

---

---

**Cartridges, type A, for indexable  
inserts —**

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

*Cartouches du type A, à plaquettes amovibles —*

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



STANDARDSISO.COM : Click to view the full PDF of ISO 5611-1:2015



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

# Contents

|                                                                                                                        | Page      |
|------------------------------------------------------------------------------------------------------------------------|-----------|
| Foreword .....                                                                                                         | iv        |
| <b>1 Scope .....</b>                                                                                                   | <b>1</b>  |
| <b>2 Normative references .....</b>                                                                                    | <b>1</b>  |
| <b>3 Survey .....</b>                                                                                                  | <b>1</b>  |
| <b>4 Correlation of dimensions .....</b>                                                                               | <b>4</b>  |
| 4.1 Length $l_1$ and dimension $f$ .....                                                                               | 4         |
| 4.2 Smallest possible internal diameter for operating .....                                                            | 4         |
| 4.3 Correlation of the shank dimension and fastening of the shank .....                                                | 5         |
| <b>5 Determination of dimensions .....</b>                                                                             | <b>7</b>  |
| 5.1 Cutting edge corners .....                                                                                         | 7         |
| 5.1.1 Cutting edge corner $K$ .....                                                                                    | 7         |
| 5.1.2 Theoretical cutting edge corner $T$ .....                                                                        | 8         |
| 5.2 Corner radius $r_\epsilon$ of master inserts .....                                                                 | 8         |
| 5.3 Length $l_1$ .....                                                                                                 | 9         |
| 5.4 Dimension $f$ .....                                                                                                | 9         |
| 5.5 Height $h_1$ .....                                                                                                 | 9         |
| 5.6 Tolerances .....                                                                                                   | 10        |
| 5.7 Dimension $a$ .....                                                                                                | 10        |
| 5.7.1 General .....                                                                                                    | 10        |
| 5.7.2 Styles R and T .....                                                                                             | 10        |
| 5.7.3 Styles K, S, W and Y .....                                                                                       | 10        |
| 5.7.4 Values for dimension $a$ .....                                                                                   | 10        |
| 5.8 Correction values $x$ and $y$ .....                                                                                | 10        |
| <b>Annex A (informative) Relationship between designations in ISO 5611 and ISO/TS 13399-2 and ISO/TS 13399-3 .....</b> | <b>15</b> |
| <b>Bibliography .....</b>                                                                                              | <b>17</b> |

## 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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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 defined cutting edges, cutting items*.

This first edition of ISO 5611-1, together with ISO 5611-2, ISO 5611-3, ISO 5611-4, ISO 5611-5, ISO 5611-6, ISO 5611-7, ISO 5611-8, ISO 5611-9, ISO 5611-10, ISO 5611-11, and ISO 5611-12, cancels and replaces ISO 5611:1995, which has been technically revised.

ISO 5611 consists of the following parts, under the general title *Cartridges, type A, for indexable inserts*:

- *Part 1: General survey, correlation and determination of dimensions*
- *Part 2: Style F*
- *Part 3: Style G*
- *Part 4: Style J*
- *Part 5: Style K*
- *Part 6: Style L*
- *Part 7: Style R*
- *Part 8: Style S*
- *Part 9: Style T*
- *Part 10: Style U*
- *Part 11: Style W*
- *Part 12: Style Y*

# Cartridges, type A, for indexable inserts —

## Part 1:

## General survey, correlation and determination of dimensions

### 1 Scope

This part of ISO 5611 is general and is completed by ISO 5611-2 to ISO 5611-12. ISO 5611 applied for cartridges, type A, for indexable inserts and gives their styles in relation to their dimensions in accordance with ISO 5611-2 to ISO 5611-12. These cartridges are primarily intended for indexable inserts made of hard metal, ceramic or other cutting materials to be used for turning operations.

These kinds of cartridges are mainly clamped with one or two screws on the cartridges.

Explanation of the designation code according to ISO 5608.

### 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 5611-2<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 2: Style F*

ISO 5611-3<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 3: Style G*

ISO 5611-4<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 4: Style J*

ISO 5611-5<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 5: Style K*

ISO 5611-6<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 6: Style L*

ISO 5611-7<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 7: Style R*

ISO 5611-8<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 8: Style S*

ISO 5611-9<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 9: Style T*

ISO 5611-10<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 10: Style U*

ISO 5611-11<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 11: Style W*

ISO 5611-12<sup>1)</sup>, *Cartridges, type A, for indexable inserts — Part 12: Style Y*

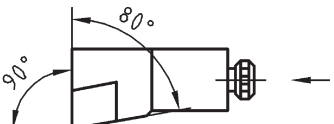
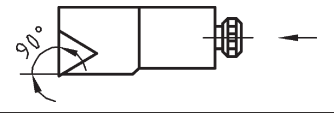
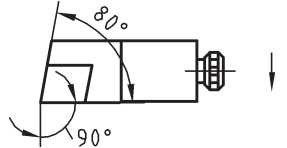
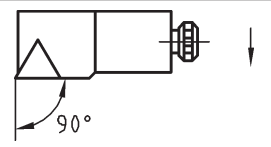
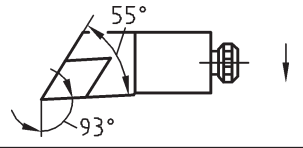
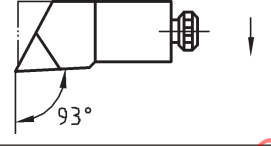
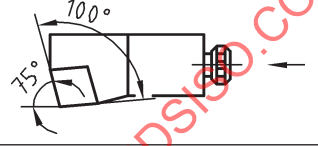
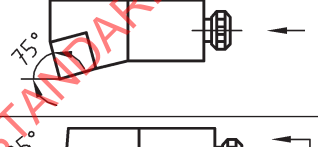
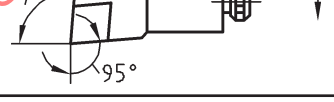
### 3 Survey

[Table 1](#) contains the survey of cartridges, type A, for indexable inserts which are standardized in ISO 5611-2 to ISO 5611-12 their corresponding letter symbols and the height  $h_1$  of the cutting edge. The arrows in the figures show the primary direction of feed.

1) To be published.

Table 1 — Survey of cartridges, type A

Dimensions in millimetres

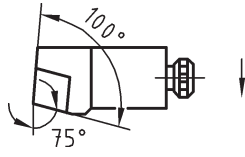
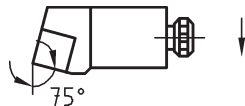
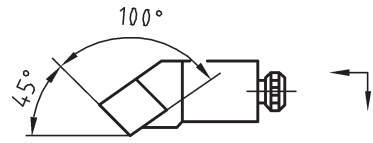
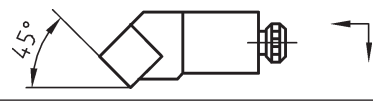
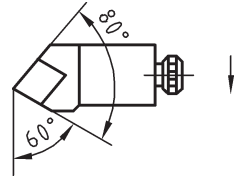
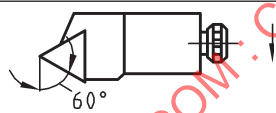
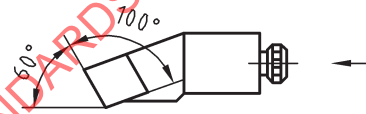
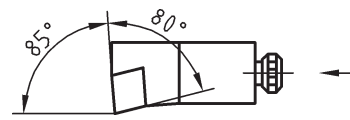
| Style | Sketch                                                                              | Height of the cutting edge |   |    |    |    |    |    | Dimensions in ISO |
|-------|-------------------------------------------------------------------------------------|----------------------------|---|----|----|----|----|----|-------------------|
|       |                                                                                     | 6                          | 8 | 10 | 12 | 16 | 20 | 25 |                   |
| F     |    | •                          | • |    |    |    |    |    | ISO 5611-2        |
|       |    |                            | • | •  | •  | •  | •  | •  |                   |
| G     |    | •                          | • |    |    |    |    |    | ISO 5611-3        |
|       |   |                            | • | •  | •  | •  | •  | •  |                   |
| J     |  |                            | • |    |    |    |    |    | ISO 5611-4        |
|       |  |                            | • | •  | •  | •  | •  | •  |                   |
| K     |  | •                          | • |    |    |    |    |    | ISO 5611-5        |
|       |  |                            |   | •  | •  | •  | •  | •  |                   |
| L     |  | •                          | • | •  | •  | •  | •  | •  | ISO 5611-6        |

<sup>a</sup> It is left to the manufacturer's discretion or by agreement with edge angle  $\epsilon_r = 80^\circ$  instead  $100^\circ$ .

• = Standardized dimensions.

blank = Not standardized.

Table 1 (continued)

| Style                                                                                                                       | Sketch                                                                              | Height of the cutting edge |    |    |    |    |    |    | Dimensions in ISO |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------|----|----|----|----|----|----|-------------------|
|                                                                                                                             |                                                                                     | $h_1$                      |    |    |    |    |    |    |                   |
|                                                                                                                             |                                                                                     | 6                          | 8  | 10 | 12 | 16 | 20 | 25 |                   |
| R                                                                                                                           |    | •a                         | •a |    |    |    |    |    | ISO 5611-7        |
|                                                                                                                             |    |                            |    | •  | •  | •  | •  | •  |                   |
| S                                                                                                                           |    | •a                         | •  |    |    |    |    |    | ISO 5611-8        |
|                                                                                                                             |    |                            |    | •  | •  | •  | •  | •  |                   |
|                                                                                                                             |   |                            | •  | •  | •  | •  | •  | •  |                   |
| T                                                                                                                           |  | •                          | •  |    |    |    |    |    | ISO 5611-9        |
|                                                                                                                             |  |                            | •  | •  | •  | •  | •  | •  |                   |
| U                                                                                                                           |  |                            | •  | •  | •  | •  | •  | •  | ISO 5611-10       |
| W                                                                                                                           |  | •                          | •  |    |    |    |    |    | ISO 5611-11       |
|                                                                                                                             |  |                            | •  | •  | •  | •  | •  | •  |                   |
| Y                                                                                                                           |  | •                          | •  |    |    |    |    |    | ISO 5611-12       |
|                                                                                                                             |  |                            |    | •  | •  | •  | •  | •  |                   |
| a It is left to the manufacturer's discretion or by agreement with edge angle $\epsilon_r = 80^\circ$ instead $100^\circ$ . |                                                                                     |                            |    |    |    |    |    |    |                   |
| • = Standardized dimensions.                                                                                                |                                                                                     |                            |    |    |    |    |    |    |                   |
| blank = Not standardized.                                                                                                   |                                                                                     |                            |    |    |    |    |    |    |                   |

## 4 Correlation of dimensions

### 4.1 Length $l_1$ and dimension $f$

Table 2 contains the correlation between the length  $l_1$  and the dimension  $f$  to their relevant height  $h_1$  of the cutting edge and style of the cartridges, see also Figure 1.

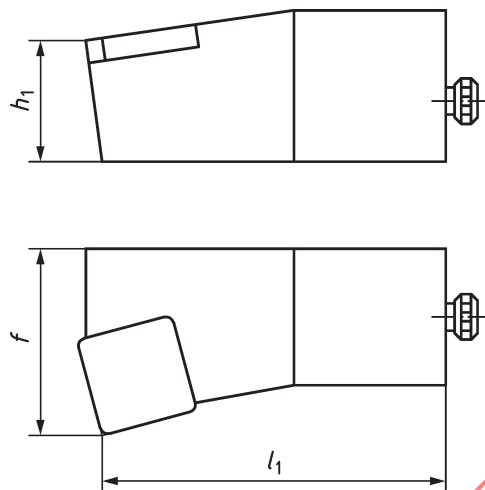


Figure 1 — Cartridge style K

Table 2 — Correlation of dimensions

Dimensions in millimetres

| $h_1$      | $l_1$                     |      | $f$<br>0<br>-0,08            |     |
|------------|---------------------------|------|------------------------------|-----|
| $\pm 0,08$ | for cartridge style       |      | for cartridge style          |     |
|            | F, G, J, K, L, R, T, U, Y | W, S | F, G, J, K, L, R, S, U, W, Y | T   |
| 6          | 25                        | 21   | 8                            | 5,5 |
| 8          | 32                        | 28   | 10                           | 6   |
| 10         | 50                        | 44   | 14                           | 9   |
| 12         | 55                        | 47   | 20                           | 13  |
| 16         | 63                        | 53   | 25                           | 15  |
| 20         | 70                        | 60   |                              |     |
| 25         | 100                       | 87   | 32                           | 20  |

### 4.2 Smallest possible internal diameter for operating

Table 3 contains the smallest possible internal diameter  $d_{1 \min}$  for operating in relation with the relevant cartridge size  $h_1$ , see also Figures 4 and 5.

Table 3 — Smallest possible internal diameter for operating

Dimensions in millimetres

| $h_1 \pm 0,08$ | 6  | 8  | 10 | 12 | 16 | 20 | 25  |
|----------------|----|----|----|----|----|----|-----|
| $d_1$ min.     | 20 | 25 | 40 | 50 | 60 | 70 | 100 |

### 4.3 Correlation of the shank dimension and fastening of the shank

Table 4 contains the correlation between the shank dimensions and the bore diameter for fastening the shank and their relevant height  $h_1$  of the cutting edge, see Figures 2, 3, 4 and 5.

Dimension  $l_3$  applies to the adjusting screw in its mid-position, which is the reference point of the length  $l_1$ , see 5.3. From this position, a minimum adjusting length of 0,4 mm shall be given in both directions.

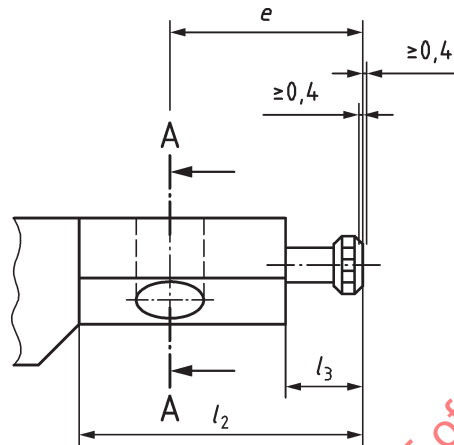


Figure 2 — Shank having  $h_1 = 6 \text{ mm}, 8 \text{ mm}, 10 \text{ mm}, 12 \text{ mm}, 16 \text{ mm}$  and  $20 \text{ mm}$

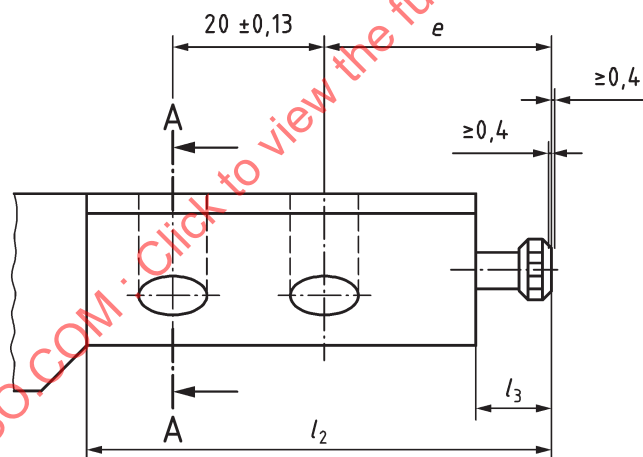


Figure 3 — Shank having  $h_1 = 25 \text{ mm}$

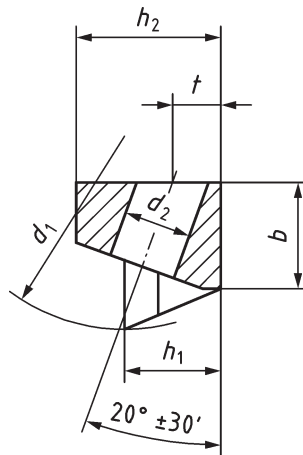


Figure 4 — Sectional drawing A-A for cartridges having  $h_1 = 6 \text{ mm}, 8 \text{ mm}, 10 \text{ mm}$  or  $12 \text{ mm}$

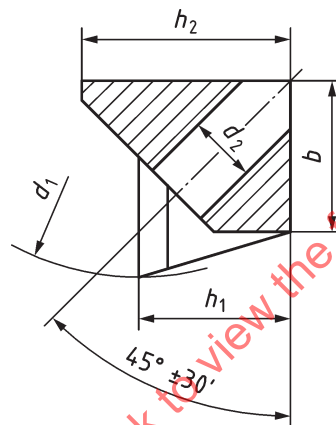


Figure 5 — Sectional drawing A-A for cartridges having  $h_1 = 16 \text{ mm}, 20 \text{ mm}$  or  $25 \text{ mm}$

Table 4 — Correlation of the shank dimension and fastening of the shank

Dimensions in millimetres

| $h_1$      | $b$       | $d_2^a$ | $e$ | $h_2$     | $l_2$ | $l_3$ | $t$        | Fastening screw |
|------------|-----------|---------|-----|-----------|-------|-------|------------|-----------------|
| $\pm 0,08$ | 0<br>-0,2 | H13     |     | 0<br>-0,2 | min.  |       | $\pm 0,13$ |                 |
| 6          | 6         | 4       | 12  | 8,5       | 16    | 4,5   | 3,5        | M3,5            |
| 8          | 8         | 4,5     | 17  | 11        | 21,5  | 6     | 4,5        | M4              |
| 10         | 11        | 7       | 20  | 15        | 26    | 8     | 5          | M6              |
| 12         | 16        |         |     | 20        |       |       | 6          |                 |
| 16         | 20        | 9       | 25  | 25        | 32,5  | 10    | —          | M8              |
| 20         | 20        | 9       | 30  | 30        | 37,5  |       | —          | M8              |
| 25         | 25        | 11      |     | 35        | 59    |       |            | M10             |

<sup>a</sup> The hole for fastening screws can be designed also as slotted hole at the manufacturer's option.

## 5 Determination of dimensions

### 5.1 Cutting edge corners

#### 5.1.1 Cutting edge corner $K$

The specified point  $K$  is defined as follows:

Consider plane  $P_f$  (assumed working plane) and  $P_s$  (tool cutting edge plane) according to ISO 3002-1 for a selected point on the major cutting edge (for example point of tangency of major cutting edge with inscribed circle).

- For  $\kappa_r \leq 90^\circ$ , point  $K$  is 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  $A_\gamma$  (see [Figures 6](#) and [7](#)).
- For  $\kappa_r > 90^\circ$ , point  $K$  is 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  $A_\gamma$  (see [Figures 8](#) and [9](#)).

NOTE The position of the cutting edge corner  $K$  is dependent from the corner radius  $r_\epsilon$  of the indexable insert.

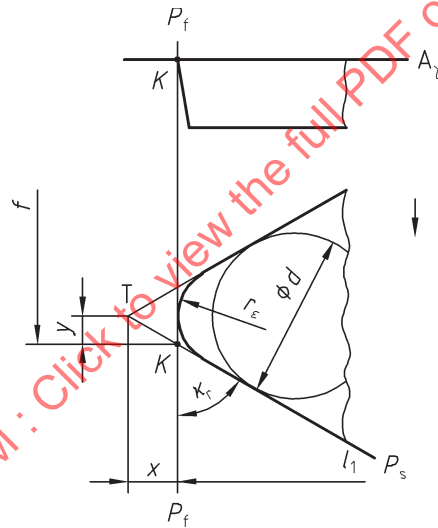


Figure 6 — Cutting edge angle  $\kappa_r \leq 90^\circ$ , with transverse feed

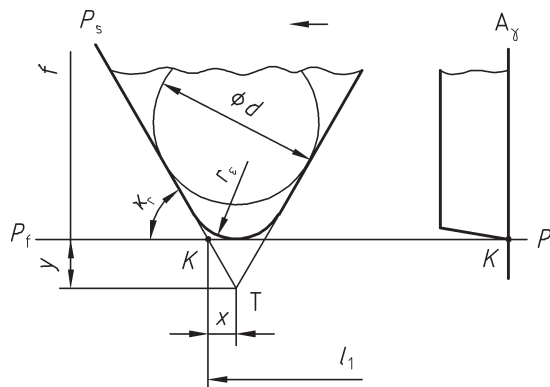


Figure 7 — Cutting edge angle  $\kappa_r \leq 90^\circ$ , with longitudinal feed

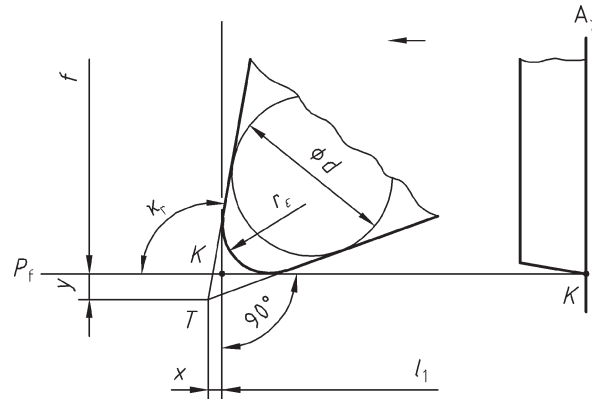


Figure 8 — Cutting edge angle  $\kappa_r > 90^\circ$ , with transverse feed

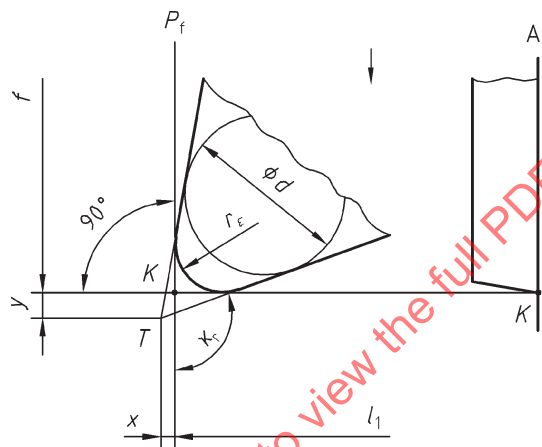


Figure 9 — Cutting edge angle  $\kappa_r > 90^\circ$ , with longitudinal feed

### 5.1.2 Theoretical cutting edge corner $T$

The intersection of the theoretical extensions of major cutting edge and minor cutting edge is considered as the theoretical cutting edge corner  $T$ , see [Figures 6 to 9](#).

NOTE The position of the theoretical corner  $T$  is independent of the corner radius  $r_\epsilon$  of the indexable insert.

### 5.2 Corner radius $r_\epsilon$ of master inserts

[Table 5](#) contains the values of the corner radius  $r_\epsilon$  of the master insert (master gauge) used for the definition and testing of length  $l_1$ , dimension  $f$  and height  $h_1$ .

The corner radius  $r_\epsilon$  of the master indexable insert is a function of the size of the indexable insert associated to cartridges and in [Table 5](#) it is therefore related to the diameter of the inscribed circle.

**Table 5 — Corner radius  $r_\epsilon$  of master inserts**

Dimensions in millimetres

| $d$    | $r_\epsilon$<br>Nominal dimensions <sup>a</sup> |
|--------|-------------------------------------------------|
| 5,56   | 0,4                                             |
| 6,35   |                                                 |
| 7,94   |                                                 |
| 9,525  | 0,8                                             |
| 12,7   |                                                 |
| 15,875 | 1,2                                             |
| 19,05  |                                                 |
| 25,4   | 2,4                                             |

<sup>a</sup> For the determination of the values of  $l_1$ ,  $f$  and the correction values  $x$  and  $y$  are derived from the accurate values of the corner radii  $r_\epsilon = 0,397$  mm; 0,794 mm; 1,191 mm and 2,381 mm, which correspond to the inch dimensions.

### 5.3 Length $l_1$

The length  $l_1$  (for values see [Table 2](#)) is the distance between the specified point  $K$  and the shank end including adjustable screw in their mid-position (see [Figure 1](#), [Figures 6](#) to [9](#) and figures in [Table 6](#)), measured on a master indexable insert with corner radius  $r_\epsilon$  in accordance with [5.2](#).

For cartridges with indexable inserts with a corner radius  $r_\epsilon$  deviating from [Table 5](#), the modified length  $l_1$  shall be determined with correction value  $x$  as shown in [Figures 6](#) to [9](#).

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 is 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 2](#)) is the distance between the specified point  $K$  and the rear backing surface of the cartridges (see [Figure 1](#), [Figures 6](#) to [9](#) and figures in [Table 6](#)), measured on a master insert with corner radius  $r_\epsilon$  in accordance with [5.2](#).

For cartridges with inserts with a corner radius  $r_\epsilon$  deviating from [Table 5](#), the modified dimension  $f$  shall be determined with correction value  $y$  as shown in [Figures 6](#) to [9](#).

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  $f$  is obtained from the value given in [Table 2](#) 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  $h_1$  determined the size of the cartridges and specified the distance between the cutting edge  $K$  and the base of the cartridges (see [Figures 1](#) to [5](#)) measured on a master indexable insert and optional on a master shim.

## 5.6 Tolerances

The tolerances given in [Tables 2](#) and [4](#) for the dimension  $f$  and the height  $h_1$  measured on a master indexable insert and a master shim, if applicable. Therefore, the tolerances on  $f$  and  $h_1$  do not include the tolerances on indexable insert, shim and respectively width of shank.

## 5.7 Dimension $a$

### 5.7.1 General

Dimension  $a$  is related to the determination of the overall width and overall length of cartridges.

In general, the width of cartridges corresponds to dimension  $f$  for the shank width and its length  $l_1$  with the exception of cartridges of styles which are listed 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 cartridge is 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 perpendicular to the shank length, see also figures in [Table 6](#).

### 5.7.3 Styles K, S, W and Y

For styles K, S, W and Y the overall length of the cartridges is the sum of the values for  $l_1$  and  $a$ .

Dimension  $a$  is defined as the distance between the specified point  $K$  and the tangent on the corner radius of the indexable insert, measured parallel to the shank length, see also figures in [Table 6](#).

### 5.7.4 Values for dimension $a$

The values for dimension  $a$  are given in the respective dimension standards and apply to indexable inserts with corner radii in accordance with [5.2](#), with rake angle  $\gamma_0 = 0^\circ$  and inclination angle  $\lambda_s = 0^\circ$ .

For cartridges 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 values  $y$  and for styles K, S, W and Y with correction value  $x$ ; for values for  $x$  and  $y$  see [Table 6](#).

For the rake angle  $\gamma_0$  and cutting edge inclination angle  $\lambda_s$  varying between  $-6^\circ$  and  $+6^\circ$ , 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](#) apply to rake angle  $\gamma_0 = 0^\circ$  and cutting edge inclination  $\lambda_s = 0^\circ$ . Rake angles  $\gamma_0$  and cutting edge inclinations  $\lambda_s$  varying between  $-6^\circ$  and  $+6^\circ$  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  $f$  and  $h_1$ . If necessary, the correction values have to be determined.

Table 6 — Correction values  $x$  and  $y$ 

Dimensions in millimetres

| Style | Sketch | $r_E$ | $x$   | $y$   |
|-------|--------|-------|-------|-------|
| F     |        | 0,2   | —     | 0,039 |
|       |        | 0,4   | —     | 0,076 |
|       |        | 0,8   | —     | 0,152 |
|       |        | 1,2   | —     | 0,288 |
|       |        | 1,6   | —     | 0,305 |
|       |        | 2,4   | —     | 0,457 |
|       |        | 0,2   | —     | 0,149 |
|       |        | 0,4   | —     | 0,291 |
|       |        | 0,8   | —     | 0,581 |
|       |        | 1,2   | —     | 0,872 |
|       |        | 1,6   | —     | 1,162 |
|       |        | 2,4   | —     | 1,743 |
| G     |        | 0,2   | 0,039 | —     |
|       |        | 0,4   | 0,076 | —     |
|       |        | 0,8   | 0,152 | —     |
|       |        | 1,2   | 0,228 | —     |
|       |        | 1,6   | 0,305 | —     |
|       |        | 2,4   | 0,457 | —     |
|       |        | 0,2   | 0,149 | —     |
|       |        | 0,4   | 0,291 | —     |
|       |        | 0,8   | 0,581 | —     |
|       |        | 1,2   | 0,872 | —     |
|       |        | 1,6   | 1,162 | —     |
|       |        | 2,4   | 1,743 | —     |
| J     |        | 0,2   | 0,176 | 0,020 |
|       |        | 0,4   | 0,344 | 0,039 |
|       |        | 0,8   | 0,688 | 0,079 |
|       |        | 1,2   | 1,031 | 0,118 |
|       |        | 1,6   | 1,375 | 0,157 |
|       |        | 2,4   | 2,062 | 0,236 |
|       |        | 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 |

Table 6 (continued)

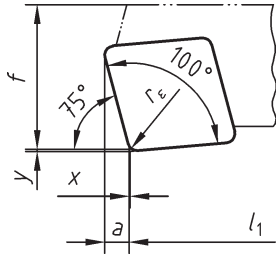
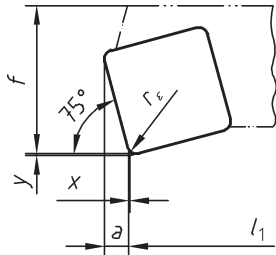
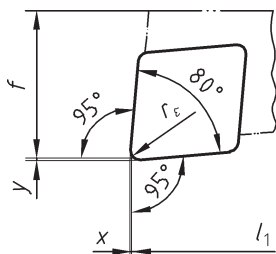
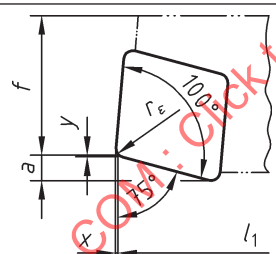
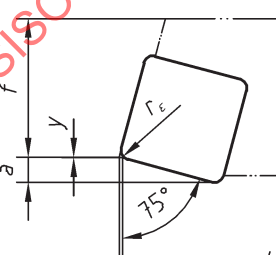
| Style | Sketch                                                                              | $r_\varepsilon$ | $x$   | $y$   |
|-------|-------------------------------------------------------------------------------------|-----------------|-------|-------|
| K     |    | 0,2             | 0,004 | 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 |
|       |    | 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     |   | 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 |
| R     |  | 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 |
|       |  | 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 | 0,143 |

Table 6 (continued)

| Style | Sketch | $r_\epsilon$ | $x$   | $y$   |
|-------|--------|--------------|-------|-------|
| S     |        | 0,2          | 0,061 | 0,061 |
|       |        | 0,4          | 0,119 | 0,119 |
|       |        | 0,8          | 0,239 | 0,239 |
|       |        | 1,2          | 0,358 | 0,358 |
|       |        | 1,6          | 0,477 | 0,477 |
|       |        | 2,4          | 0,715 | 0,715 |
|       |        | 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 |
|       |        | 0,2          | 0,185 | 0,185 |
|       |        | 0,4          | 0,370 | 0,370 |
|       |        | 0,8          | 0,740 | 0,740 |
|       |        | 1,2          | 1,109 | 1,109 |
|       |        | 1,6          | 1,479 | 1,479 |
|       |        | 2,4          | 2,219 | 2,219 |
| T     |        | 0,2          | 0,108 | 0,062 |
|       |        | 0,4          | 0,211 | 0,122 |
|       |        | 0,8          | 0,422 | 0,244 |
|       |        | 1,2          | 0,634 | 0,366 |
|       |        | 1,6          | 0,845 | 0,488 |
|       |        | 2,4          | 1,267 | 0,731 |
|       |        | 0,2          | 0,203 | 0,117 |
|       |        | 0,4          | 0,397 | 0,229 |
|       |        | 0,8          | 0,794 | 0,458 |
|       |        | 1,2          | 1,191 | 0,687 |
|       |        | 1,6          | 1,588 | 0,917 |
|       |        | 2,4          | 2,381 | 1,375 |
| U     |        | 0,2          | 0,018 | 0,138 |
|       |        | 0,4          | 0,035 | 0,269 |
|       |        | 0,8          | 0,071 | 0,538 |
|       |        | 1,2          | 0,106 | 0,806 |
|       |        | 1,6          | 0,142 | 1,075 |
|       |        | 2,4          | 0,213 | 1,613 |