INTERNATIONAL STANDARD

ISO 1173

Third edition
2001-04-01

Assembly tools for screws and nuts — Drive ends for hand- and machine-operated screwdriver bits and connecting parts — Dimensions, torque testing

Outils de manœuvre pour vis et écrous — Entraînements des embouts tournevis à main et à machine et éléments de connexion — Dimensions, couple d'essai

Reference number
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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 1173 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 10, *Assembly tools for screws and nuts, pliers and nippers*.

This third edition cancels and replaces the second edition (ISO 1173:1988), which has been technically revised.

Annex A of this International Standard is for information only.

Assembly tools for screws and nuts — Drive ends for hand- and machine-operated screwdriver bits and connecting parts — Dimensions, torque testing

1 Scope

This International Standard specifies the dimensions and torque testing of drive ends for hand- and machine-operated screwdriver bits as well as to driving spindles of screw driving machines.

It ensures the interchangeability of tool bits and tool holders.

This International Standard defines only the distinctive features of individual drive ends. Details of design, e.g. of fixing devices, are left to the user of this International Standard.

2 Dimensions

See Figures 1 to 8 and Tables 1 to 8.

Details not given shall be chosen appropriately.

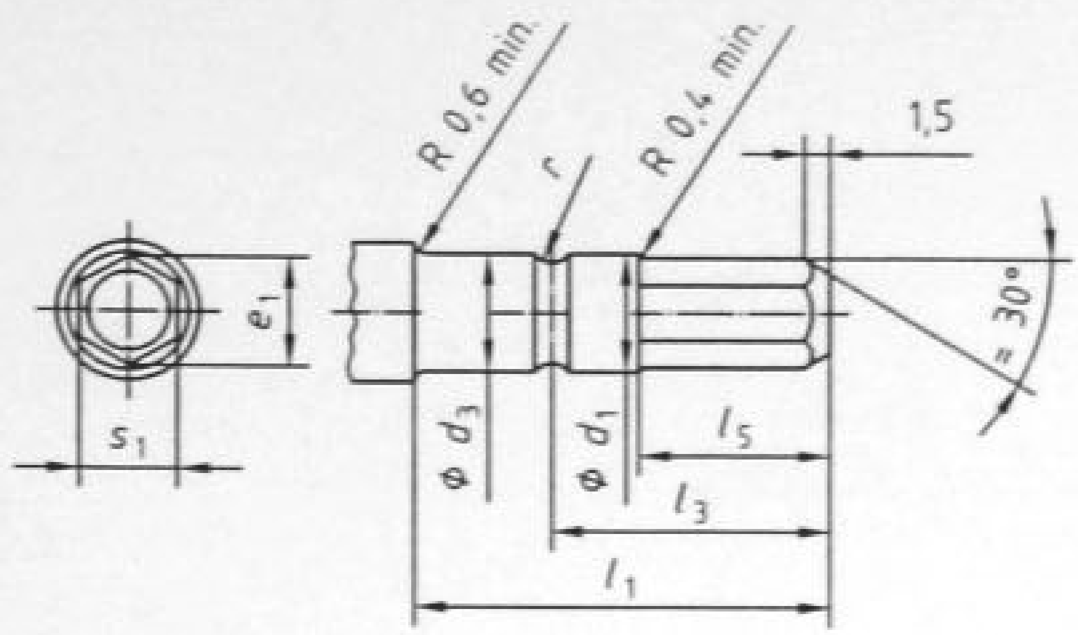
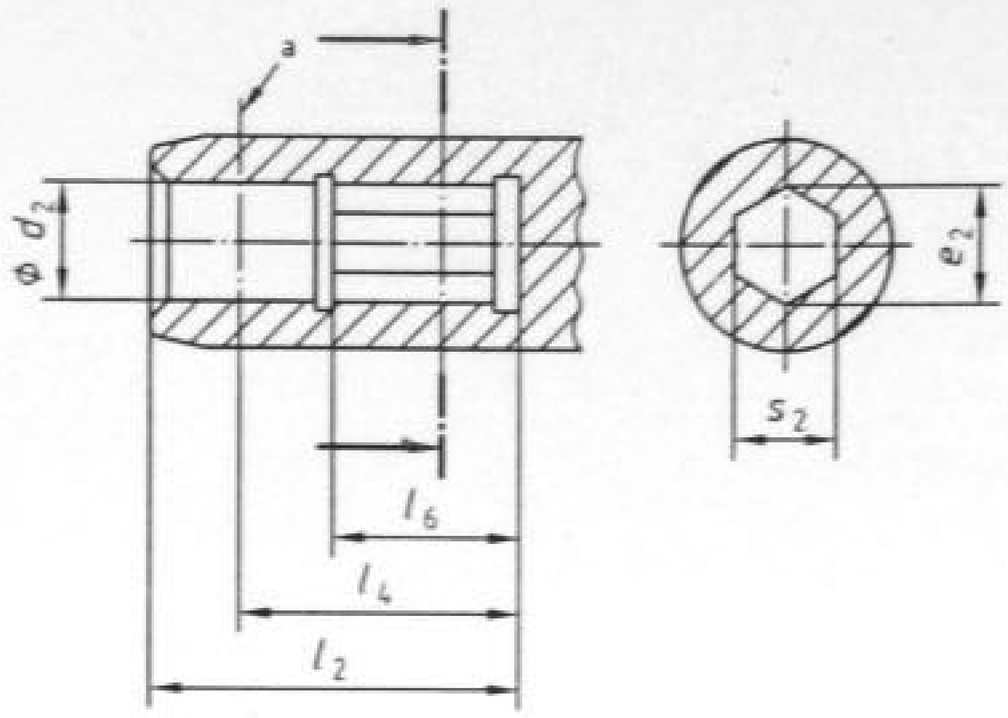


Figure 1 — Male hexagon form A



a Retaining system of the manufacturer's choice

Figure 2 — Female hexagon form B

Table 1 — Male hexagon form A

Dimensions in millimetres

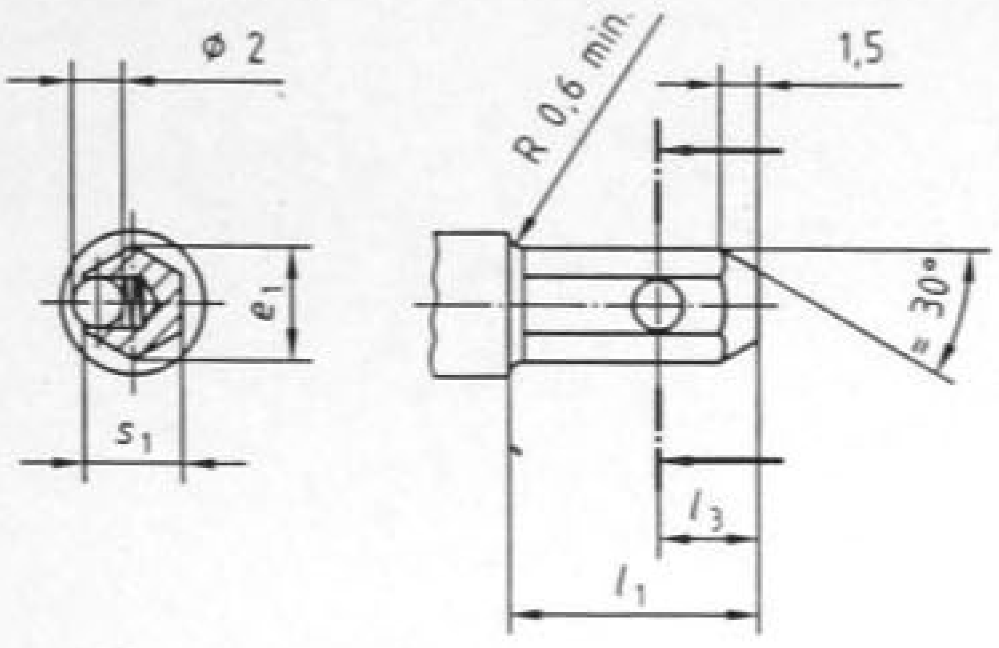
Form	Nominal dimension	s_1		d_1	d_3	e_1		l_1	l_3	l_5	r
		max.	min.	h9	h12	max.	min.	min.	$^{0}_{-0,2}$	$^{+0,4}_{0}$	min.
A	3	3	2,96	3,6	3	3,39	3,34	19,5	11,9	7,4	1
	5,5	5,50	5,45	6,7	5,7	6,21	6,16	24	16	10,9	1,25

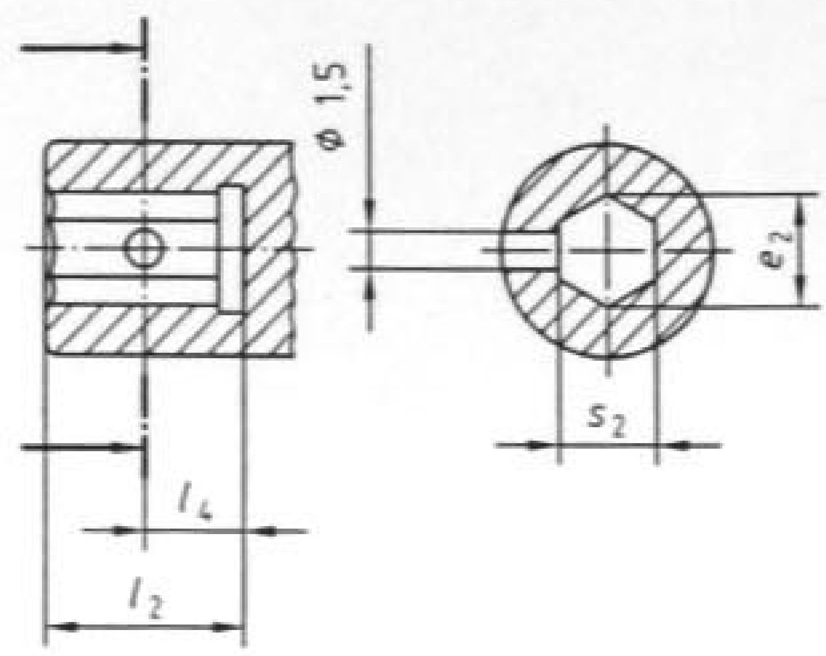
Table 2 — Female hexagon form B

Dimensions in millimetres

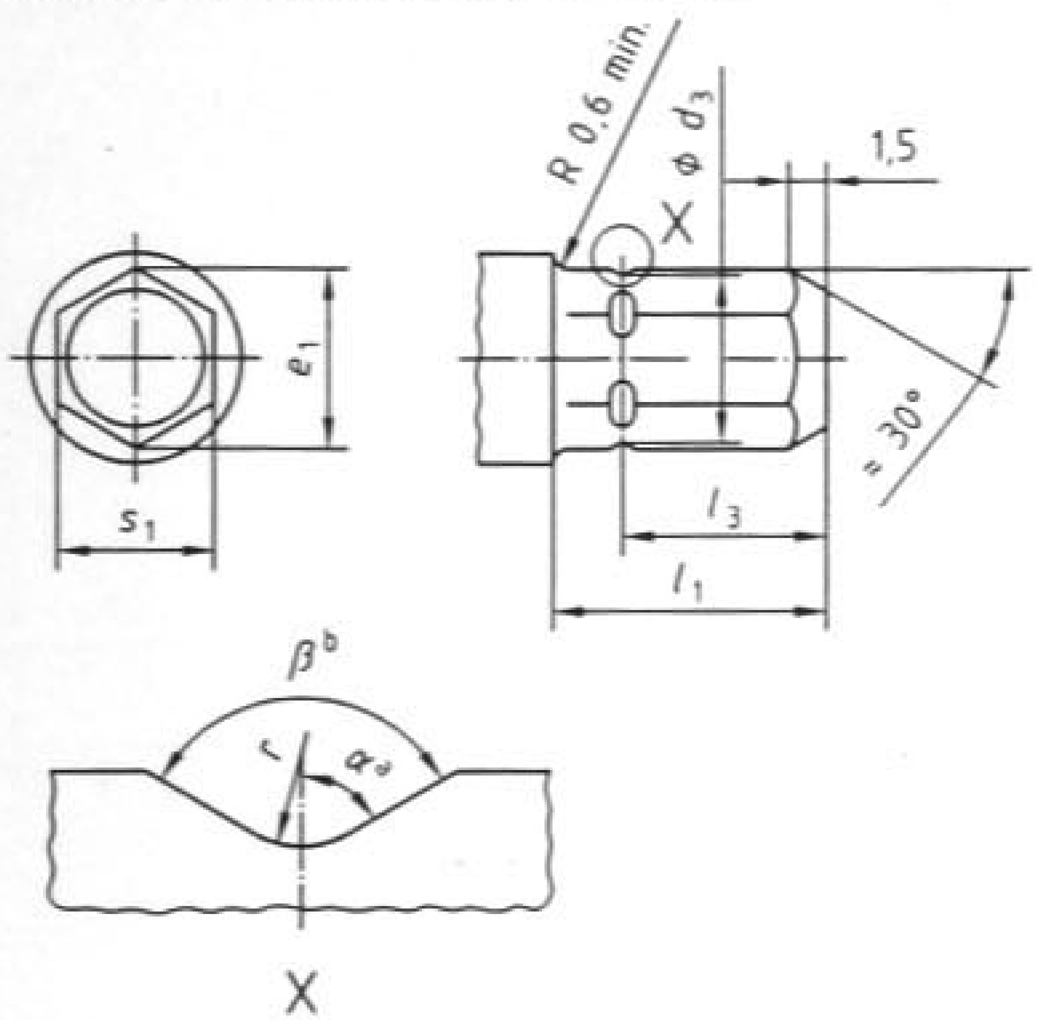
Form	Nominal dimension	s_2		d_2	e_2	l_2	l_4	l_6
		max.	min.	D10	min.	± 0,1	$^{+0,2}_{0}$	$^{0}_{-0,4}$
B	3	3,06	3,02	3,6	3,41	16,5	11,9	7,2
	5,5	5,58	5,53	6,7	6,25	21	16	10,7

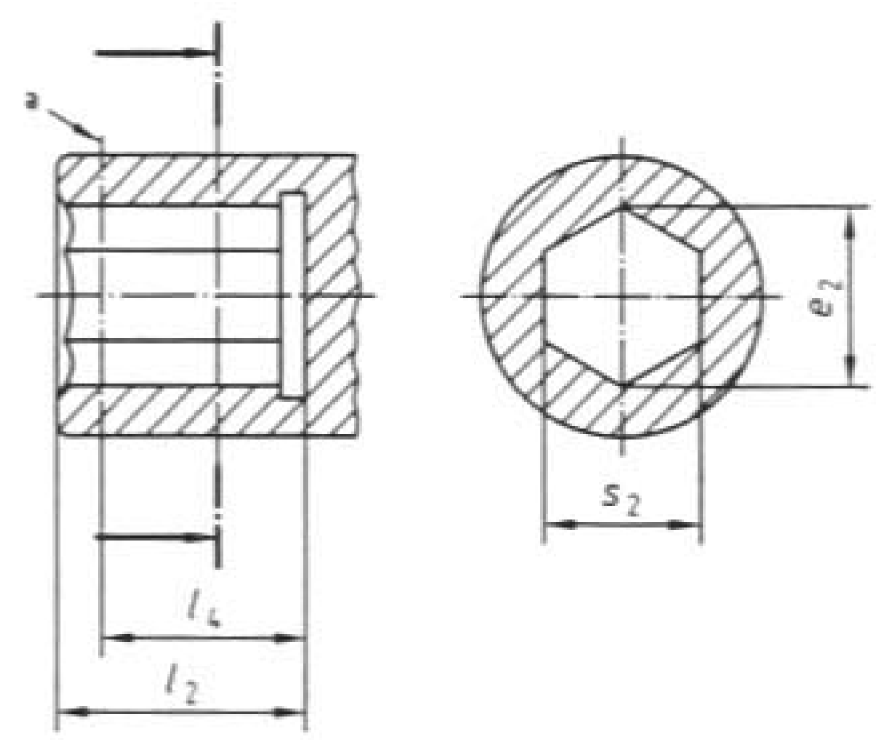
Nominal dimension 4





Nominal dimensions 6,3, 8 and 12,5





a   40° ⩽ α ⩽ 60°

b   80° ⩽ β ⩽ 120°

Figure 3 — Male hexagon form C

a   Retaining system of the manufacturer's choice.

Figure 4 — Female hexagon form D

Table 3 — Male hexagon form C

Dimensions in millimetres

Form	Nominal dimension	s_1		d_3	e_1		l_1	l_3	r
		max.	min.	h12	max.	min.	min.	$^{0}_{-0,2}$	min.
C	4	3,96	3,91	—	4,48	4,42	9	4	—
	6,3	6,35	6,29	6,7	7,18	7,11	11	8,2	0,3
	8	7,93	7,87	8,2	8,96	8,90	13,5	10,2	
	12,5	12,70	12,63	13,5	14,35	14,27	15,9	12,7	

Table 4 — Female hexagon form D

Dimensions in millimetres

Form	Nominal dimension	s_2		e_2	l_2	l_4
		max.	min.	min.	± 0,1	$^{+0,2}_{0}$
D	4	4,04	3,99	4,51	8	4
	6,3	6,45	6,39	7,22	10	8,2
	8	8,03	7,97	9	12,5	10,2
	12,5	12,80	12,75	14,4	14,9	12,7

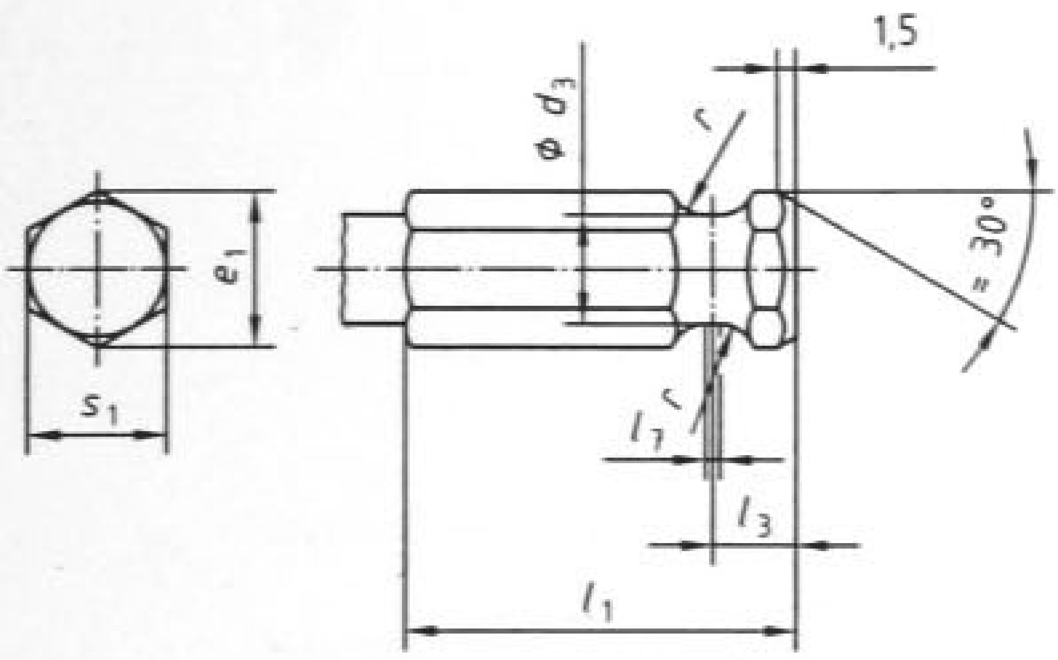
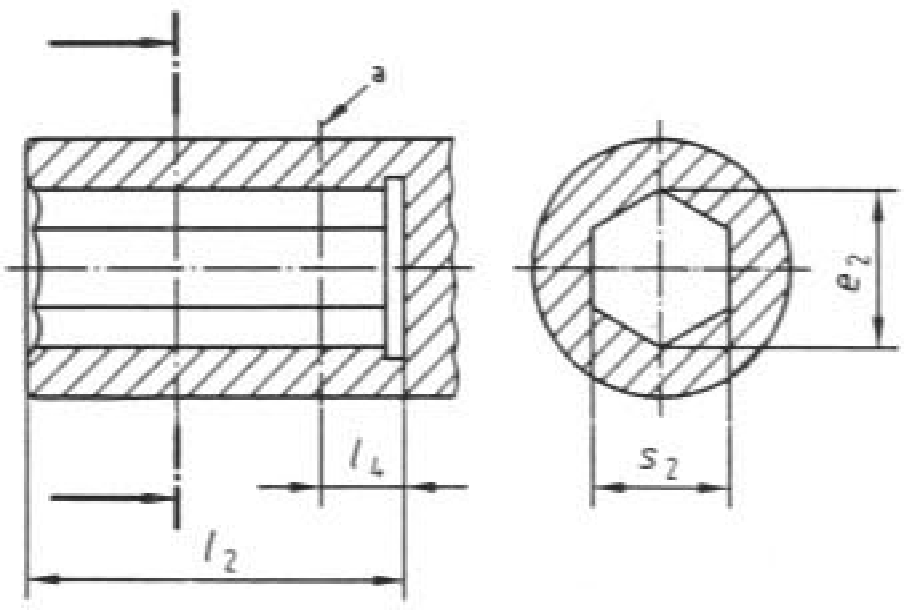


Figure 5 — Male hexagon form E



a Retaining system of the manufacturer's choice.

Figure 6 — Female hexagon form F

Table 5 — Male hexagon form E

Dimensions in millimetres

Form	Nominal dimension	s_1		d_3	e_1		l_1	l_3	l_7	r
		max.	min.	h12	max.	min.	min.	$^{0}_{-0,1}$	≈	min.
E	6,3	6,35	6,29	4,7	7,18	7,11	25	9,5	1	2,4
	(8) [a]	7,93	7,87	6,3	8,96	8,90	27	5,4	1,2	2,4
	11,2	11,11	11,04	8,7	12,56	12,48	31,5	6,7	1,2	2,8

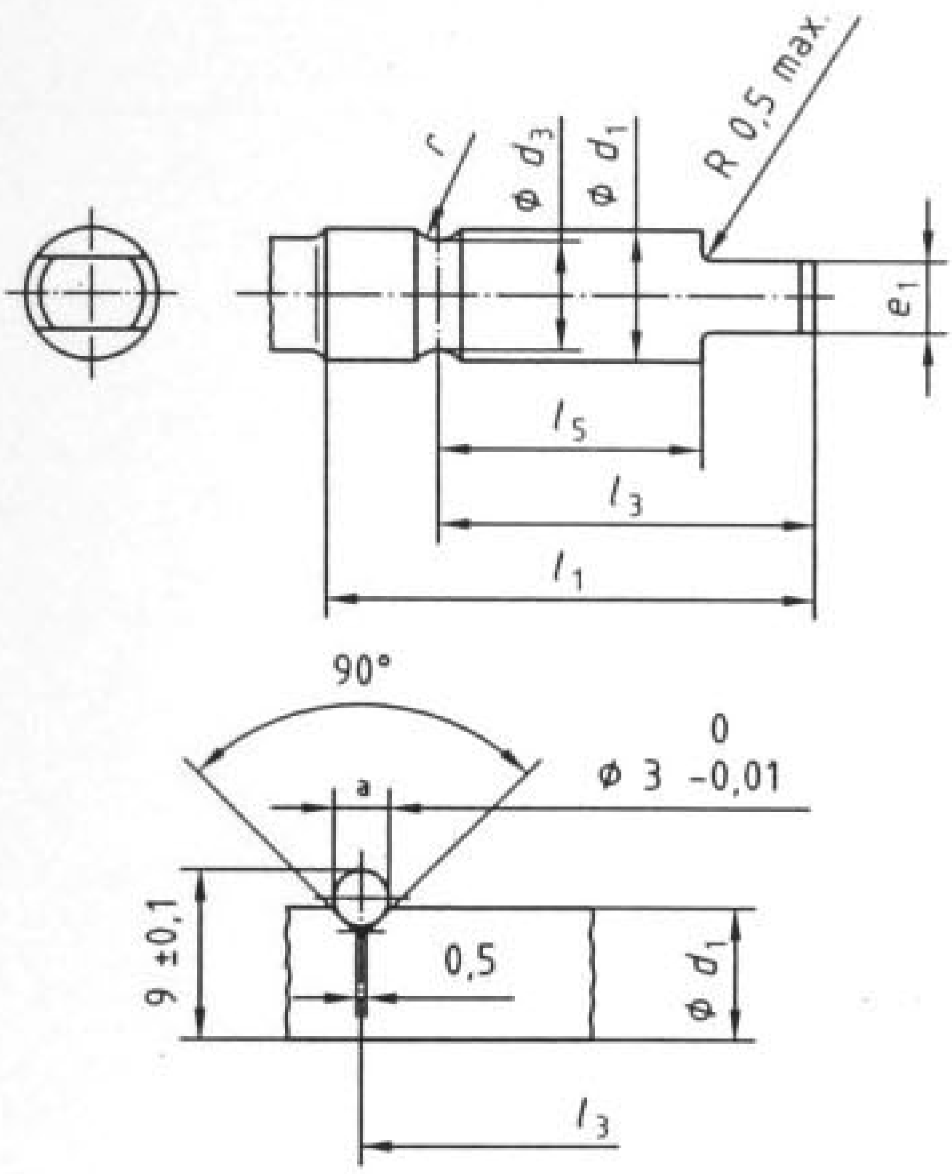
a Non-preferred dimension.

Table 6 — Female hexagon form F

Dimensions in millimetres

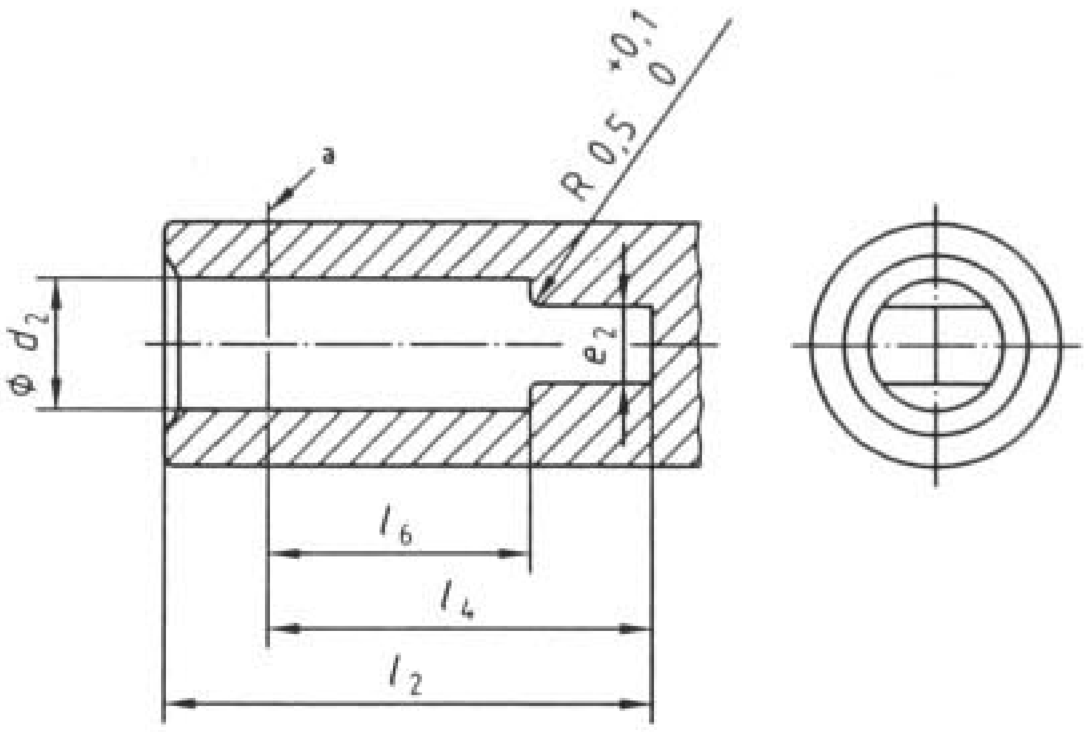
Form	Nominal dimension	s_2		e_2	l_2	l_4
		max.	min.	min.	max.	$^{+0,1}_{0}$
F	6,3	6,45	6,39	7,22	24	9,5
	(8) [a]	8,03	7,97	9	25,5	5,4
	11,2	11,23	11,16	12,61	30	6,7

[a] Non-preferred dimension.



a Arrangement with test role for the determination of the groove depth.

Figure 7 — Male flat end form G



a Retaining system of the manufacturer's choice.

Figure 8 — Female flat end form H

Table 7 — Male flat end form G

Dimensions in millimetres

Form	Nominal dimension	d_1	d_3	e_1		l_1	l_3	l_5	r
		f8	h12	max.	min.	min.	± 0,2	± 0,2	min.
G	7	7	5,8	3,86	3,74	26	20	14	1,5

Table 8 — Female flat end form H

Dimensions in millimetres

Form	Nominal dimension	d_2	e_2	l_2	l_4	l_6
		H10	$^{+0,1}_{0}$	max.	min.	± 0,2
H	7	7	4,1	26	20,5	14

3 Design

Form D

— Magnetic types for hand-operated screwdriver bits may be manufactured without a bore for a ball or without a groove for a retaining (snap) ring.

Form G

— Male flat ends may also have a V-shaped ring groove instead of a circular arc shape ring groove (of the manufacturer's choice), which shall comply with the pictorial representation.

4 Designation

A drive end conforming to this International Standard shall be designated by

a) "Male hexagon" or "Female hexagon" in the case of a design with a male or a female hexagon drive respectively;

b) "Male flat end" or "Female flat end" in the case of a design with a male or female flat end respectively;

c) reference to this International Standard, i.e. ISO 1173;

d) capital letter for the respective form (A, B, C, D, E, F, G or H);

e) nominal dimension.

EXAMPLE 1 A male hexagon Form A of nominal dimension 3 is designated as follows:

Male hexagon ISO 1173 - A 3

EXAMPLE 2 A female hexagon Form B of nominal dimension 3 is designated as follows:

Female hexagon ISO 1173 - B 3

EXAMPLE 3 A male hexagon Form C of nominal dimension 8 is designated as follows:

Male hexagon ISO 1173 - C 8

EXAMPLE 4 A female hexagon Form D of nominal dimension 8 is designated as follows:

Female hexagon ISO 1173 - D 8

EXAMPLE 5 A male hexagon Form E of nominal dimension 11,2 is designated as follows:

Male hexagon ISO 1173 - E 11,2

EXAMPLE 6 A female hexagon Form F of nominal dimension 11,2 is designated as follows:

Female hexagon ISO 1173 - F 11,2

EXAMPLE 7 A male flat end Form G of nominal dimension 7 is designated as follows:

Male flat end ISO 1173 - G 7

EXAMPLE 8 A female hexagon Form H of nominal dimension 7 is designated as follows:

Female flat end ISO 1173 - H 7

5 Torque testing

5.1 Test piece

For torque testing, test devices shall be used which correspond in their dimensions to the respective "counterbodies" of the connecting parts to be tested.

The same dimensional specifications apply to the test pieces as to the connection parts, however, they do not have to be equipped with a retaining system.

The torque test device and the test pieces shall have a hardness of at least HRC 62.

5.2 Test values

The test torque values for torque testing are given in Table 9.

Following the application of the test torque the connecting parts shall show no permanent deformation or any other damage, such as e.g. cracks or fractures, which might affect the usability of the tool.

Table 9 — Test torque values

Form	Nominal dimension mm	Test torque [a] min. N·m
A, B	3	7,6
	5,5	47
C, D	4	18
	6,3	71
	8	144
	12,5	478
E, F	6,3	71
	8	144
	11,2	396
G, H	7	25

[a] The values for the test torque apply only to connecting parts made of alloyed steel for hardening and tempering or tool steel, heat treated over its whole length, having a hardness of at least HRC 53.

When testing with the test torque it shall be ensured that the connecting parts to be tested are engaged under load over their whole lengths l_1 and l_2.

The test torque shall be applied smoothly and steadily. Following the application of the minimum test torque, any resulting damage or deformation shall not affect the usability of the tool.

Annex A
(informative)

Explanatory notes

In the case of screwdriver bits and driving spindles of electric and pneumatic screwdrivers driving is performed by hexagon connection or a flat end connection. The interchangeability of tool bits and tool holders is ensured by the standardization of the drive ends.

To emphasize the relation between the matching dimensions of male and female hexagons or male and female flat ends respectively, this International Standard has been editorially designed such that dimensional letters for male parts have only uneven subscripts (1, 3, 5 ...) and for female parts even subscripts (2, 4, 6 ...).

In order to coordinate the corner dimensions of the hexagon ends they were calculated according to following formulae:

$$e_{1\,\max} = 1{,}13\, s_{1\,\max}$$

$$e_{1\,\min} = 1{,}13\, s_{1\,\min}$$

$$e_{2\,\min} = 1{,}13\, s_{2\,\min}$$

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