International Standard

ISO 8745

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Fasteners — Taper grooved pins — Half-length progressive grooves

Fixations — Goupilles cannelées progressives — Cannelures progressives sur la moitié de la longueur

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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 document 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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This document was prepared by Technical Committee ISO/TC 2, *Fasteners*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 185 *Fasteners*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 8745:1997) which has been technically revised.

The main changes are as follows:

— terms and definitions, principles for grooved pins and assembly (including hole dimensions), control of the expanded diameter d_2 and pin straightness, mechanical and physical properties (including shear resistance and hardness) and inspection which are common for all grooved pins (product standards ISO 8739 to ISO 8747, ISO 13670 and ISO 13672) have been specified in the new reference standard ISO 13669, dealing with general requirements;

— non-preferred diameters 1 mm, 3,5 mm, 7 mm, 9 mm, 14 mm and 18 mm have been added;

— values of expanded diameter d_2 for steel pins have been slightly increased for the shortest length range, and have been added for stainless steel pins;

— tolerances for the rounded end and values for the chamfered end have been added;

— tolerances for the length of the grooves have been added;

— stainless steel grades A2, A4, C1 and F1 have been added;

— other materials (such as hardened steels, brass, aluminium) are by agreement (see Table 3);

— specifications for labelling have been added as Clause 8.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Fasteners — Taper grooved pins — Half-length progressive grooves

1 Scope

This document specifies the characteristics of taper grooved pins with half-length progressive grooves (with close-end at the insertion side), in steel and stainless steel, and with nominal diameter 1 mm to 25 mm.

These grooved pins are designed to fulfil the main following functions:

— positioning or guiding, and

— relative rotation of the assembled parts,

with an easy installation (due to its shape) and a medium level of pull-out resistance (due to the elastic fit behaviour of the pin).

The general requirements (including functional principles for grooved pins and assembly) are specified in ISO 13669.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1891-4, *Fasteners — Vocabulary — Part 4: Control, inspection, delivery, acceptance and quality*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-6, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 6: General rules for the selection of stainless steels and nickel alloys for fasteners*

ISO 4042, *Fasteners — Electroplated coating systems*

ISO 9717, *Metallic and other inorganic coatings — Phosphate conversion coating of metals*

ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coating systems*

ISO 13669, *Fasteners — Grooved pins — General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13669 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Principles of grooved pins and assembly

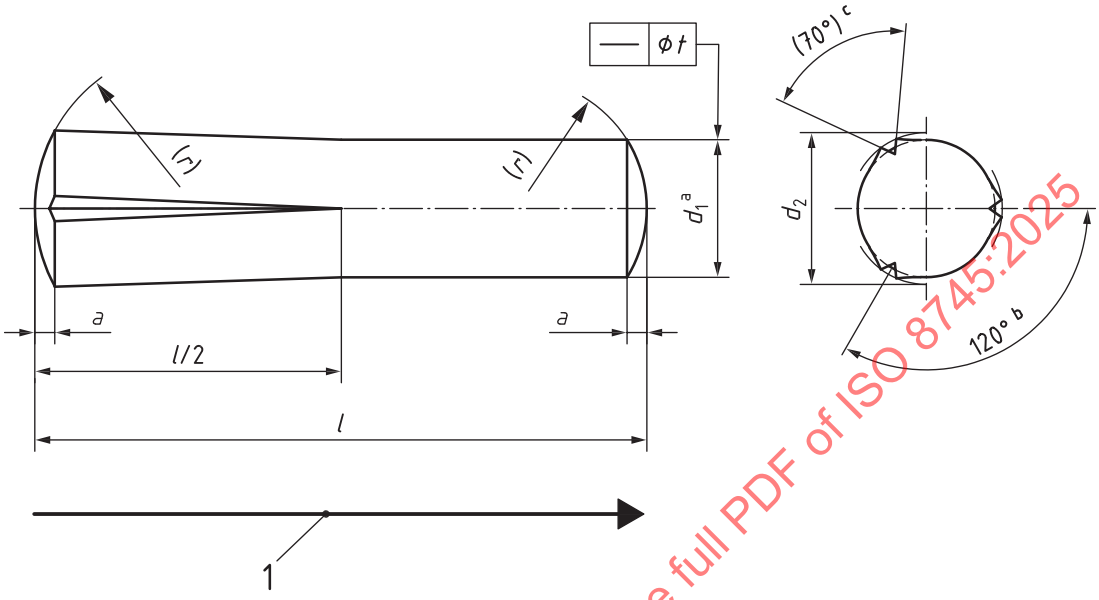
The principles of grooved pins and assembly specified in ISO 13669 shall apply.

5 Dimensions

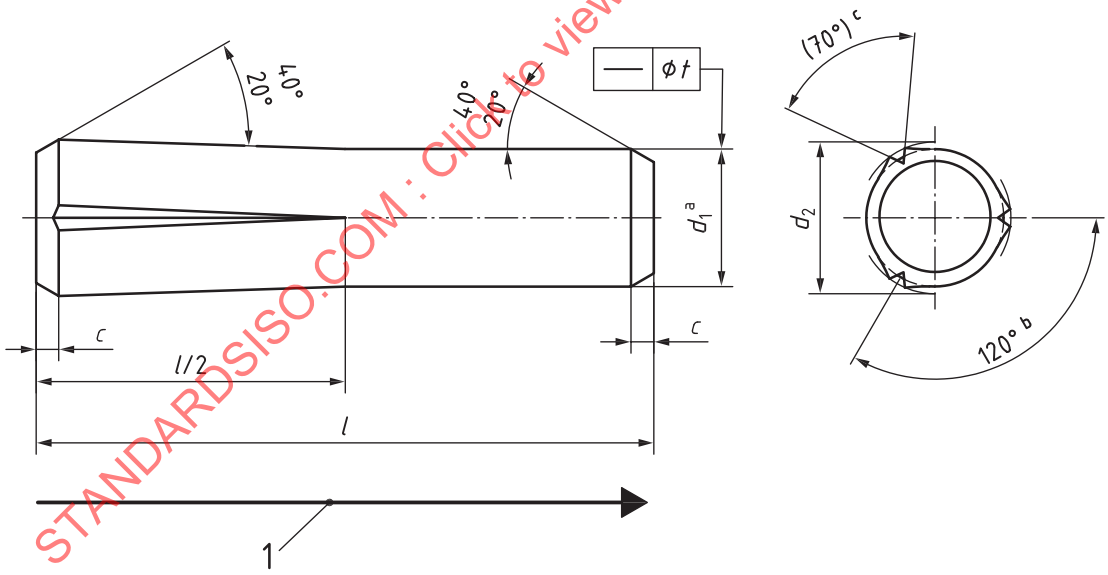
Dimensions shall be in accordance with Figure 1 and with Tables 1 and 2. The control of the expanded diameter d_2 and the pin axial straightness t shall be as specified in ISO 13669.

For coated pins, dimensions and tolerances shall apply prior to coating.

Unless otherwise agreed at the time of the order, the pins are manufactured with rounded ends.



a) Pin with rounded ends (RN)



b) Option: pin with chamfered ends (CH)

Key

1 insertion side

a The pin diameter d_1 is only applicable in areas where grooves are not present.

b The angle of 120° between two grooves shall apply with a tolerance of ±20°.

c The groove angle of 70° is a reference dimension, see ISO 13669.

Figure 1 — Taper grooved pins with half-length progressive grooves

In accordance with Figure 1, the length of the grooves shall be equal to $l/2$ with the following tolerance:

— $l \leq 10$ mm $l/2 \pm 0{,}3$ mm

— 10 mm $< l \leq 50$ mm $l/2 \pm 0{,}6$ mm

— 50 mm $< l \leq 100$ mm $l/2 \pm 1{,}0$ mm

— 100 mm $< l \leq 200$ mm $l/2 \pm 1{,}5$ mm

The three grooves shall be open at the end opposite to the insertion side.

Table 1 — Dimensions for sizes 1 mm to 7 mm

Dimensions in millimetres

Nominal diameter, d		(1)	**1,5**	**2**	**2,5**	**3**	(3,5)	**4**	**5**	**6**	(7)
d_1	max.	1,000	1,500	2,000	2,500	3,000	3,500	4,000	5,000	6,000	7,000
	min.	0,975	1,475	1,975	2,475	2,975	3,425	3,925	4,925	5,925	6,910
a	nom.	0,13	0,20	0,27	0,34	0,40	0,47	0,54	0,67	0,80	0,94
	max.	0,23	0,35	0,42	0,49	0,55	0,67	0,74	0,87	1,00	1,19
	min.	0,03	0,05	0,12	0,19	0,25	0,27	0,34	0,47	0,60	0,69
c [a]	nom.	0,20	0,30	0,35	0,40	0,50	0,55	0,65	0,80	1,20	1,40
	max.	0,35	0,50	0,55	0,60	0,70	0,80	0,90	1,05	1,45	1,70
	min.	0,05	0,10	0,15	0,20	0,30	0,30	0,40	0,55	0,95	1,10
r	ref.	$\approx d_1$									

Length, l		**Expanded diameter**, d_2 [b]										l
nom.	tol.	+0,05 0			±0,05							nom.
6	±0,25	1,10 [1,075]										6
8			1,63 [1,60]	2,15 [2,10]	2,70 [2,65]	3,20 [3,15]	3,70 [3,675]	4,25 [4,20]	5,25 [5,20]			8
10												10
12	±0,50					3,25 [3,20]	3,75 [3,70]			6,25 [6,20]	7,25 [7,20]	12
14								4,30 [4,225]	5,30 [5,225]			14
16												16
18						3,30 [3,225]	3,80 [3,725]			6,30 [6,225]	7,30 [7,225]	18
20												20
22								4,35 [4,25]	5,35 [5,25]			22
24												24
26										6,35 [6,25]	7,35 [7,25]	26
28												28
30												30
32						3,25 [3,20]	3,75 [3,70]					32
35												35
40												40
45								4,30 [4,225]	5,30 [5,225]			45
50												50
55	±0,75									6,30 [6,225]	7,30 [7,225]	55
60												60
65												65
70												70
75												75
80												80

Sizes shown in brackets are non-preferred.

The range of standard lengths are specified between the stepped bold lines (white area).

[a] Chamfered end only upon specific request at the time of the order.

[b] Within a length range, the first value for d_2 is specified for steel pins and the second value in square brackets for stainless steel pins.

Table 2 — Dimensions for sizes 8 mm to 25 mm

Dimensions in millimetres

Nominal diameter, d		**8**	(9)	**10**	**12**	(14)	**16**	(18)	**20**	**25**
d_1	max.	8,00	9,00	10,00	12,00	14,00	16,00	18,00	20,00	25,00
	min.	7,91	8,91	9,91	11,89	13,89	15,89	17,89	19,87	24,87
a	nom.	1,07	1,21	1,34	1,61	1,88	2,14	2,41	2,68	3,35
	max.	1,32	1,46	1,64	1,91	2,23	2,49	2,86	3,13	3,90
	min.	0,82	0,96	1,04	1,31	1,53	1,79	1,96	2,23	2,80
c [a]	nom.	1,6	1,8	2,0	2,5	2,7	3,0	3,2	3,5	4,0
	max.	1,90	2,10	2,35	2,85	3,10	3,40	3,70	4,00	4,60
	min.	1,30	1,50	1,65	2,15	2,30	2,60	2,70	3,00	3,40
r	ref.	$\approx d_1$								

Length, l		**Expanded diameter**, d_2 [b]									l
nom.	tol.	±0,05			±0,10						nom.
14	±0,50	8,25 [8,20]	9,25 [9,20]	10,30 [10,225]							14
16											16
18		8,30 [8,225]	9,30 [9,225]		12,35 [12,275]						18
20											20
22		8,35 [8,25]	9,35 [9,25]	10,35 [10,25]							22
24											24
26				10,40 [10,30]	12,40 [12,30]	14,40 [14,30]	16,50 [16,375]	18,50 [18,375]	20,55 [20,40]	25,55 [25,40]	26
28											28
30											30
32							16,55 [16,40]	18,55 [18,40]			32
35											35
40											40
45		8,40 [8,30]	9,40 [9,30]								45
50				10,45 [10,35]	12,45 [12,35]	14,45 [14,35]					50
55	±0,75								20,60 [20,45]	25,60 [25,45]	55
60											60
65											65
70											70
75											75
80		8,35 [8,25]	9,35 [9,25]								80
85				10,40 [10,30]	12,40 [12,30]	14,40 [14,30]					85
90											90
95											95
100											100
120				10,35 [10,25]	12,35 [12,275]	14,35 [14,275]					120
140											140
160											160
180											180
200											200

Sizes shown in brackets are non-preferred.

The range of standard lengths are specified between the stepped bold lines (white area).

[a] Chamfered end only upon specific request at the time of the order.

[b] Within a length range, the first value for d_2 is specified for steel pins and the second value in square brackets for stainless steel pins.

6 Requirements and reference International Standards

The requirements specified in the International Standards referenced in Table 3 shall apply.

Table 3 — Requirements and reference International Standards

Material [a]		Steel	Stainless steel
General requirements	International Standard	ISO 13669	
Material	Steel symbol	St	—
	Stainless steel grade [b]	—	A1 A2 A4 C1 F1
	International Standard	At the discretion of the manufacturer, providing that the mechanical and physical properties are met	ISO 3506-6
Mechanical properties		ISO 13669	
Surface condition		As processed (no coating) Electroplated coatings as specified in ISO 4042 Non-electrolytically applied zinc flake coatings as specified in ISO 10683 Phosphate coatings as specified in ISO 9717	Clean and bright and/or Passivated [c]
		Other finishes, coatings and/or additional requirements shall be agreed between the purchaser and the supplier	
Workmanship		Pins shall be free of burrs and detrimental defects	
Acceptability		Acceptance inspection as specified in ISO 3269	

[a] For a particular application, these pins may be manufactured from materials other than steel and stainless steel (such as quenched and tempered, case-hardened or carbo-nitrided steels, brass, aluminium, etc.); in this case, material and related mechanical properties shall be agreed between the purchaser and the manufacturer before the order (see ISO 13669), as well as at least values for expanded diameter, d_2.

[b] If other stainless steel grades are needed, they can be selected in ISO 3506-6.

[c] See e.g. ISO 16048.

7 Labelling on package

Labelling on the package for pins shall include at least:

— the reference to this document, i.e. ISO 8745;

— the nominal diameter, *d*, and nominal length, *l*;

— option as relevant: CH for pins with chamfered ends;

— the symbol St for steel pins, or the grade for stainless steel pins;

— the type of surface condition (finish and/or coating);

— the manufacturer's and/or distributor's identification and/or name;

— the manufacturing lot number as specified in ISO 1891-4;

— the quantity of pieces in the package.

8 Designation

When no specific surface condition (finish and/or coating) is specified in the designation, steel pins are delivered in the as processed condition and stainless steel pins in the clean and bright condition.

EXAMPLE 1 A taper grooved pins with half-length progressive grooves, nominal diameter d = 6 mm, nominal length l = 50 mm, rounded ends (RN), in steel (St), as processed, is designated as follows:

Grooved pin ISO 8745 – 6 × 50 – St

EXAMPLE 2 A taper grooved pins with half-length progressive grooves, nominal diameter d = 6 mm, nominal length l = 50 mm, chamfered ends (CH), in austenitic stainless steel of grade A1, clean and bright, is designated as follows:

Grooved pin ISO 8745 – 6 × 50 – CH – A1