



# SLOVENSKI STANDARD

## oSIST prEN ISO 13669:2024

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### **Vezni elementi - Zasekani zatiči z utori - Splošne zahteve (ISO/DIS 13669:2023)**

Fasteners - Grooved pins - General requirements (ISO/DIS 13669:2023)

Verbindungselemente - Kerbstifte - Allgemeine Anforderungen (ISO/DIS 13669:2023)

Fixations - Goupilles cannelées - Exigences générales (ISO/DIS 13669:2023)

**Ta slovenski standard je istoveten z: prEN ISO 13669**

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# DRAFT INTERNATIONAL STANDARD

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## Fasteners — Grooved pins — General requirements

*Fixations — Goupilles cannelées — Exigences générales*

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# ISO/DIS 13669:2023(E)

## 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)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 2, *Fasteners* and by Technical Committee CEN/TC 185, *Fasteners* in collaboration.

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](http://www.iso.org/members.html).

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# Fasteners — Grooved pins — General requirements

## 1 Scope

This document specifies the general characteristics of grooved pins, made of steel and stainless steel, with nominal diameters 1 mm to 25 mm.

These grooved pins are designed to fulfil the main following functions, due to the elastic fit behavior of the grooves:

- locking of two (or more) parts,
- positioning or guiding,
- relative rotation of the assembled parts.

## 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 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 8749, *Pins and grooved pins — Shear test*

ISO 16228, *Fasteners — Types of inspection documents*

ISO 16426, *Fasteners — Quality assurance system*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological 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/>

### 3.1

#### **pin**

cylindrical or conical shafted fastener designed to be fitted into a hole, which provides functions such as immobilization by locking parts together, positioning, rotation and/or guiding

### 3.2

#### **groove [for a pin]**

longitudinal indentation into the material of the pin forming two protruding lips along the side of the groove

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## 3.3

**grooved pin**

fastener whose shaft presents three grooves at equidistant  $120^\circ$  intervals resulting in the expanded diameter, which are compressed when the pin is inserted into a hole smaller than the expanded diameter but greater than the pin nominal diameter, thus achieving an elastic locking due to interference fit between this expanded diameter of the pin and the diameter of the hole

## 3.4

**parallel grooved pin**

pin with constant grooves along a portion of the shaft or along its whole shaft, resulting in a uniform expanded diameter

## 3.5

**taper grooved pin**

pin with grooves gradually decreasing from the pin end along a portion of the shaft or along its whole shaft, resulting in a progressive expanded diameter

## 3.6

**reverse-taper grooved pin**

pin with grooves gradually increasing from the pin end along a portion of the shaft, resulting in a progressive expanded diameter

## 4 Shapes and ends for grooved pins

## 4.1 Ends for grooved pins

Ends for grooved pins and their symbols are defined in [Figure 1](#).



a) Rounded end (symbol RN)    b) Chamfered end (symbol CH)    c) Pilot point with rounded end (symbol PRN)    d) Pilot point with chamfered end (symbol PCH)

**Figure 1 — Ends for grooved pins**

## 4.2 Groove ends

Groove ends are defined in [Figure 2](#).



**a) Open end**



**b) Closed end**



**Figure 2 — Groove ends**

### 4.3 Groove shapes

#### 4.3.1 Diamond groove (symbol D)

Straight parallel shaped groove forming a uniform expanded diameter along the pin, with open end or closed end.

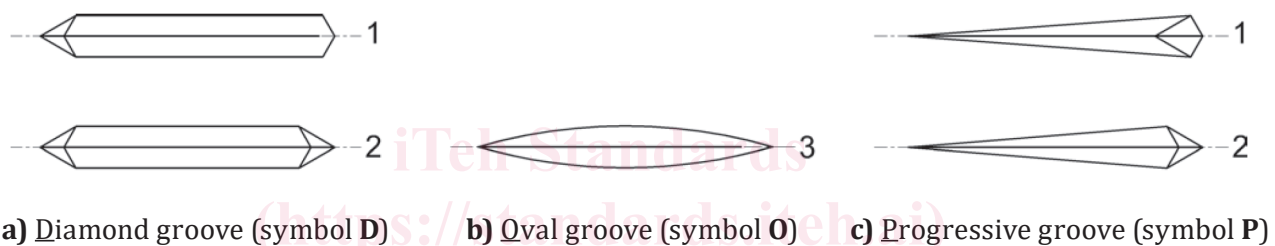
#### 4.3.2 oval groove (symbol O)

Symmetrical lip-shaped groove forming a progressive increasing then decreasing expanded diameter along the pin, with closed end.

#### 4.3.3 progressive groove (symbol P)

Non-symmetrical almond shaped groove forming a progressive increasing or decreasing expanded diameter along the pin, with open end or closed end.

Groove shapes are shown in [Figure 3](#).

**Figure 3 — Groove shapes**

## 5 Principles for grooved pins and assembly

### 5.1 Principles for grooved pins

Grooved pins have three equidistant grooves indented longitudinally in their surface, the displaced material to each side of the grooves forming an expanded diameter  $d_2$  larger than the nominal diameter  $d_1$ . This expanded diameter causes an elastic fit locking when the grooved pin is forced into a hole equal to the pin diameter  $d_1$ , as specified in [4.2](#).

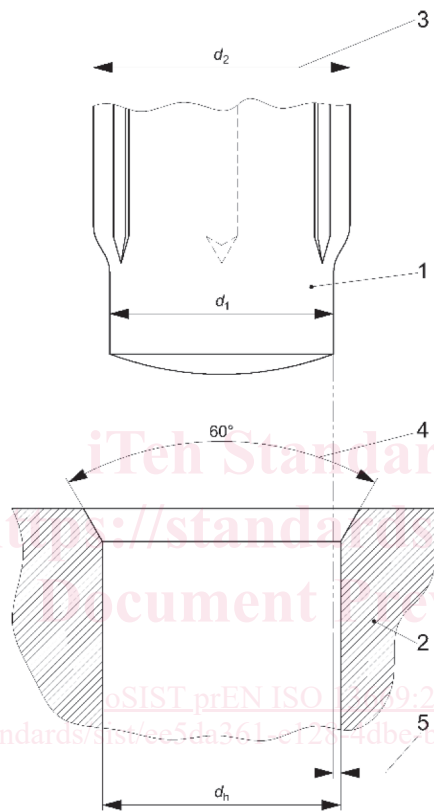
In the application, the insertion force and the pull-out force are caused by the amount of material of the grooves that are elastically compressed by insertion into the hole, resulting in radial stresses and locking effect. The insertion and the pull-out forces basically result from:

- the actual dimension and tolerances of the part hole diameter  $d_h$  into which the pin is inserted (see [Figure 4](#)): this is essential to ensure that the function is actually performed;
- the shape of the grooves: oval and progressive shapes need a lower insertion force of the pin compare to diamond shape, but they also provide a lower resistance to pull-out;
- the working length of the grooves compressed in the assembled part(s);
- the material and hardness of the assembled part(s).

## 5.2 Assembly

Grooved pins are designed to assemble parts under the following conditions for functional purpose:

- the hardness of the parts into which the grooved pin is to be inserted should be lower than the pin hardness;
- the hole  $d_h$  into which the groove pin is to be inserted shall be chamfered, see [Figure 4](#);
- for uncoated pins, the hole diameter  $d_h$  shall be as specified in [Table 1](#),
- in addition for coated pins, the hole diameter  $d_h$  shall be increased to take into account the coating thickness.



### Key

- 1 grooved pin
- 2 part to be assembled
- 3 expanded diameter  $d_2$  always larger than the hole diameter in the assembled part  $d_h$  to achieved the elastic fit locking after assembly
- 4 chamfered hole for the appropriate closure of the lips of the grooves at the insertion side
- 5 required clearance between the pin diameter  $d_1$  and the hole diameter in the assembled part  $d_h$

**Figure 4 — Example of hole in part to be assembled**