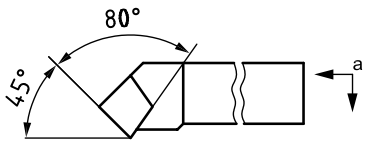
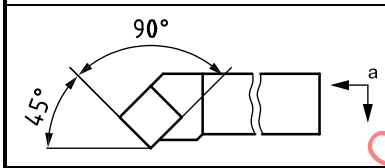
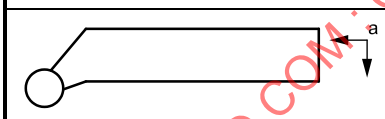
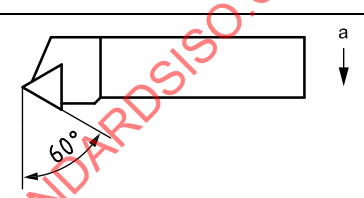
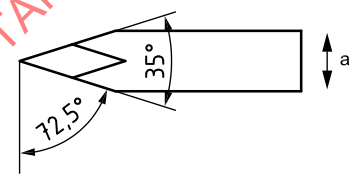
J		•	•	•	•	•	•	•		•			ISO 5610-7
						•	•	•		•			
				•	•	•	•	•					
K		•	•										ISO 5610-8
				•	•	•	•	•	•		•		
L		•	•	•	•	•	•	•	•		•		ISO 5610-9
		•	•	•	•	•	•	•	•				

Table 1 (*continued*)

Style of tool holder	Illustration	Symbols for the cross-section $h_2 \times b$											Dimensions in
		0808	1010	1212	1616	2020	2525	3225	3232	4032	4040	5050	
N		•	•	•	•	•	•	•		•			ISO 5610-10
							•	•		•			
R				•	•	•	•	•	•		•	•	ISO 5610-11
S		•	•	•	•	•	•	•					ISO 5610-12
				•	•	•	•	•	•		•	•	
		•	•	•	•	•	•	•	•		•		
T				•	•	•	•	•	•		•		ISO 5610-13
V				•	•	•	•	•					ISO 5610-15

• standardized
blank not standardized
a Primary direction of feed.

4 Dimensions

4.1 Cross-section and length, l_1

The dimensions of the cross-section, depending on the length, l_1, and height, h_1, of the cutting edge shall be in accordance with Figure 1 and Table 2.

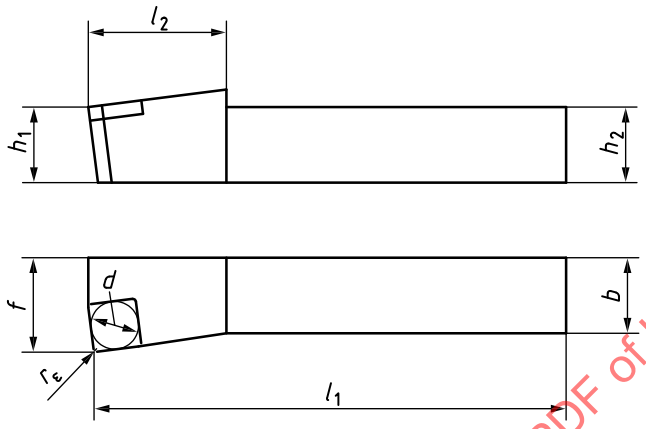


Figure 1 — Tool holder type K

Table 2 — Dimensions of the cross-section

Dimensions in millimetres

h_1 js13	h_2 h13	b[a] h13		l_1 k16	
		Series 1	Series 2	long	short
8	8	8	—	60	40
10	10	10	8	70	50
12	12	12	10	80	60
16	16	16	12	100	70
20	20	20	16	125	80
25	25	25	20	150	100
32	32	32	25	170	125
40	40	40	32	200	150
50	50	50	40	250	—

[a] Series 1: $b = h_2$; Series 2: $b \approx 0{,}8\ h_2$.

4.2 Head length, l_2

The maximum head length, l_2, depending on the diameter, d, of the inscribed circle of the indexable inserts, shall be in accordance with Figure 1 and Table 3.

The head length given in Table 3 shall not apply to tool holders with indexable inserts styles D and V.

Table 3 — Head length

Dimensions in millimetres

d	l_2 max.
6,35	25
7,94	28
9,525	32
12,7	36
15,875	40
19,05	45
25,4	50

4.3 Dimension, f

The dimension, f, depending on the width, b, of the cross-section and the shape of the tool holder, shall be in accordance with Table 4.

Table 4 — Dimension f

Dimensions in millimetres

b	f for tool holder styles					
	D, V ±0,25	N +0,5 0	B, T +0,5 0	A +0,5 0	R +0,5 0	F, G, H, J, K, L, S +0,5 0
8	4		7	8,5	9	10
10	5		9	10,5	11	12
12	6		11	12,5	13	16
16	8		13	16,5	17	20
20	10		17	20,5	22	25
25	12,5		22	25,5	27	32
32	16		27	33	35	40
40	20		35	41	43	50
50	25		43	51	53	60

5 Determination of dimensions

5.1 Cutting edge corners

5.1.1 Cutting edge corner, K

5.1.1.1 The specified point, K, shall be defined as follows.

Consider planes P_f (assumed working plane) and P_s (tool cutting edge plane), as defined in ISO 3002-1 for a selected point on the major cutting edge (e.g. point of tangency of major cutting edge with inscribed circle):

a) for $\kappa_r \leqslant 90°$, point K shall be defined as the intersection of plane P_s, a plane parallel to plane P_f tangent to the corner radius and a plane containing the tool face A_γ (see Figures 2 and 3);

b) for $\kappa_r > 90°$, point K shall be defined as the intersection of a plane parallel to plane P_f tangent to the corner radius, a plane perpendicular to plane P_f tangent to the corner radius and a plane containing the tool face A_γ (see Figures 4 and 5).

For tool holders style S, the side rake shall be equal to the back rake.

5.1.1.2 For special cases of tool holders styles D and S with round indexable inserts:

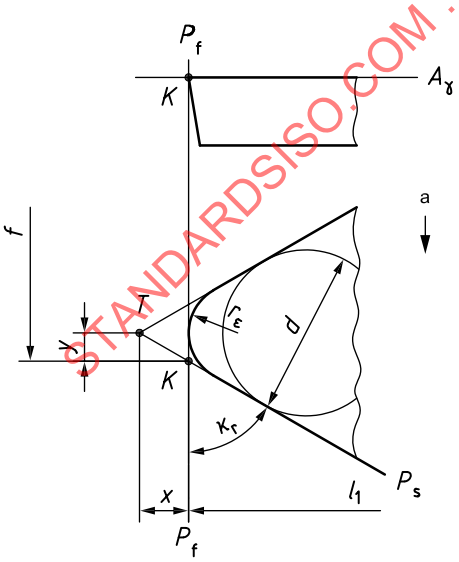
a) for tool holders style D (see Figure 6), point K shall be defined as the intersection of

— a plane parallel to P_f passing through the axis of the indexable insert,

— a plane perpendicular to P_f and tangential to the cutting edge, and

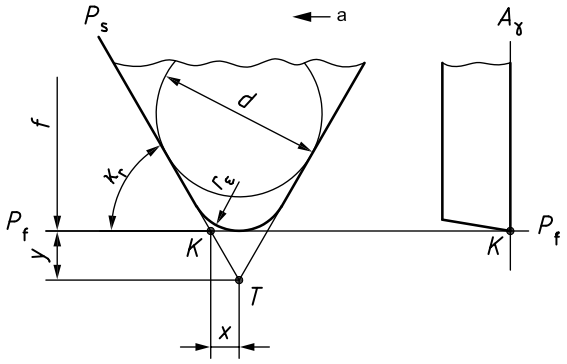
— a plane containing A_γ;

b) for tool holders style S (see Figure 7), there are two cases of point K. These shall be defined by two planes P_f in directions of two main perpendicular feeds, which are tangential to the cutting edge of the indexable insert.



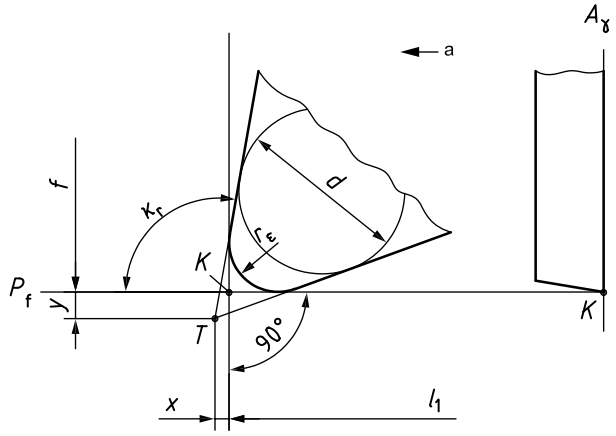
a Primary direction of feed.

Figure 2 — Cutting edge angle $\kappa_r \leqslant 90°$, with transverse feed



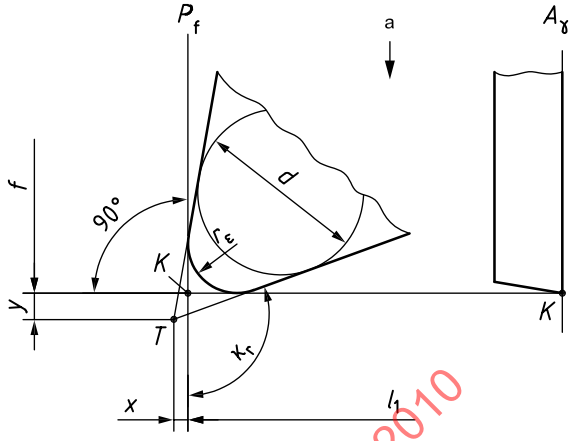
a Primary direction of feed.

Figure 3 — Cutting edge angle $\kappa_r \leqslant 90°$, with longitudinal feed



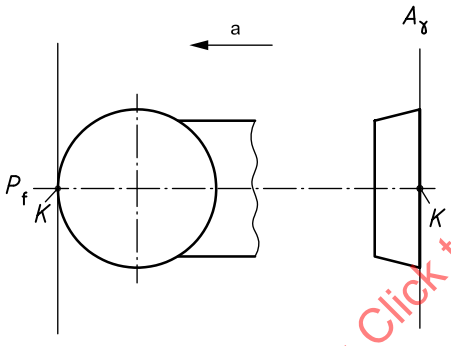
a Primary direction of feed.

Figure 4 — Cutting edge angle $\kappa_r > 90°$, with longitudinal feed



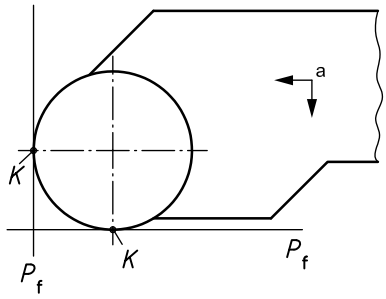
a Primary direction of feed.

Figure 5 — Cutting edge angle $\kappa_r > 90°$, with transverse feed



a Primary direction of feed.

Figure 6 — Point K for tool style D with round indexable insert



a Primary direction of feed.

Figure 7 — Point K for tool style S with round indexable insert

5.1.2 Theoretical cutting edge corner, T

The intersection of the theoretical extensions of major cutting edge and minor cutting edge shall be considered as the theoretical cutting edge corner, T (see Figures 2 to 5).

NOTE The position of the theoretical corner, T, is independent of the corner radius, r_ε, of the indexable insert.

5.2 Corner radius, r_ε, of the master indexable inserts

The values of the corner radius, r_ε, of the master indexable insert (master gauge) used for the definition and testing of length, l_1, dimension, f, and height, h_1, shall be in accordance with Table 5.

Table 5 — Corner radius

Dimensions in millimetres

d	r_ε **Nominal dimension**[a]
6,35	0,4
7,94	
9,525	0,8
12,7	
15,875	1,2
19,05	
25,4	2,4

[a] The correction values x and y are derived from the accurate values of the corner radii $r_\varepsilon = 0{,}397$ mm, 0,794 mm, 1,191 mm and 2,381 mm, which correspond to the inch dimensions.

The corner radius, r_ε, of the master indexable insert shall be a function of the size of the indexable insert associated to the tool holder and Table 5 it shall, therefore, be related to the diameter of the inscribed circle.

5.3 Length, l_1

The length, l_1 (for values, see Table 2), shall be the distance between the specified point, K, and the shank end (see Figures 1 to 5 and the illustrations in Table 6), measured on a master indexable insert with corner radius, r_ε, in accordance with 5.2.

For tool holders with indexable inserts with a corner radius, r_ε, deviating from Table 5, the modified length, l_1, shall be determined with correction value x as shown in Figures 2 to 5.

The correction value x (see Table 6) corresponds to the distance, measured parallel to the shank, between the specified point, K, and the theoretical corner, T.

The modified length shall be obtained from the length, l_1, given in Table 2 and the difference between the values x for the new corner radius and the corner radius given in Table 5.

5.4 Dimension f

Dimension f (for values, see Table 4) shall be the distance between the specified point, K, and the rear backing surface of the tool holder (see Figures 1 to 5 and the illustrations in Table 6), measured on a master indexable insert with corner radius, r_ε, in accordance with 5.2.

Exceptions to this definition are symmetrical tool holders styles D and V, for which the values given in Table 4 for dimension f shall apply to the distance measured between the theoretical cutting edge corner, T, and the rear backing surface of the tool holders (see Figures 2 and 3).

For tool holders style D, the functional dimension relating to the cutting edge corner, K, shall be either the dimension $f + y$ or $f - y$, where y has to be taken from Table 6.

For tool holders with indexable inserts with a corner radius, r_ε, deviating from Table 5, the modified dimension f shall be determined with correction value y as shown in Figures 2 to 5.

Correction value, y, corresponds to the distance between the specified point, K, and the theoretical cutting edge corner, T, measured transverse to the shank.

The modified dimension, f, shall be obtained from the value given in Table 4 and the difference between the y-values for the new corner radius and the corner radius given in Table 5.

5.5 Height, h_1

The height, h_1 (for values, see Table 2), shall be the distance between the specified point, K, and the base of the tool holder (see Figure 1), measured on a master indexable insert and optional on a master shim.

5.6 Tolerances

The tolerances given in Tables 2 and 4 refer to length, l_1, dimension, f, and height, h_1, measured on a master indexable insert and a master shim, if applicable. Therefore, the tolerances on l_1, f and h_1 shall not include the tolerances on indexable insert and shim.

5.7 Dimension, a

5.7.1 General

Dimension, a, shall be related to the determination of the overall width and overall length of tool holders.

In general, the overall width corresponds to dimension f for the shank width and the overall length corresponds to dimension l_1, with the exception of tool holders of styles defined in 5.7.2 and 5.7.3.

5.7.2 Styles R and T

For styles R and T, the overall width of the tool holder shall be the sum of the values for f and a.

Dimension, a, is defined as the distance between the specified point, K, and the tangent to the corner radius of the indexable insert, measured parallel to the shank length (see the illustrations in Table 6).

5.7.3 Styles K and S

For styles K and S, the overall length of the tool holder shall be the sum of the values for l_1 and a.

Dimension, a, shall be defined as the distance between the specified point, K, and the tangent on the corner radius of the indexable insert, measured perpendicular to the shank length (see the illustrations in Table 6).

5.7.4 Values for dimension, a

The values for dimension, a, shall be given in the respective dimension standards and apply to indexable inserts with corner radii in accordance with 5.2, with rake angle $\gamma_n = 0°$ and inclination angle $\lambda_s = 0°$.

For tool holders with indexable inserts with corner radii deviating from the values given in Table 5, the modified dimension, a, shall be determined for styles R and T with correction value, y, and for styles K and S with correction value x (for values for x and y, see Table 6).

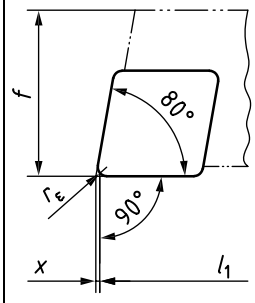
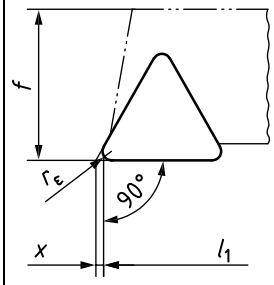
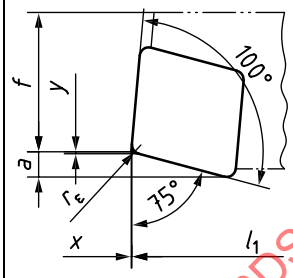
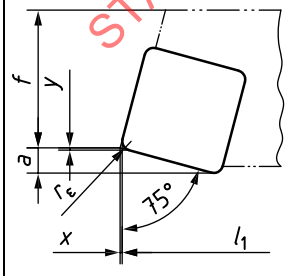
For the rake γ_n and cutting edge inclination λ_s varying between –6° and +6°, variations of the values for a are less than 0,1 mm and thus negligible.

5.8 Correction values, x and y

The correction values, x and y, given in Table 6 shall apply to rake angle $\gamma_n = 0°$ and cutting edge inclination $\lambda_s = 0°$. Rake angles γ_n and cutting edge inclinations λ_s varying between –6° and +6° result in variations from the x and y-values in the range of 0,001 mm to 0,01 mm, which are significantly smaller than the tolerances on l_1, f and h_1. If necessary, the correction values shall be determined.

Table 6 — Correction values

Dimensions in millimetres

Style	Illustration	r_ε	x	y
A and G	 Indexable insert, rhombic	0,2	0,039	—
		0,4	0,076	—
		0,8	0,152	—
		1,2	0,228	—
		1,6	0,304	—
		2,4	0,456	—
	 Indexable insert, triangular	0,2	0,149	—
		0,4	0,291	—
		0,8	0,581	—
		1,2	0,872	—
		1,6	1,162	—
		2,4	1,743	—
B	 Indexable insert, rhombic	0,2	0,014	0,004
		0,4	0,028	0,007
		0,8	0,055	0,015
		1,2	0,083	0,022
		1,6	0,110	0,029
		2,4	0,165	0,044
B and R	 Indexable insert, square	0,2	0,046	0,012
		0,4	0,089	0,024
		0,8	0,178	0,048
		1,2	0,268	0,072
		1,6	0,357	0,096
		2,4	0,535	0,147

Dimensions in millimetres

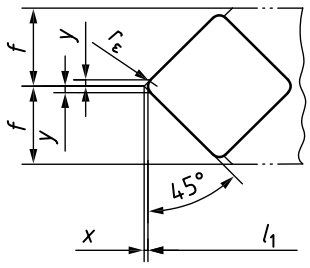
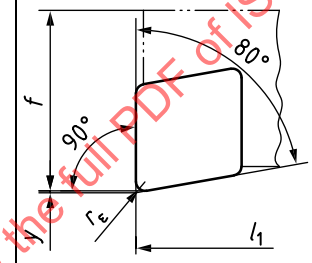
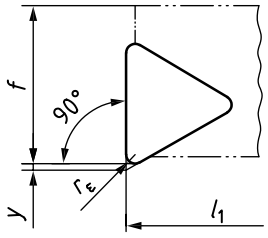
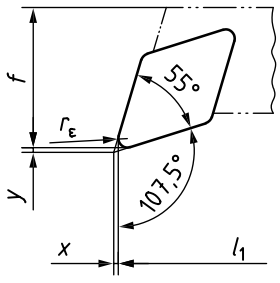
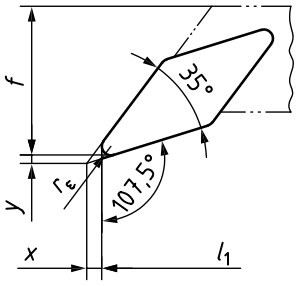
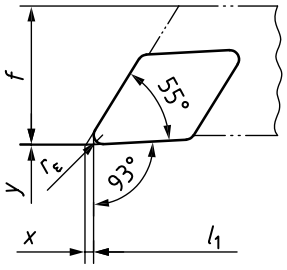
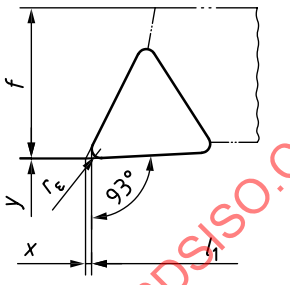
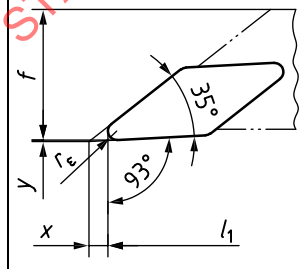
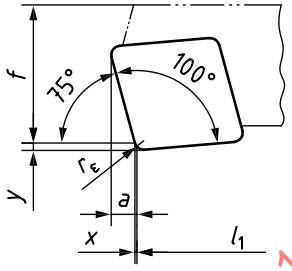
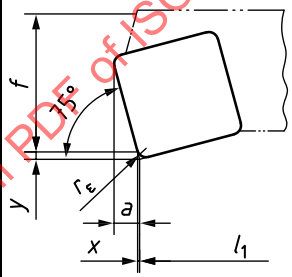
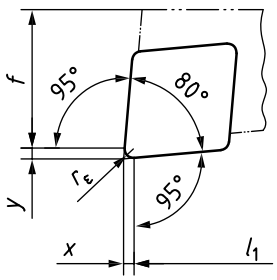
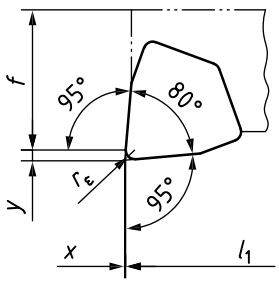
Style	Illustration	r_ε	x	y
D	 Indexable insert, square	0,2	0,084	0,084
		0,4	0,164	0,164
		0,8	0,329	0,329
		1,2	0,493	0,493
		1,6	0,658	0,658
		2,4	0,986	0,986
F	 Indexable insert, rhombic	0,2	—	0,039
		0,4	—	0,076
		0,8	—	0,152
		1,2	—	0,228
		1,6	—	0,304
		2,4	—	0,456
	 Indexable insert, triangular	0,2	—	0,149
		0,4	—	0,291
		0,8	—	0,581
		1,2	—	0,872
		1,6	—	1,162
		2,4	—	1,743
H	 Indexable insert, rhombic (D)	0,2	0,108	0,108
		0,4	0,211	0,211
		0,8	0,422	0,422
		1,2	0,633	0,633
		1,6	0,844	0,844
		2,4	1,265	1,265

Table 6 (*continued*)

Dimensions in millimetres

Style	Illustration	r_ε	x	y
H	 Indexable insert, rhombic (V)	0,2	0,342	0,180
		0,4	0,684	0,360
		0,8	1,369	0,721
		1,2	2,053	1,081
		1,6	2,738	1,441
		2,4	4,107	2,162
J	 Indexable insert, rhombic (D)	0,2	0,176	0,020
		0,4	0,344	0,039
		0,8	0,687	0,079
		1,2	1,031	0,118
		1,6	1,375	0,157
		2,4	2,062	0,236
	 Indexable insert, triangular	0,2	0,138	0,018
		0,4	0,269	0,035
		0,8	0,538	0,071
		1,2	0,806	0,106
		1,6	1,075	0,142
		2,4	1,613	0,213
	 Indexable insert, rhombic (V)	0,2	0,420	0,033
		0,4	0,840	0,065
		0,8	1,680	0,131
		1,2	2,519	0,196
		1,6	3,358	0,261
		2,4	5,038	0,392

Dimensions in millimetres

Style	Illustration	r_ε	x	y
K	 Indexable insert, rhombic	0,2	0,004	0,014
		0,4	0,007	0,028
		0,8	0,015	0,055
		1,2	0,022	0,083
		1,6	0,029	0,110
		2,4	0,044	0,165
	 Indexable insert, square	0,2	0,012	0,046
		0,4	0,024	0,089
		0,8	0,048	0,178
		1,2	0,072	0,268
		1,6	0,096	0,357
		2,4	0,143	0,535
L	 Indexable insert, rhombic (C)	0,2	0,020	0,020
		0,4	0,040	0,040
		0,8	0,079	0,079
		1,2	0,119	0,119
		1,6	0,159	0,159
		2,4	0,238	0,238
	 Indexable insert, hexagonal, trigone (W)	0,2	0,020	0,020
		0,4	0,040	0,040
		0,8	0,079	0,079
		1,2	0,119	0,119
		1,6	0,159	0,159
		2,4	0,238	0,238