BRITISH STANDARD

BS ISO 702-1:2009

# Machine tools — Connecting dimensions of spindle noses and work holding chucks

## Part 1: Conical connection

ICS 25.060.20



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# National foreword

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BS ISO 702-1:2009

INTERNATIONAL STANDARD

**ISO 702-1**

Third edition
2009-07-15

# Machine tools — Connecting dimensions of spindle noses and work holding chucks —

## Part 1: Conical connection

*Machines-outils — Dimensions d'assemblage des nez de broche et des mandrins porte-pièces —*

*Partie 1: Assemblage conique*

Reference number
ISO 702-1:2009(E)

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ISO 702-1 was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 8, *Work holding spindles and chucks*.

This third edition cancels and replaces the second edition (ISO 702-1:2001), Tables 1 and 2 and Figures 1 and 2 of which have been technically revised.

ISO 702 consists of the following parts, under the general title *Machine tools — Connecting dimensions of spindle noses and work holding chucks*:

— *Part 1: Conical connection*

— *Part 2: Camlock type*

— *Part 3: Bayonet type*

— *Part 4: Cylindrical connection*

**INTERNATIONAL STANDARD** **ISO 702-1:2009(E)**

# Machine tools — Connecting dimensions of spindle noses and work holding chucks —

# Part 1: Conical connection

## 1 Scope

This part of ISO 702 specifies the sizes for interchangeability of conical spindle noses and corresponding connecting faces of face plates or work holding chucks.

NOTE The "camlock type", "bayonet type" and "cylindrical connection" are specified in ISO 702-2, ISO 702-3 and ISO 702-4, respectively.

## 2 Interchangeability

In this part of ISO 702, all dimensions and tolerances are expressed in millimetres.

Although there are differences in the values of dimensions and assembly screws in metric and inch series, the connecting dimensions in Tables 1 and 2 allow for interchangeability between metric- and inch-based chucks (see also footnote "a" in Table 2).

## 3 Sizes for interchangeability

### 3.1 Spindle noses

See Figure 1 and Table 1.

— Type A1: Two bolt circles of diameter $d_2$ and $d_3$;

— Type A2: One outer bolt circle of diameter $d_3$ (Type A2 for Nos. 3 and 4; types A1 and A2 for Nos. 5 to 28).

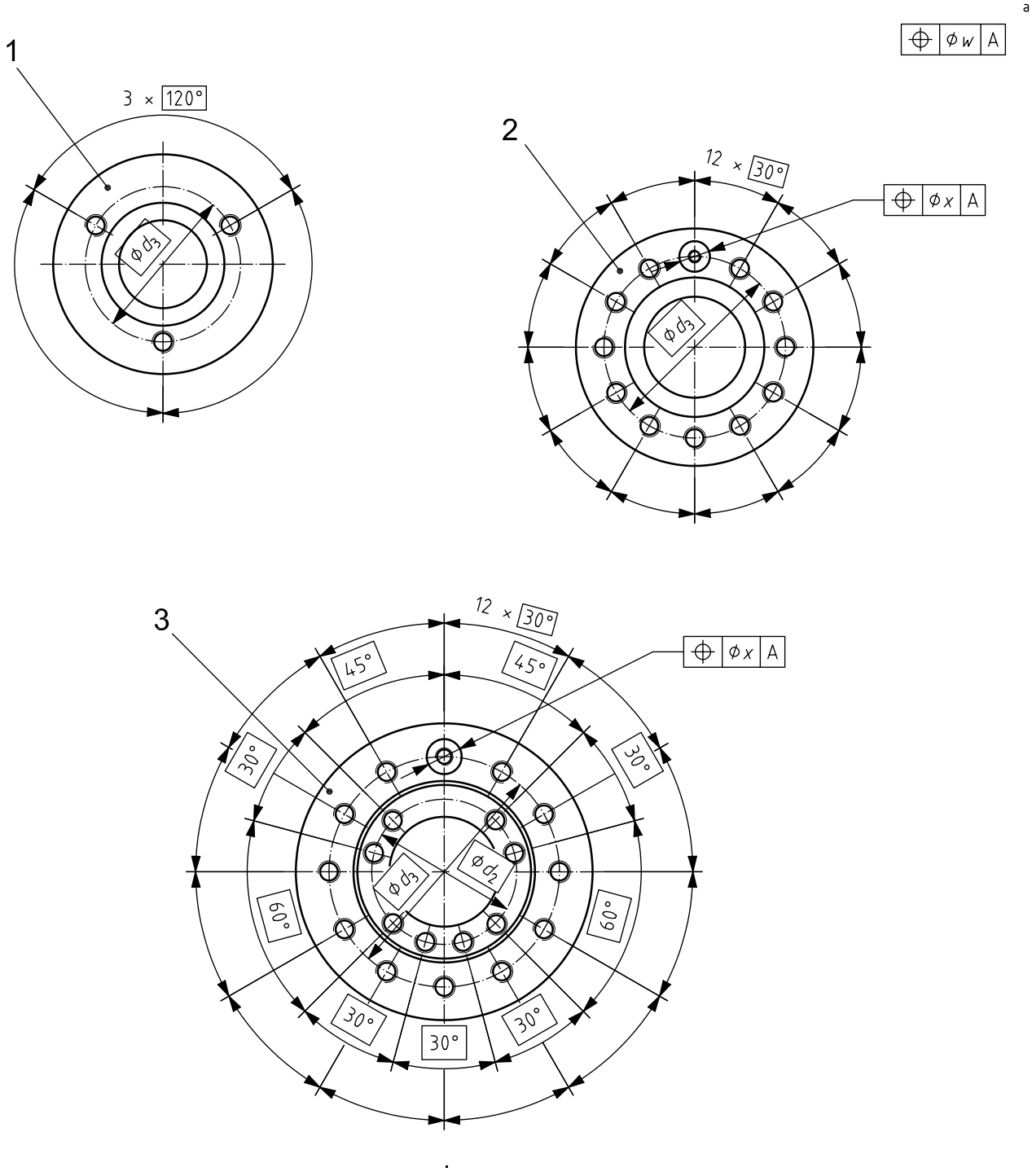
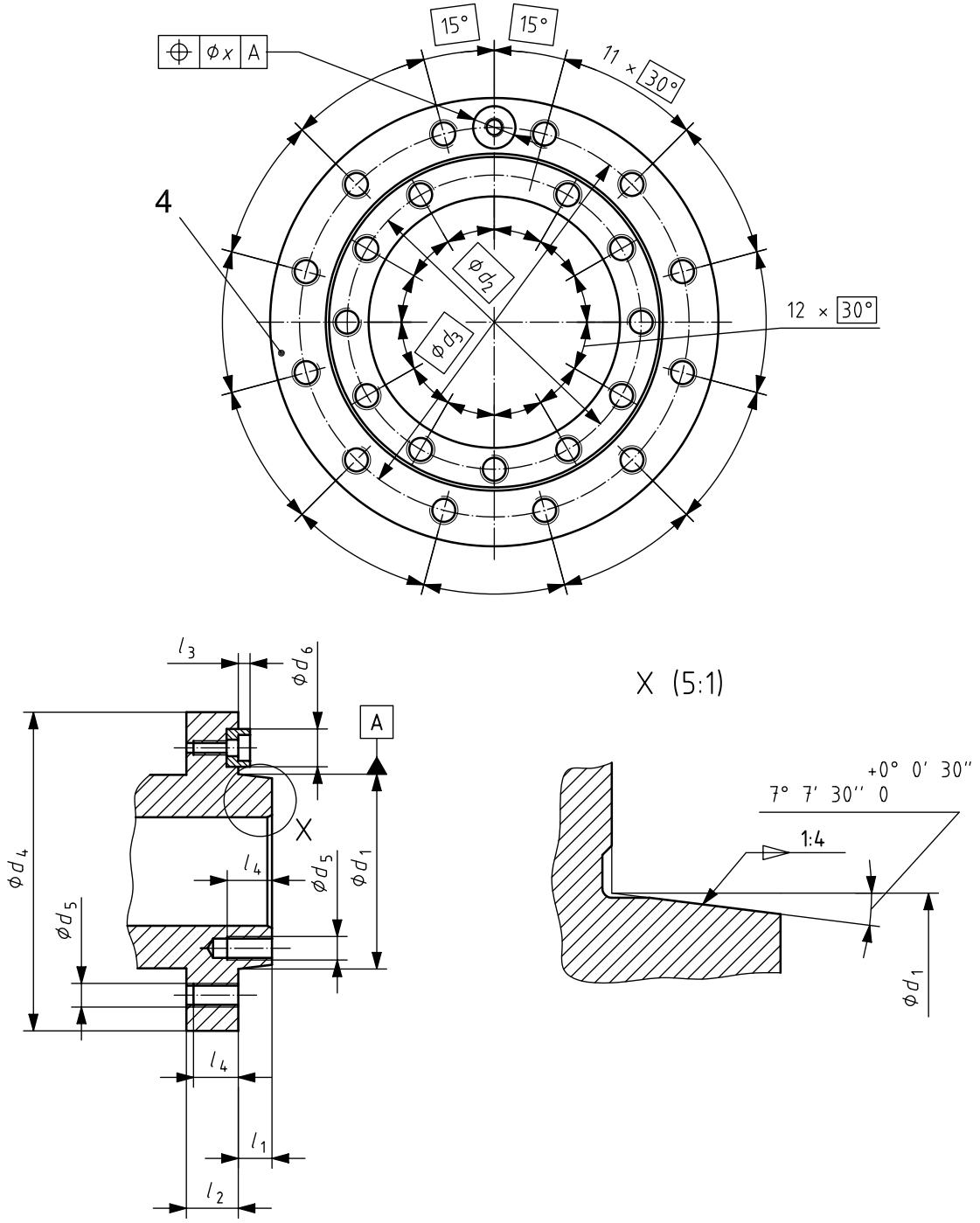



**Figure 1** (*continued*)




**Key**

1 size No. 3
2 size No. 4
3 size Nos. 5 to 11
4 size Nos. 15 to 28

[a] All fixing holes.

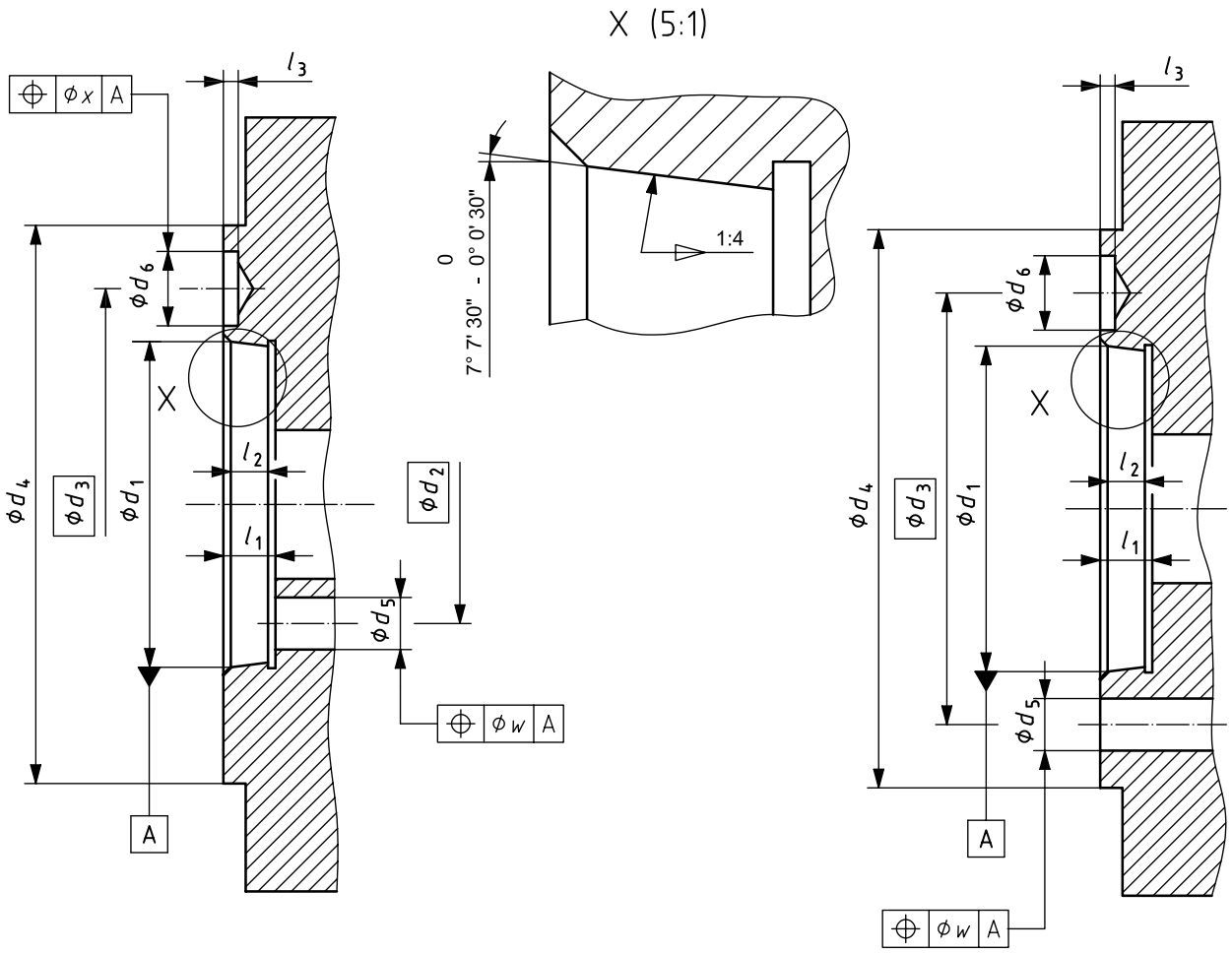
**Figure 1 — Spindle noses**

**Table 1 — Dimensions of spindle noses**

| Dimension | | No. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **3** | **4** | **5** | **6** | **8** | **11** | **15** | **20** | **28** |
| $d_1$ | nom. | 53,975 | 63,513 | 82,563 | 106,375 | 139,719 | 196,869 | 285,775 | 412,775 | 584,225 |
| | tol. | $^{+0,008}_{-0}$ | $^{+0,008}_{-0}$ | $^{+0,010}_{-0}$ | $^{+0,010}_{-0}$ | $^{+0,012}_{-0}$ | $^{+0,014}_{-0}$ | $^{+0,016}_{-0}$ | $^{+0,020}_{-0}$ | $^{+0,023}_{-0}$ |
| $d_2$ | | — | — | 61,9 | 82,6 | 111,1 | 165,1 | 247,6 | 368,3 | 530,2 |
| $d_3$ | | 70,6 | 82,6 | 104,8 | 133,4 | 171,4 | 235 | 330,2 | 463,6 | 647,6 |
| $d_4$ | | 92 | 108 | 133 | 165 | 210 | 280 | 380 | 520 | 725 |
| $d_5$ | | M10 | M10 | M10 | M12 | M16 | M20 | M24 | M24 | M30 |
| $d_6$ H8/h8 | | — | 14,25 | 15,9 | 19,05 | 23,8 | 28,6 | 34,9 | 41,3 | 50,8 |
| $l_1$ (Type A1) | $^{0}_{-0,025}$ | — | — | 14,288 | 15,875 | 17,462 | 19,050 | 20,638 | 22,225 | 25,400 |
| $l_1$ (Type A2) | | 11 | 11 | 13 | 14 | 16 | 18 | 19 | 21 | 24 |
| $l_2$ | | 16 | 20 | 22 | 25 | 28 | 35 | 42 | 48 | 56 |
| $l_3$ | | — | 5 | 5 | 5 | 6 | 8 | 8 | 8 | 8 |
| $l_4$ | | 14 | 17 | 19 | 22 | 25 | 32 | 37 | 42 | 50 |
| $w$ and $x$ | | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,3 | 0,3 | 0,3 |
| NOTE The general tolerance for untoleranced dimensions is ± 0,4 mm. | | | | | | | | | | |

### 3.2 Connecting face dimensions

See Figure 2 and Table 2.




**a) With inner bolt circle (for mounting on spindle nose A1 by means of its inner bolt circle)**

**b) With outer bolt circle (for mounting on spindle nose A1, or spindle nose A2 by means of its outer bolt circle)**

**Figure 2 — Connecting face dimensions**

**Table 2 — Connecting face dimensions**

| Dimension | No. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 8 | 11 | 15 | 20 | 28 |
| $d_1$ | 53,975 | 63,513 | 82,563 | 106,375 | 139,719 | 196,869 | 285,775 | 412,775 | 584,225 |
| tol. Type 1 [a] | $^{+0,003}_{-0,005}$ | $^{+0,003}_{-0,005}$ | $^{+0,004}_{-0,006}$ | $^{+0,004}_{-0,006}$ | $^{+0,004}_{-0,008}$ | $^{+0,004}_{-0,010}$ | $^{+0,004}_{-0,012}$ | $^{+0,005}_{-0,015}$ | $^{+0,006}_{-0,017}$ |
| tol. Type 2 [a] | $^{+0,008}_{0}$ | $^{+0,008}_{0}$ | $^{+0,010}_{0}$ | $^{+0,010}_{0}$ | $^{+0,012}_{0}$ | $^{+0,014}_{0}$ | $^{+0,016}_{0}$ | $^{+0,020}_{0}$ | $^{+0,030}_{0}$ |
| $d_2$ | — | — | 61,9 | 82,6 | 111,1 | 165,1 | 247,6 | 368,3 | 530,2 |
| $d_3$ | 70,6 | 82,6 | 104,8 | 133,4 | 171,4 | 235 | 330,2 | 463,6 | 647,6 |
| $d_4$ | 92 | 108 | 133 | 165 | 210 | 280 | 380 | 520 | 725 |
| $d_5$ | 12 | 12 | 12 | 14 | 18 | 22 | 25,5 [b] | 27 [b] | 33 |
| $d_6$ $^{+0,1}_{0}$ | — | 14,7 | 16,3 | 19,45 | 24,2 | 29,4 | 35,7 | 42,1 | 51,6 |
| $l_1$ (Type A1) $^{+0,025}_{0}$ | — | — | 14,288 | 15,875 | 17,462 | 19,050 | 20,638 | 22,225 | 25,400 |
| $l_1$ min. (Type A2) [c] | — | — | 15 | 16 | 18 | 20 | 21 | 23 | 26 |
| $l_2$ | 10 | 10 | 12 | 13 | 14 | 16 | 17 | 19 | 22 |
| $l_3$ | — | 6,5 | 6,5 | 6,5 | 8 | 10 | 10 | 10 | 10 |
| $w$ and $x$ | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,3 | 0,3 | 0,3 |

NOTE The general tolerance for untoleranced dimensions is ± 0,4 mm.

[a] Type identification shall be marked.

[b] These are compromise dimensions to allow for interchangeability between inch and metric chucks.

[c] $l_1$ of Type 1 may be used in place of $l_1$ of Type 2 only if the face plate is rigid enough not to cause bending when the screws are tightened on the inner bolt circle.

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