



SLOVENSKI STANDARD oSIST prEN ISO 407:2020

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Male plinske jeklenke za uporabo v medicini - Ventilski priključni nastavki po sistemu pin-index (ISO/DIS 407:2020)

Small medical gas cylinders - Pin-index yoke-type valve connections (ISO/DIS 407:2020)

Kleine Gasflaschen für die medizinische Anwendung - Ventilseitenstutzen mit Anschlussbügel nach dem PIN-Index-System (ISO/DIS 407:2020)

Petites bouteilles à gaz médicaux - Raccords de robinets du type étrier avec ergots de sécurité (ISO/DIS 407:2020)

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Small medical gas cylinders — Pin-index yoke-type valve connections

Petites bouteilles à gaz médicaux — Raccords de robinets du type à étrier avec ergots de sécurité

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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html. (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinders fittings*.

This fourth edition cancels and replaces the third edition (ISO 407:2004), which has been technically revised.

The main changes compared to the previous edition are as follows:

- addition of a note in [Figure 1](#) on the introduction of a radius to avoid stress concentration;
- addition of dimension "m" in [Figure 1](#);
- the basic dimensions for pin index yoke type valve connections have been revised (see [Table 2](#));
- addition of a requirement for the design of the connecting yoke.

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.

Small medical gas cylinders — Pin-index yoke-type valve connections

1 Scope

This document concerns pin-index yoke-type valve connections for medical gas cylinders, with a working pressure up to a maximum of 200 bar and/or test pressure up to a maximum of 300 bar.

NOTE This type of connection is primarily used for small cylinders (5 l or below).

It specifies:

- basic dimensions;
- requirements for alternative designs of the yoke-type valve connections;
- dimensions and positions for the holes and pins for the outlet connections.

It also specifies the dimensions and positions for the holes and pins for the outlet connections for the gases and gas mixtures given in [Table 1](#).

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 32:1977, *Gas cylinders for medical use — Marking for identification of content*

3 Terms and definitions

No terms and definitions are listed in this document.

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

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Valve

Each small medical gas cylinder can be fitted with a yoke valve (see [Clause 6](#)). The yoke valve shall have location holes of the dimensions and in the positions indicated in [Clause 8](#) for the appropriate gas or gas mixture.

The name or chemical symbol of the gas or gas mixture shall be clearly and indelibly stamped on the valve.

Table 1 — Allocated gases and gas mixtures

Gas or gas mixture	Chemical symbol
Oxygen	O ₂
Oxygen/carbon dioxide (CO ₂ u 7 %)	O ₂ + CO ₂ ,
Oxygen/helium (He u 80 %)	O ₂ + He
Ethylene	C ₂ H ₄
Nitrous oxide (with and without draw-off)	N ₂ O
Cyclopropane	C ₃ H ₆
Helium and helium/oxygen (O ₂ < 20 %)	He
Carbon dioxide (with and without draw-off) and carbon dioxide/oxygen CO ₂ > 7 %)	CO ₂
Medical air	Air
Nominal mixture 50 % oxygen/50 % nitrous oxide (47,5 % < N ₂ O < 52,5 %)	O ₂ + N ₂ O
Nitrogen	N ₂
Mixture of air, helium and carbon monoxide (CO < 1 %)	Air + He + CO

5 Yoke

The connecting yoke shall conform to the requirements and dimensions given in [Clauses 6](#) and [7](#). The yoke shall be fitted with pins, the dimensions and the positions of which correspond to the holes in the valve as indicated in [Clause 8](#) for the appropriate gas or gas mixture.

The name or chemical symbol of the gas or gas mixture shall be clearly and indelibly stamped on the yoke. If an identification colour is used, it shall be in conformity with ISO 32.

Examples of the alternative designs for the connecting yoke are given in [7.2](#).

In [Figures 3](#) and [4](#), the circled numbers and letters are the pin-hole positions.

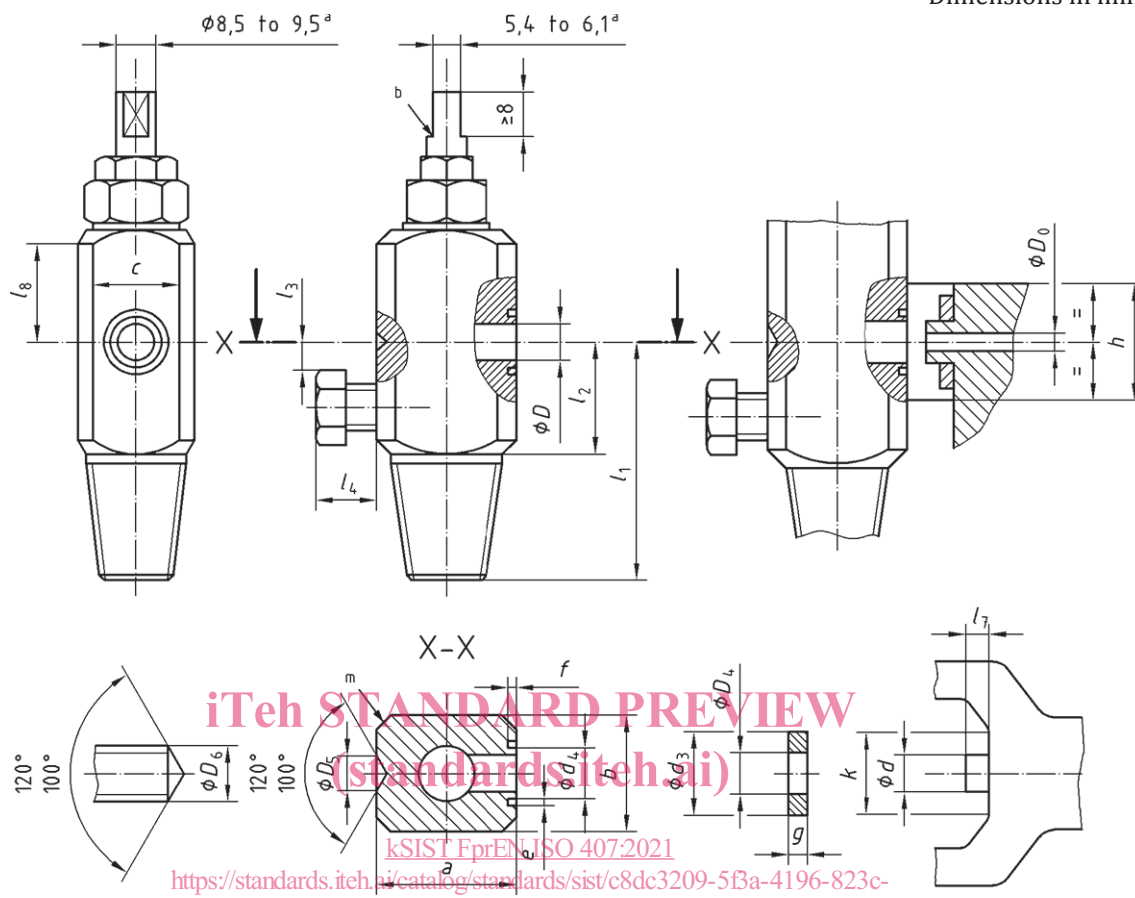
6 Basic dimensions

6.1 General

The basic dimensions for pin-index yoke-type valve connections are shown in [Figures 1](#) to [4](#), and are listed in [Table 2](#).

6.2 Pin-index yoke-type valve body

Dimensions in millimetres



Key

- a Applicable only to single-key valves.
- b Consider introduction of radius of 0,5 mm to avoid stress concentration.

Figure 1 — Pin-index yoke-type valve body

6.3 Single-pin yoke-type valve connection system

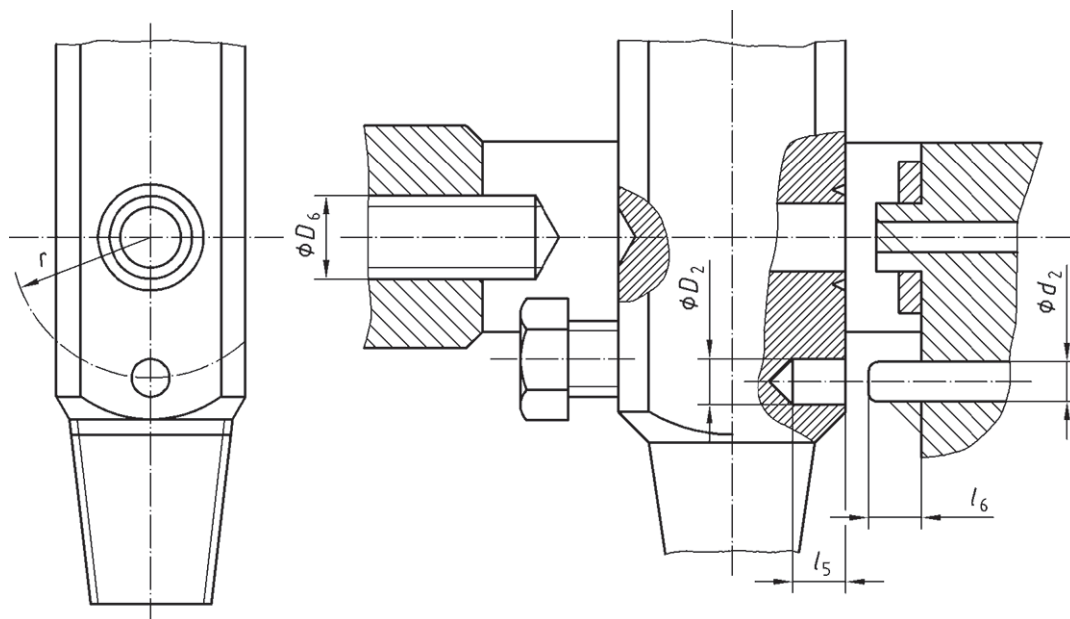


Figure 2 — Single-pin yoke-type valve connection system

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6.4 Two-pin yoke-type valve connection system with the pins in a single row

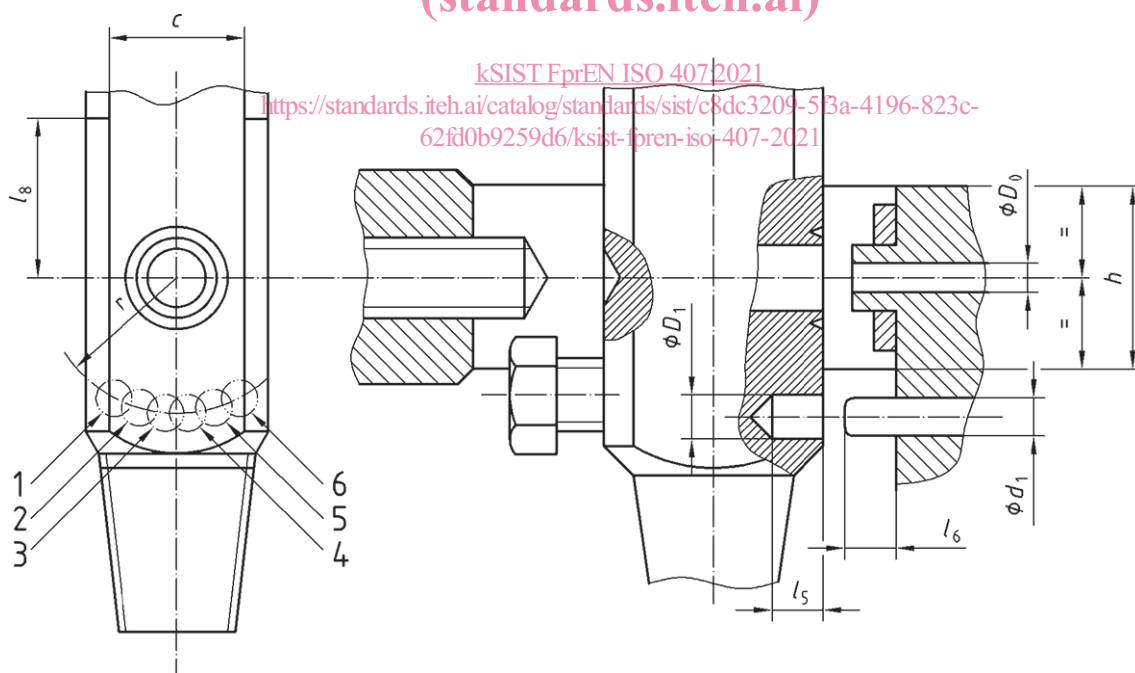


Figure 3 — Two-pin yoke-type valve connection system with the pins in a single row

6.5 Two-pin yoke-type valve connection system with the pins in a double row

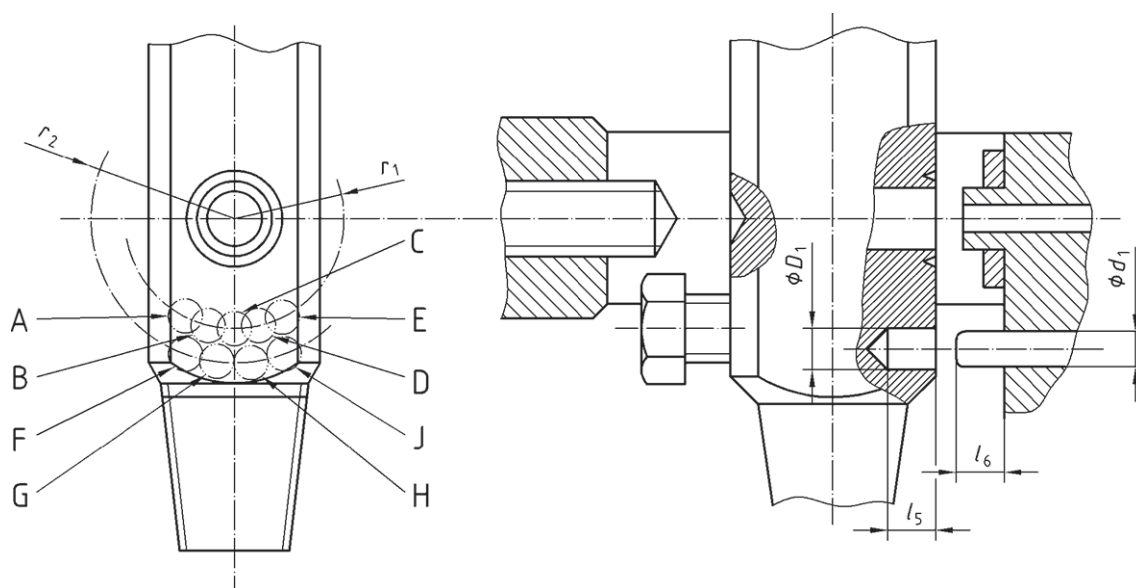


Figure 4 — Two-pin yoke-type valve connection system with the pins in a double row

6.6 Basic dimensions

See [Table 2](#).

Table 2 — Basic dimensions for pin-index yoke-type valve connections

Dimension	mm	Dimension	mm
a	$25^{+0,8}_{-0,2}$	f	0,8 max
b	21,8 – 22,6	g	$1,6 \pm 0,4$
c	16 min	h^a	$20 \pm 0,5$
D	$7^{+0,2}_{-0}$	k	16,5 min
D_0	$2,4 \pm 0,8$	l_1	44,5 min
D_1	$4,75^{+0,1}_{-0}$	l_2	22 min
D_2	5,8 to 5,9	l_3^b	8 min
D_4	$6,3^0_{-0,2}$	l_4^b	9,6 max
D_5	$6^0_{-0,5}$	l_5	$5,5^{+0,5}_0$
D_6^c	7 min	l_6	$5,5^0_{-0,5}$
d	$6,5^0_{-0,2}$	l_7	3 to 3,6
d_1	3,9 to 4,0	l_8^d	15 min
d_2	$5,4^0_{-0,1}$	m	$1,6 \pm 0,25^e$

^a Dimensions h and q , q_1 (see [Clause 6](#)). As an alternative, these dimensions may be given in order to satisfy the requirements of [6.1 g](#).

^b Applicable only if a projecting-type safety plug is used.

^c Dimension D_6 is the dimension at the top of the cone.

^d This dimension is very important.

^e larger chamfer permitted, provided dimension "c" is maintained

Table 2 (continued)

Dimension	mm	Dimension	mm
d_3	$16 \pm 0,5$	r	14,3 nom.
d_4	$9 \pm 0,2$	r_1	12 nom.
e	0,8 max	r_2	17,5 nom.
<p>^a Dimensions h and q, q_1 (see Clause 6). As an alternative, these dimensions may be given in order to satisfy the requirements of 6.1 g).</p> <p>^b Applicable only if a projecting-type safety plug is used.</p> <p>^c Dimension D_6 is the dimension at the top of the cone.</p> <p>^d This dimension is very important.</p> <p>^e larger chamfer permitted, provided dimension "c" is maintained</p>			

7 Requirements for alternative designs of yoke-type valve connections

7.1 Requirements for the design of the connecting yoke

The design of the connecting yoke shall meet the following requirements.

- A gas-tight seal shall only be possible when the pins in the yoke correspond to the holes in the valve;
- when the pins in the yoke do not correspond to the holes in the valve, a gas-tight seal shall not be possible and damage to the yoke or the valve shall be prevented;
- pins shall be fixed or assembled in such a manner that they cannot be removed by the user or become loose in service;
- the sealing washer shall be a retained fit on the yoke spigot;
- the use of more than one sealing washer is not permitted;
- the yoke shall be able to resist, without permanent deformation, the load resulting from a torque of 50 N.m applied to the valve clamping screw or locking device;
- the dimensions of the yoke shall limit the movement of the valve in the yoke to a maximum of 6° about the long axis prior to pin engagement;
- the dimension of the yoke shall not cause any physical interference with the valve and its operation or prevent an effective seat at the outlet connection.

7.2 Examples of alternative construction for the connecting yoke

Three alternative designs of pin-index yoke-type connections are shown in Figures 5 to 7.