INTERNATIONAL STANDARD

ISO 10692-1

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Gas cylinders — Gas cylinder valve connections for use in the micro-electronics industry —

Part 1: Outlet connections

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Bouteilles à gaz — Raccords pour robinets de bouteilles à gaz pour l'industrie de la microélectronique —

Partie 1: Raccords de sortie

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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.

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 part of ISO 10692 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 10692-1 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinder fittings*.

ISO 10692 consists of the following parts, under the general title *Gas cylinders — Gas cylinder valve connections for use in the micro-electronics industry*:

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— *Part 1: Outlet connections*

— *Part 2: Specification and type testing for valve to cylinder connections*

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Annex A forms a normative part of this part of ISO 10692. Annex B is for information only.

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Gas cylinders — Gas cylinder valve connections for use in the micro-electronics industry —

Part 1:
Outlet connections

1 Scope

This part of ISO 10692 applies to the outlet connections of gas cylinder valves for gases and gas mixtures and concerns special requirements where the highest levels of cleanliness and freedom from particles are demanded for the manufacture of microelectronic components or similar applications.

2 Normative references

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The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 10692. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 10692 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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ISO 68-2, *ISO general-purpose screw threads — Basic profile — Part 2: Inch screw threads.*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method.*

ISO 10156, *Gases and gas mixtures — Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.*

ISO 10297, *Gas cylinders — Refillable gas cylinder valves — Specification and type testing.*

ISO 10298, *Determination of toxicity of a gas or gas mixture*.

ISO 11114-1, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials*.

3 General requirements

3.1 Materials

The following materials and specifications are recommended:

— For valve and nipple: AISI 316L, microfinished, hardness at least 130 HBW in accordance with ISO 6506-1;

— For the union nut: AISI 304, threading silver plated.

Other materials and values may be chosen if they give at least equivalent performance in terms of yield stress and resistance to corrosion (see ISO 11114-1).

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3.2 Operation

For these connections the outboard leak rate shall not exceed a value of 1×10^{-7} mbar·l·s^{-1} at 137 bar helium when the connection is tightened to 50 N·m.

When this outboard leak rate is obtained, an inboard helium leak rate shall be no greater than 1×10^{-9} mbar·l·s^{-1}.

The gasket shall be an unused recessed flat, uncoated gasket of Ni 200, fully annealed with the requirements of 8.1. Its hardness shall be HBW 2,5/62,5: 80 to 100 HBW (in accordance with ISO 6506-1) with a surface finish $< 0{,}8$ µm turned in the sealing area. Gaskets of other materials, e.g. polymers, may be used if they do not compromise the leak integrity of the connection and are compatible with the duty. These gaskets shall be used at a torque appropriate for the material.

NOTE Conditions of use may cause significant differences in both the inboard and outboard leak rates, e.g. nickel gaskets should be used only once.

3.3 Marking

The valves shall be marked with the requirements listed in ISO 10297, as far as appropriate. In addition to all the required valve marking the letters "*nnn*", where *nnn* is the outlet number, shall be marked.

4 General design

Figure 1 shows the connection in the assembled state (view from the top). The nipple tip has two notches to facilitate the removal of the gasket.

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A pair of keys on the nipple and of the corresponding key ways on the valve prevent rotation of the parts during assembly. The keys shall be opposite to each other and vertically oriented. The antirotational device shall always be in place. The nut shall not engage on the outlet thread until the antirotational pins fitted to the plug are engaged in the slots on the valve outlet. An alternative way to design the antirotational device of the nipple is described in 8.3.

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The union nut shall have two venting holes opposite to each other.

5 Dimensions

Dimensions for the outlet connections are given in Figures 2 to 9. Only dimensions explicitly given there are mandatory. Others shall be chosen as appropriate. All dimensions are in millimetres. The thread definition is given in clause 9.

The diameters d_A, d_B, d_M and d_N are not dimensioned in the figures because they assume different values for each connection. They are chosen in such a way that combinations other than the intended ones are impossible. The diameters d_A and d_B on the valve outlet as well as d_M and d_N on the nipple shall be concentric within 0,05 mm full indicator movement because these are critical dimensions for safety.

6 630 and 640 series connections

Details of the valve outlet are given in Figure 2. Figure 3 gives details of the nipple.

The values of the diameters d_A, d_B, d_M and d_N for the 630 and 640 series connections are given in Table 1.

Figure 4 shows the union nut.

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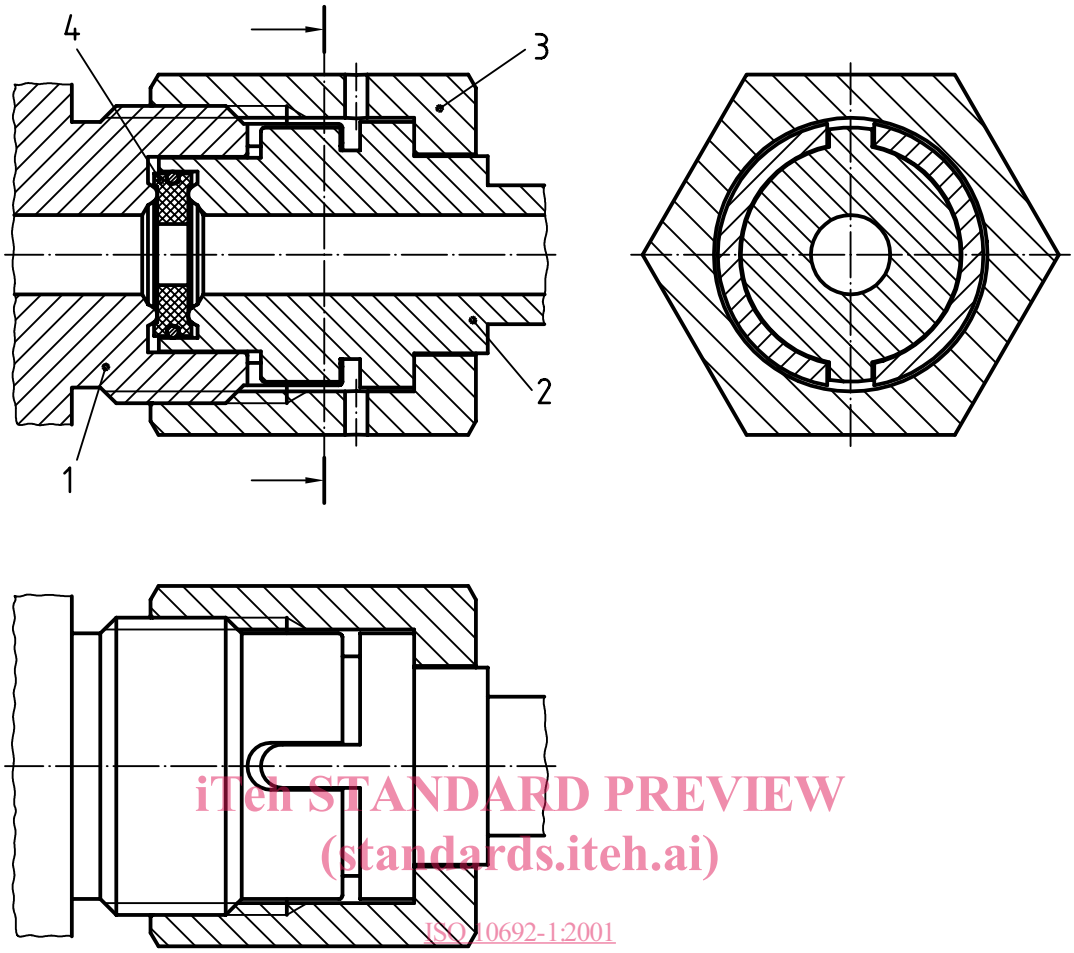

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Key

1 Valve outlet
2 Nipple
3 Union nut
4 Gasket and circlips

Figure 1 — Assembly drawing of the connections (view from the top)

Table 1 — Index diameters of the 630 and 640 series connections

No.	d_A		d_B		d_M		d_N	
	min.	max.	min.	max.	min.	max.	min.	max.
632	16,49	16,58	20,22	20,32	16,31	16,40	20,04	20,14
634	16,84	16,94	19,86	19,96	16,66	16,76	19,69	19,79
636	17,2	17,3	19,51	19,61	17,02	17,12	19,33	19,43
638	17,55	17,65	19,15	19,25	17,37	17,48	18,97	19,08
640	17,91	18,00	18,80	18,89	17,73	17,83	18,62	18,71
642	18,26	18,36	18,26	18,36	18,08	18,18	18,08	18,18

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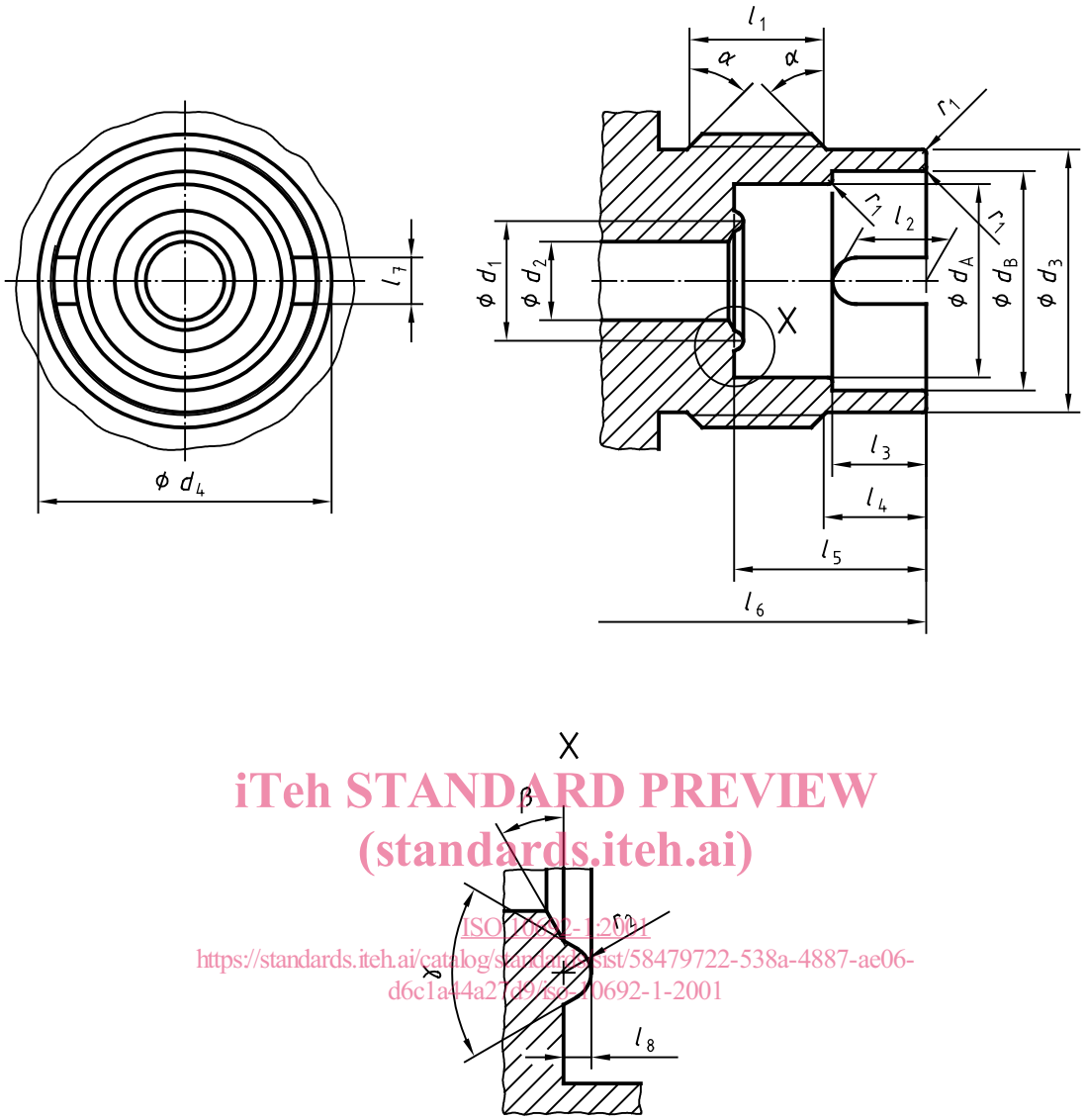

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l_1	11,1 min.	d_1	$10{,}62 \leqslant d_1 \leqslant 10{,}71$
l_2	$8{,}38\ ^{+\ 0{,}25}_{-\ 0{,}13}$	d_2	8,13 max.
l_3	$8{,}38\ ^{+\ 0}_{-\ 0{,}25}$	d_3	$23{,}37 \leqslant d_3 \leqslant 23{,}49$
l_4	$9{,}14\ ^{+\ 0{,}25}_{-\ 0}$	d_4	1,030 external [a]
l_5	$17{,}15\ ^{\ 0}_{-\ 0{,}25}$	r_1	$0{,}25 \leqslant r_1 \leqslant 0{,}38$
l_6	42,54 max.	r_2	$0{,}76 \leqslant r_2 \leqslant 0{,}89$
l_7	$4{,}09 \leqslant l_7 \leqslant 4{,}19$	α	$45° \pm 5°$
l_8	$0{,}76 \leqslant l_8 \leqslant 0{,}89$	β	$30° \pm 5°$
—	—	γ	$60° \pm 1°$

[a] Nominal diameter in inches.

Figure 2 — Valve outlet of the 630 and 640 series connections (view from the top)

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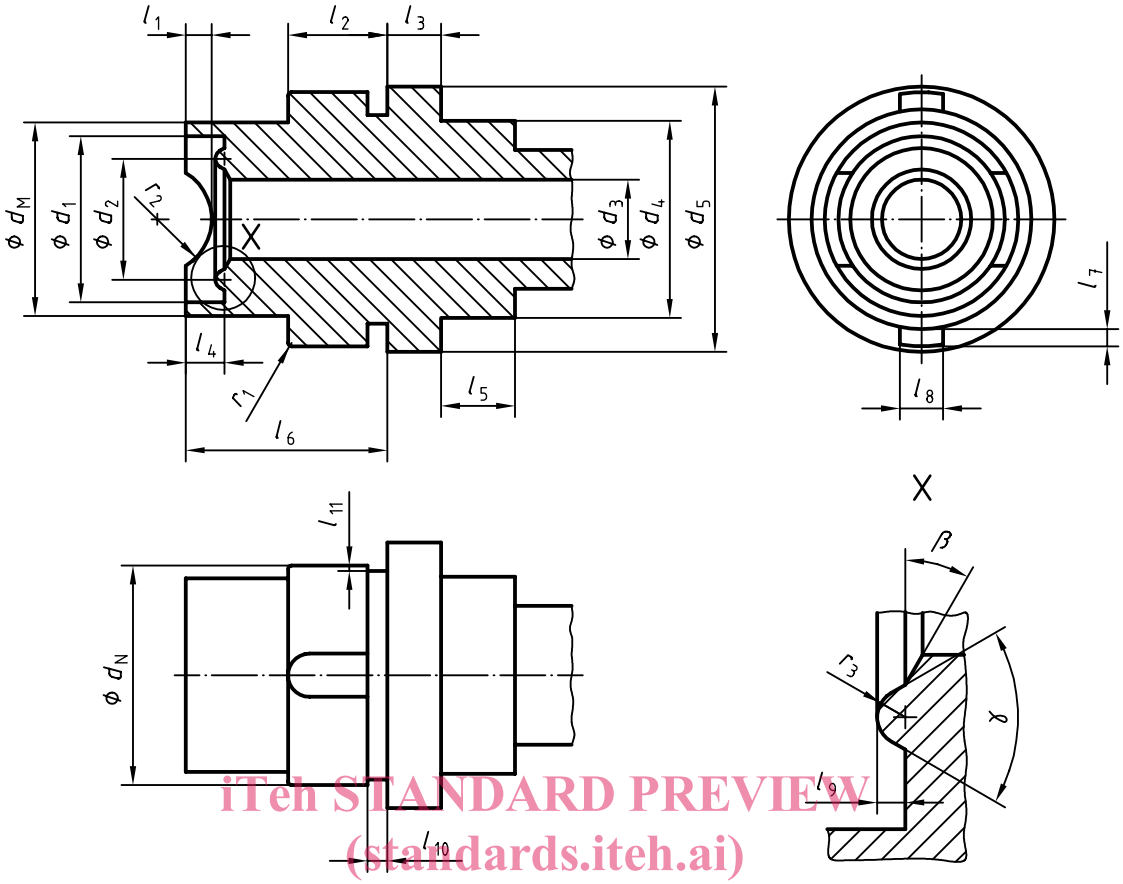

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l_1	2,29 ± 0,13	d_1	14,61 ⩽ d_1 ⩽ 14,73
l_2	$8{,}76\,^{+\,0{,}25}_{\ 0}$	d_2	10,62 ⩽ d_2 ⩽ 10,71
l_3	$4{,}75\,^{+\,0{,}25}_{\ 0}$	d_3	8,13 maximum
l_4	3,38 ⩽ l_4 ⩽ 3,47	d_4	17,32 ⩽ d_4 ⩽ 17,45
l_5	5,85 minimum	d_5	23,42 ± 0,13
l_6	$17{,}78\,^{+\,0{,}25}_{\ 0}$	r_1	0,25 ⩽ r_1 ⩽ 0,38
l_7	1,52 ± 0,05	r_2	4,8 ± 0,25
l_8	3,78 ⩽ l_8 ⩽ 3,84	r_3	0,76 ⩽ r_3 ⩽ 0,89
l_9	0,76 ⩽ l_9 ⩽ 0,89	β	30° ± 5°
l_{10}	8,51 ⩽ l_{10} ⩽ 8,76	γ	60° ± 1°
l_{11}	2,11 maximum	—	—

Figure 3 — Nipple of the 630 and 640 series connections

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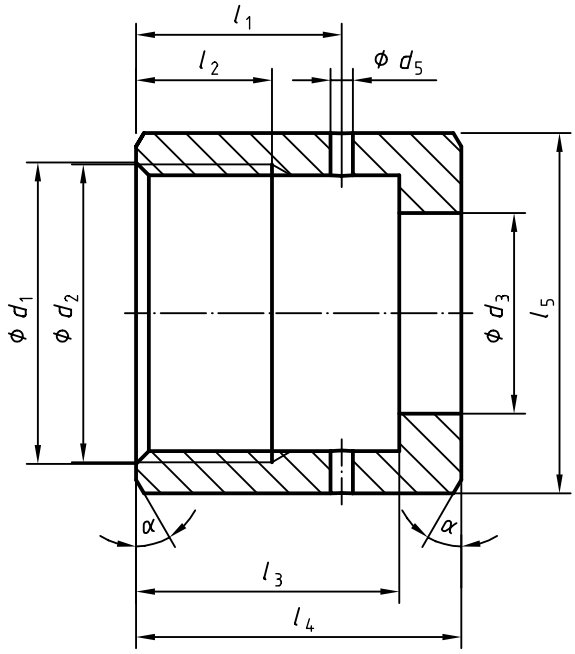

l_1	18,14 ± 0,13	d_1	26,59 ± 0,25
l_2	11,4 min.	d_2	1,035 internal [a]
l_3	$23{,}24\ ^{0}_{-0{,}25}$	d_3	17,70 ± 0,13
l_4	28,7 ± 0,25	d_5	1,98
l_5	31,8 hexagonal	α	30° ± 5°

[a] Nominal diameter in inches.

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Figure 4 — Union nut of the 630 and 640 series connections

7 710 and 720 series connections

The connections of the 710 and 720 series are similar to those of the 630 and the 640 series, except for the thread and the corresponding dimensions and for the diameters d_A, d_B, d_M and d_N.

Figure 5 gives details of the valve outlet. Figure 6 shows details of the nipple. The values of the diameters d_A, d_B, d_M and d_N for the 710 and 720 series connections are given in Table 2.

Figure 7 shows the union nut.

Table 2 — Diameters for the 710 and 720 connections

No.	d_A		d_B		d_M		d_N	
	min.	max.	min.	max.	min.	max.	min.	max.
712	16,48	16,58	22,43	22,52	16,30	16,41	22,25	22,35
714	16,84	16,94	22,08	22,17	16,67	16,76	21,90	21,99
716	17,20	17,29	21,72	21,81	17,02	17,11	21,54	21,64
718	17,56	17,65	21,37	21,46	17,38	17,47	21,19	21,28
720	17,91	18,00	21,01	21,10	17,73	17,83	20,83	20,92
722	18,27	18,36	20,65	20,75	18,09	18,18	20,48	20,57
724	18,62	18,71	20,30	20,39	18,44	18,54	20,12	20,21
726	18,98	19,07	19,94	20,04	18,80	18,89	19,77	19,86
728	19,33	19,43	19,33	19,43	19,16	19,25	19,16	19,25

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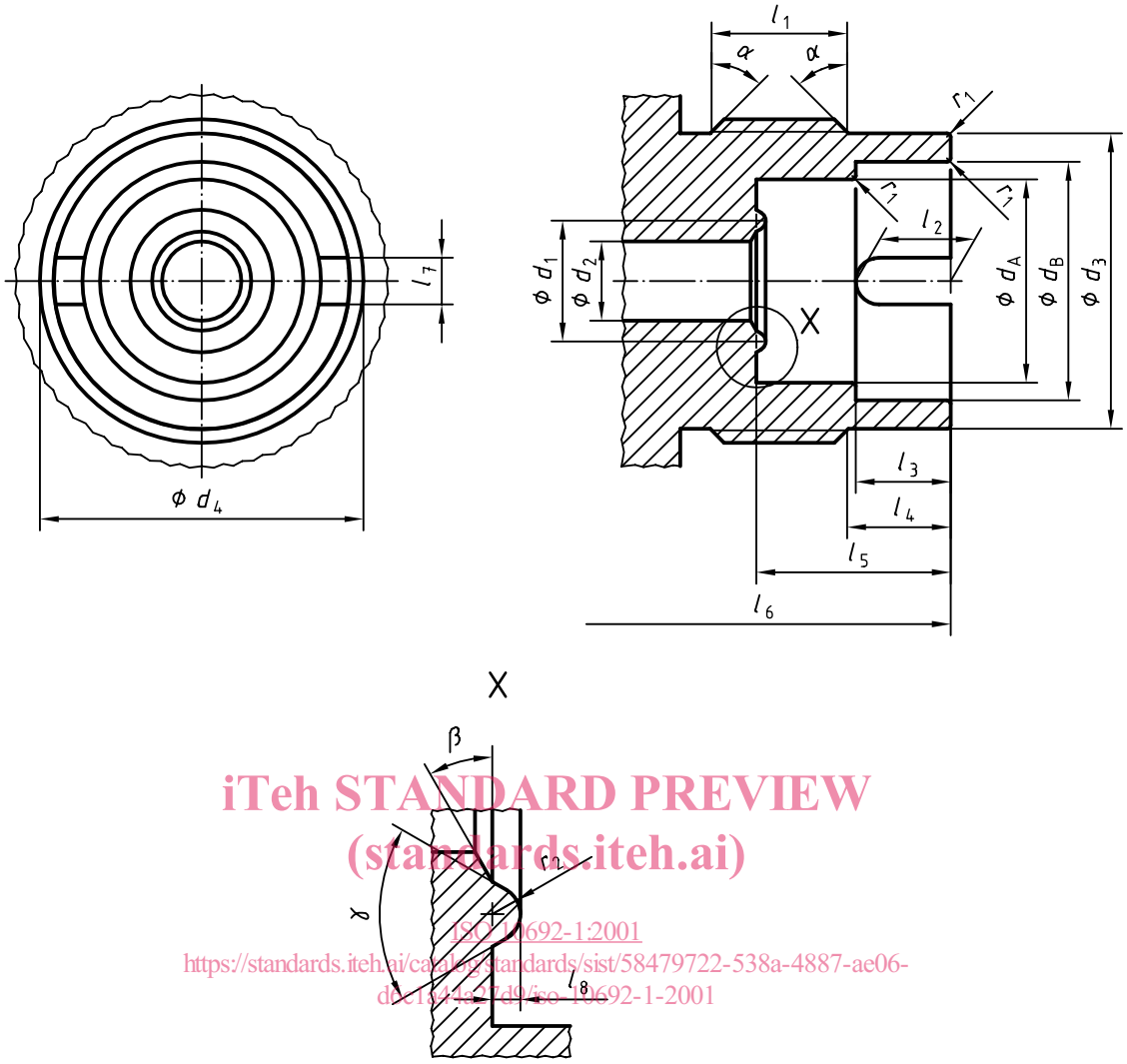

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l_1	11,1 min.	d_1	$10{,}62 \leqslant d_1 \leqslant 10{,}71$
l_2	$8{,}38\,^{+\,0{,}25}_{-\,0{,}13}$	d_2	8,13 max.
l_3	$8{,}38\,^{0}_{-\,0{,}25}$	d_3	$26{,}04 \leqslant d_3 \leqslant 26{,}16$
l_4	$9{,}14\,^{+\,0{,}25}_{0}$	d_4	1,125 external [a]
l_5	$17{,}15\,^{0}_{-\,0{,}25}$	r_1	$0{,}25 \leqslant r_1 \leqslant 0{,}38$
l_6	42,54 max.	r_2	$0{,}76 \leqslant r_2 \leqslant 0{,}89$
l_7	$4{,}09 \leqslant l_7 \leqslant 4{,}19$	α	$45° \pm 5°$
l_8	$0{,}76 \leqslant l_8 \leqslant 0{,}89$	β	$30° \pm 5°$
—	—	γ	$60° \pm 1°$

[a] Nominal diameter in inches.

Figure 5 — Valve outlet of the 710 and 720 series connections (view from the top)

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