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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 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.

This document was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinders fittings*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 23, *Transportable gas cylinders*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fifth edition cancels and replaces the fourth edition (ISO 407:2002) of which it constitutes a minor revision.

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

- correction of Figure 1.

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 is applicable to pin-index yoke-type valve connections for medical gas cylinders, with a working pressure up to a maximum of 200 bar or test pressure up to a maximum of 300-bar, or both.

NOTE 1 This type of connection is primarily used for small cylinders (5 l or below).

NOTE 2 In this document the unit bar is used, due to its universal use in the field of technical gases. It should, however, be noted that bar is not an SI unit, and that the corresponding SI unit for pressure is Pa (1 bar = 10^5 Pa = 10^5 N/m²).

This document 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 gases and gas mixtures.

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, *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 <https://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 (see Table_1).

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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 ≤ 7 %)	O ₂ + CO ₂
oxygen/helium (He ≤ 80 %)	O ₂ + He
ethylene	C ₂ H ₄
nitrous oxide (with or without liquid draw-off)	N ₂ O
cyclopropane	C ₃ H ₆
helium	He
helium/oxygen (O ₂ < 20 %)	
carbon dioxide (with or without liquid draw-off)	CO ₂
carbon dioxide/oxygen CO ₂ > 7 %	
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.

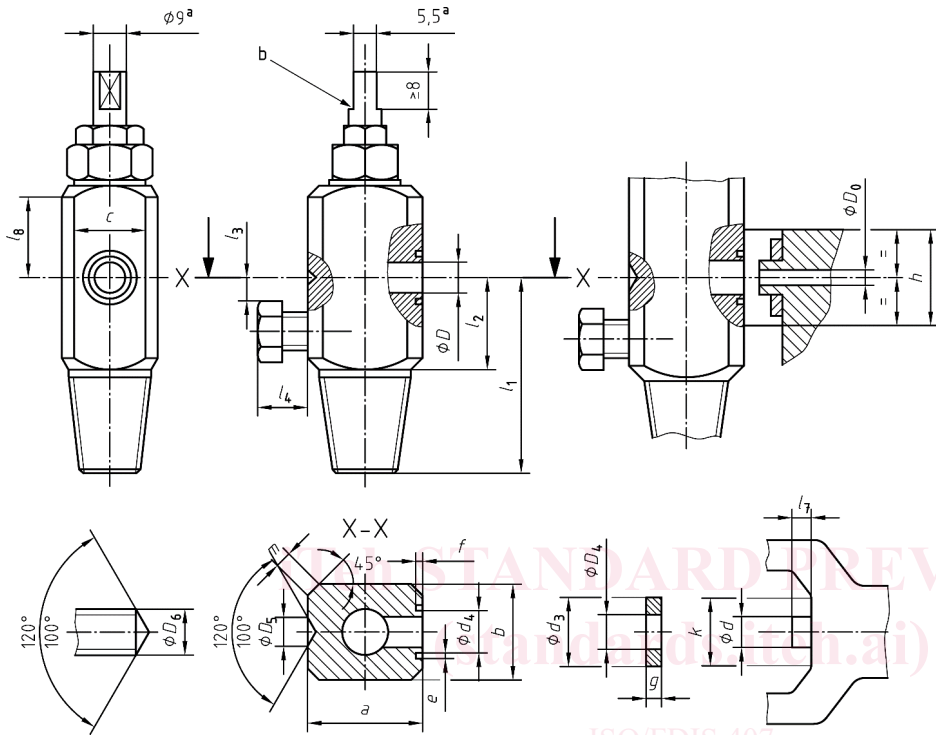
6 Basic dimensions

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.

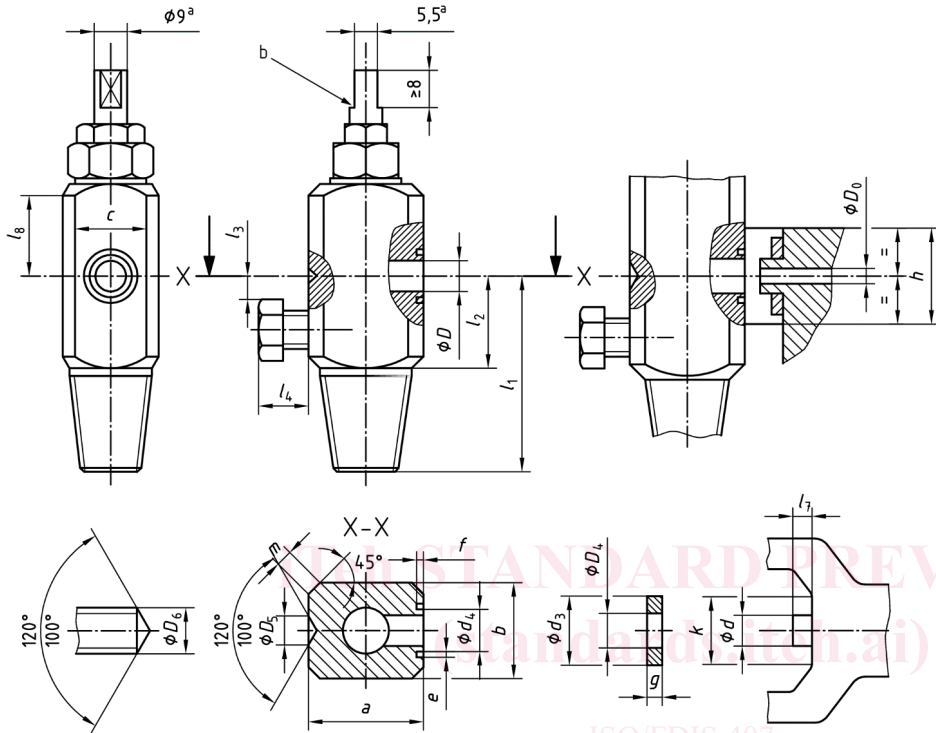
6.2 Pin-index yoke-type valve body

Dimensions in millimetres



Note

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- <https://standards.iteh.ai/catalog/standards/sist/dc3974ad-f252-4d14-a2d2-d495f7fa7d77/iso-fdis-407>
- a Applicable only to single-key valves.
 - b Consider introduction of radius of 0,5 mm to avoid stress concentration.
 - m Radius permitted, provided dimension c is maintained.

Figure 1 — Pin-index yoke-type valve body

6.3 Single-pin yoke-type valve connection system

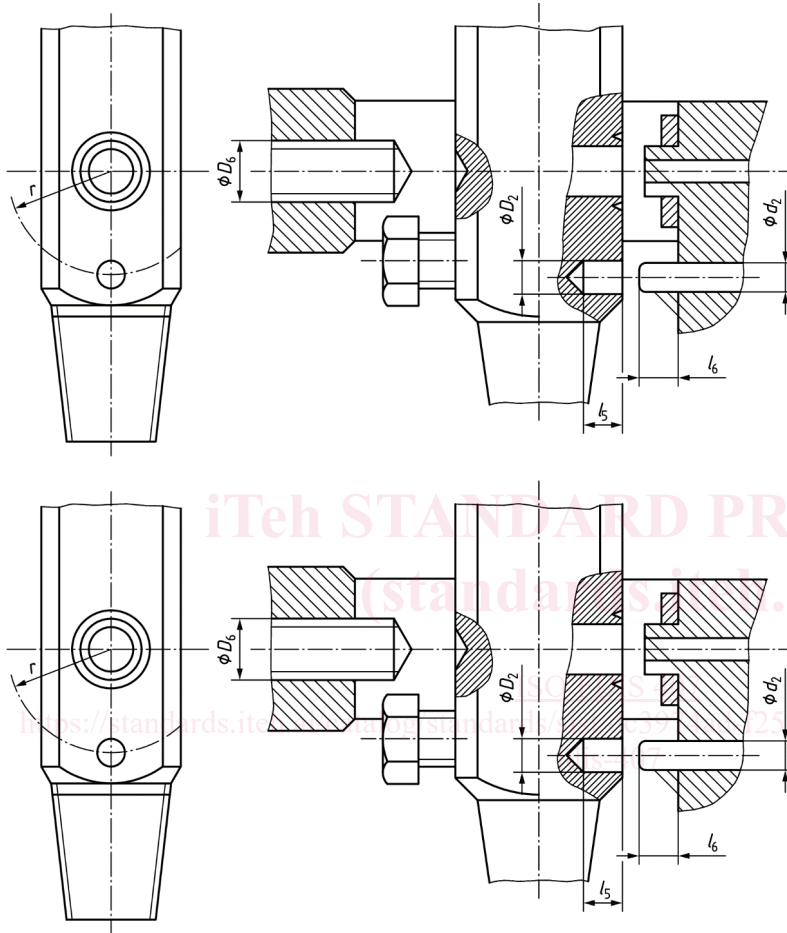


Figure 2 — Single-pin yoke-type valve connection system

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

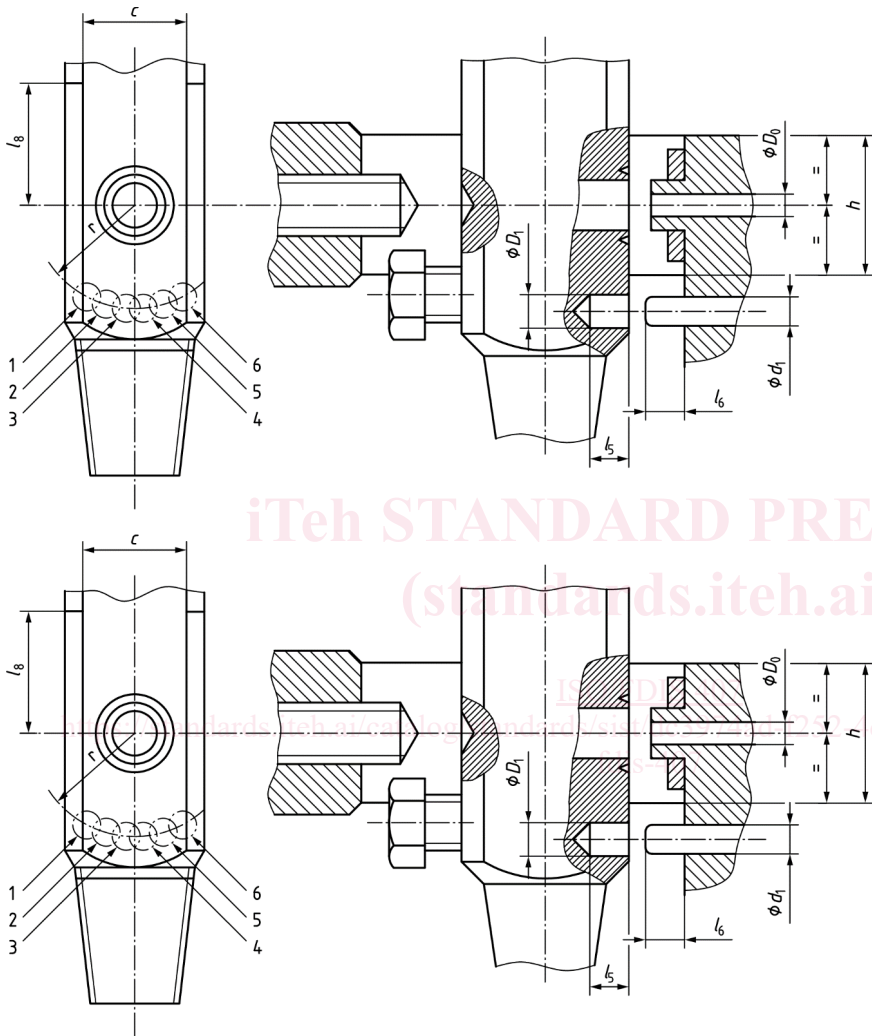


Figure 3 — Two-pin yoke-type valve connection system with the pins in a single row

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

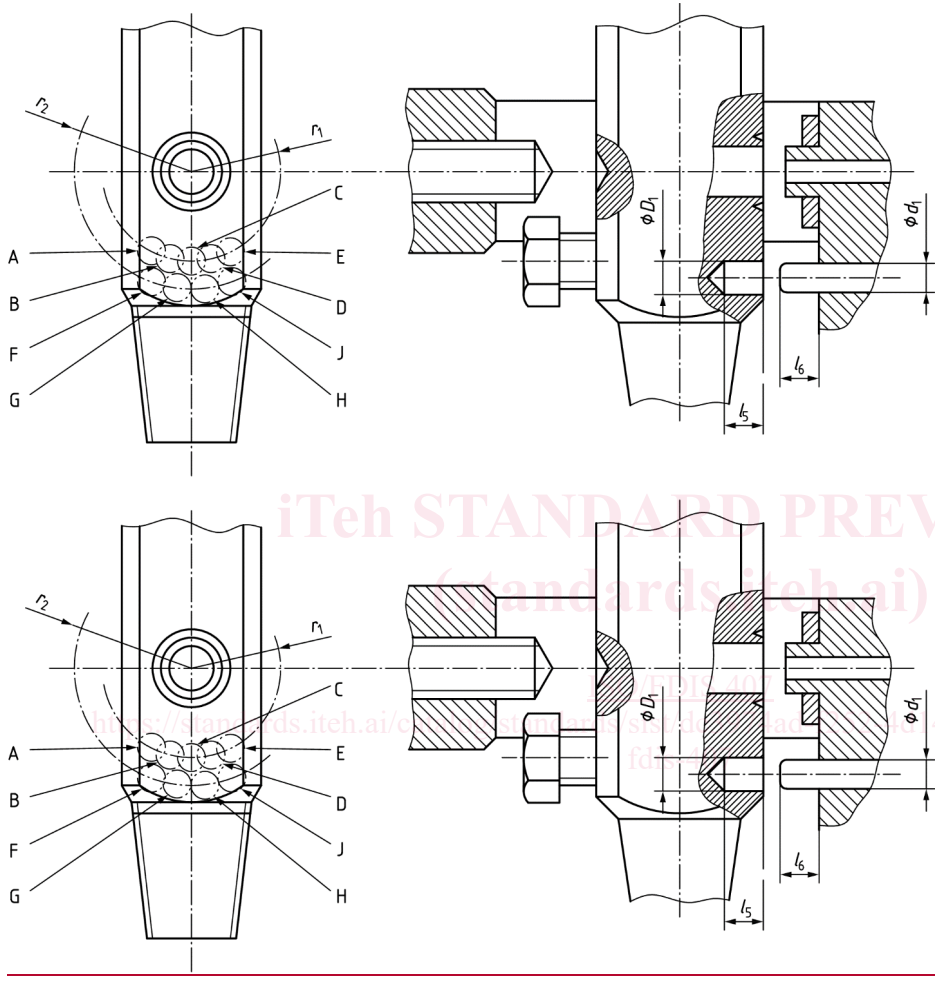


Figure 4 — Two-pin yoke-type valve connection system with the pins in a double row

6.6 Basic dimensions

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.

Field Code Changed

<i>b</i>	21,8 – 22,6	<i>g</i>	1,6 ± 0,4
<i>c</i>	16 min.	<i>h^a</i>	20 ± 0,5
<i>D</i>	7^{+0,2}₋₀ 7 ^{+0,2} ₋₀	<i>k</i>	16,5 min.
<i>D₀</i>	2,4 ± 0,8	<i>l₁</i>	44,5 min.
<i>D₁</i>	4,75^{+0,1}₋₀ 4,75 ^{+0,1} ₋₀	<i>l₂</i>	22 min.
<i>D₂</i>	5,8 to 5,9	<i>l_{3^b}</i>	8 min.
<i>D₄</i>	6,3⁺⁰_{-0,2} 6,3 ⁺⁰ _{-0,2}	<i>l_{4^b}</i>	9,6 max.
<i>D₅</i>	6⁺⁰_{-0,5} 6 ⁺⁰ _{-0,5}	<i>l₅</i>	5,5^{+0,5}₋₀ 5,5 ^{+0,5} ₋₀
<i>D_{6^c}</i>	7 min.	<i>l₆</i>	5,5⁺⁰_{-0,5} 5,5 ⁺⁰ _{-0,5}
<i>d</i>	6,5⁺⁰_{-0,2} 6,5 ⁺⁰ _{-0,2}	<i>l₇</i>	3 to 3,6
<i>d₁</i>	3,9 to 4,0	<i>l_{8^d}</i>	15 min.
<i>d₂</i>	5,4⁺⁰_{-0,1} 5,4 ⁺⁰ _{-0,1}	<i>m</i>	1,4 min. maximum allowed: any length provided dimension <i>c</i> is maintained ^e
<i>d₃</i>	16 ± 0,5	<i>r</i>	14,3 nom.
<i>d₄</i>	9 ± 0,2	<i>r₁</i>	12 nom.
<i>e</i>	0,8 max.	<i>r₂</i>	17,5 nom.

^a—Dimensions *h* and as alternatives *q*, *q₁* (see 7.2). These dimensions may be chosen in order to satisfy the requirements of 7.1 g).
^b—Applicable only if a projecting-type safety plug is used.
^c—Dimension *D₆* is the dimension at the top of the cone.
^d—This dimension is very important.
^e—A radius is permitted instead of a chamfer, provided dimension *c* is maintained.

Field Code Changed

Field Code Changed

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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) a gas-tight seal shall only be possible when the pins in the yoke correspond to the holes in the valve;