
**Ships and marine technology —
Manholes with bolted covers**

*Navires et technologie maritime — Trous d'homme avec couvercle
boulonné*

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Published in Switzerland

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 8, *Ship design*.

This third edition cancels and replaces the second edition (ISO 5894:1999), which has been technically revised.

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

- a) the type O manhole has been classified as type AO and BO;
- b) the type E manhole has been classified as type AE and BE;
- c) the nominal sizes of 450 × 350, 600 × 400, 600 × 450 and 800 × 600 for type CO manholes have been added;
- d) the nominal sizes of 450 × 350, 600 × 400, 600 × 450 and 800 × 600 for type DO manholes have been added;
- e) the nominal sizes of 500 × 400 and 600 × 450 for type AO and type BO manholes have been added;
- f) the plate thickness of manhole covers is more in line with the requirements of modern shipbuilding;
- g) a marking for each manhole cover has been added;
- h) a handle for each manhole cover has been added;
- i) an auxiliary size for fasteners has been added;
- j) the geometrical design of the oval manhole covers has been added;
- k) the design of jacking-up bolts for every type of manhole has been added;
- l) a free from asbestos requirement for the gasket material has been added;

m) the fastener coordinates values have been adjusted.

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.

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Ships and marine technology — Manholes with bolted covers

1 Scope

This document specifies requirements for watertight and oiltight manholes of the current types with bolted covers, for general shipboard use other than for pressure vessels.

It specifies the dimensions for the holes in the plating and the number, size and position of the fasteners.

It is applicable to manholes of raised coaming, surface mounted or recessed cover types.

The details of the manholes are at the discretion of the manufacturer.

2 Normative references

The following documents are referenced in this text in such a way that some or all of their content constitutes requirements of this document. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*

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:

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

4 Typical forms, nominal sizes and dimensions

All dimensions are given in millimetres.

Manholes shall be classified as type AO, AE, BO, BE, CO or DO according to nominal sizes (see [Figures 1](#) to [4](#) and [Table 1](#) to [6](#)).

The dimensions of the manholes and the spacing of the fasteners shall be in accordance with [Figures 1](#) to [11](#) and [Tables 1](#) to [7](#).

The nominal size $l_1 \times b_1$ shall correspond to the length and breadth of the clear opening, as given in [Tables 1](#) to [6](#).

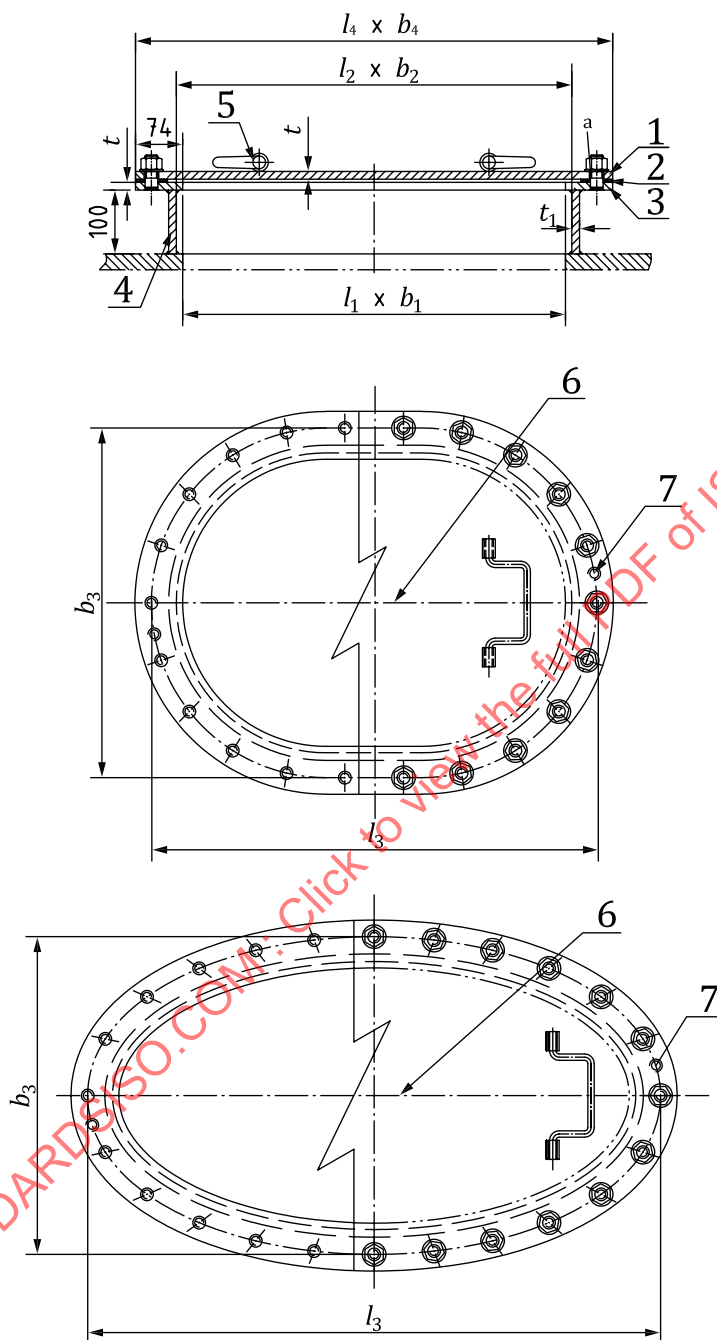
The thread of fasteners (nuts and bolts) shall be in accordance with ISO 262.

The thickness of the cover plate, ring and coaming shall be chosen by the user in accordance with the values specified in [Table 1](#) to [Table 6](#). Classification society rules and regulatory conventions can require higher values.

[Figures 1](#) to [4](#) show manhole with raised coaming, surface mounted and recessed cover. In order to ensure interchangeability of covers and gaskets, the dimensions of these components and the fastener coordinates shall be as given in this document.

Figures 1 to 4 show welded studs as an example. Other reliable joints between the studs and plate ring are permitted.

Dimensions in millimetres



Key

- | | | | |
|----------|------------------|-----------|---------------------------|
| 1 cover | 3 plate ring | 5 handle | 7 jacking-up bolt 2 × M20 |
| 2 gasket | 4 raised coaming | 6 marking | |

The weld size and details should meet the recognized industrial standard.

NOTE 1 $l_1 \times b_1$ is a clear opening.

NOTE 2 Jacking-up bolts 2 × M20 can be chosen by the user if suitable.

a Fastener M20, hole $\Phi 23$ mm.

Figure 1 — Manhole with cover type AO and AE

Table 1 — Type AO, nominal size

Dimensions in millimetres

Nominal size $l_1 \times b_1$	l_2	b_2	l_3	b_3	l_4	b_4	t	t_1	Fasteners	
									Diameter	Number
450 × 350	470	370	548	448	598	498	8	6	M20	18
500 × 400	520	420	598	498	648	548	8	6		20
600 × 400	620	420	698	498	748	548	8	6		22
600 × 450	620	470	698	548	748	598	8	6		26
800 × 600	820	620	898	698	948	748	12	10		

NOTE 1 Thicknesses t and t_1 are for minimum thickness, the thicknesses that are not displayed in the table can be designed according to the builder practice.

NOTE 2 Refer to [Figure 1](#) where the dimensions are specified.

Table 2 — Type AE, nominal size

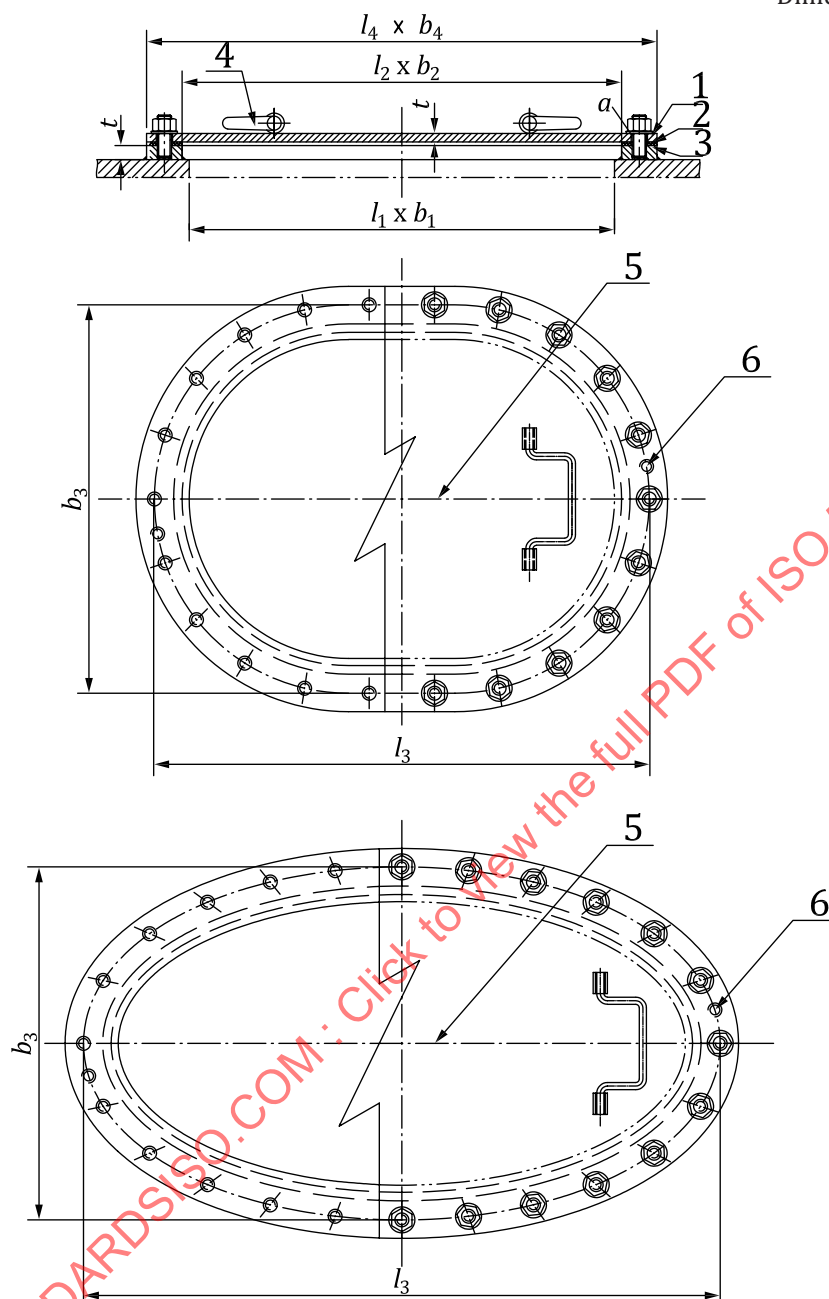
Dimensions in millimetres

Nominal size $l_1 \times b_1$	l_2	b_2	l_3	b_3	l_4	b_4	t	t_1	Fasteners	
									Diameter	Number
800 × 400	820	420	898	495	948	548	12	10	M20	24

NOTE 1 Thicknesses t and t_1 are for minimum thickness, the thicknesses that are not displayed in the table can be designed according to builder practice.

NOTE 2 Refer to [Figure 1](#) where the dimensions are specified.

Dimensions in millimetres

**Key**

- | | | |
|----------|--------------|---------------------------|
| 1 cover | 3 plate ring | 5 marking |
| 2 gasket | 4 handle | 6 jacking-up bolt 2 × M20 |

The weld size and details should meet the recognized industrial standard.

NOTE 1 $l_1 \times b_1$ is a clear opening.

NOTE 2 Jacking up bolts 2 × M20 can be chosen by the user if suitable.

^a Fastener M20, hole $\Phi 23$ mm.

Figure 2 — Manhole with cover type BO and BE

Table 3 — Type BO, nominal size

Dimensions in millimetres

Nominal size $l_1 \times b_1$	l_2	b_2	l_3	b_3	l_4	b_4	t	Fasteners	
								Diameter	Number
450 × 350	470	370	530	430	590	490	6	M20	16
500 × 400	520	420	580	480	640	540	8		18
600 × 400	620	420	680	480	740	540	8		20
600 × 450	620	470	680	530	740	590	8		22
800 × 600	820	620	880	680	940	740	12		26

NOTE 1 t is for minimum thickness, the thicknesses that are not displayed in the table can be designed according to builder practice.

NOTE 2 Refer to [Figure 2](#) where the dimensions are specified.

Table 4 — Type BE, nominal size

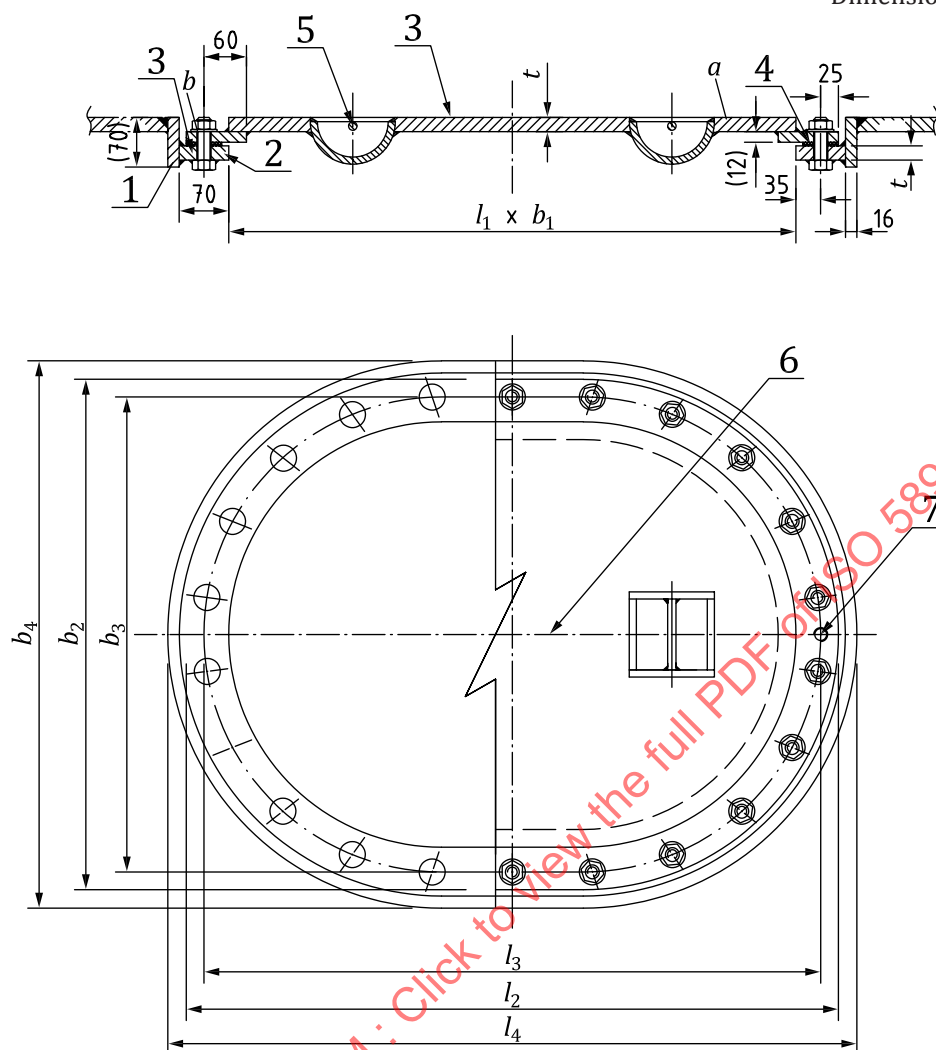
Dimensions in millimetres

Nominal size $l_1 \times b_1$	l_2	b_2	l_3	b_3	l_4	b_4	t	Fasteners	
								Diameter	Number
800 × 400	820	420	880	480	940	540	12	M20	24

NOTE 1 t is for minimum thickness, the thicknesses that are not displayed in the table can be designed according to builder practice.

NOTE 2 Refer to [Figure 2](#) where the dimensions are specified.

Dimensions in millimetres



Key

- | | | | | | |
|---|---------------|---|--------|---|--------------------------|
| 1 | coaming plate | 4 | gasket | 6 | marking |
| 2 | plate ring | 5 | handle | 7 | jacking-up bolt, 2 × M20 |
| 3 | cover | | | | |

The weld size and details should meet the recognized industrial standard.

Dimensions given in brackets () can be adjusted. The top of the cover, including the nut, should not protrude from the flush surface when choosing a dimension given in brackets.

NOTE 1 Jacking-up bolts 2 × M20 can be chosen by the user if suitable.

NOTE 2 $l_1 \times b_1$ is a clear opening.

NOTE 3 The type of handle can be designed and changed according to builder practice.

^a Fastener M20, hole $\Phi 23$ mm.

Figure 3 — Manhole with recessed cover type CO (Oval)

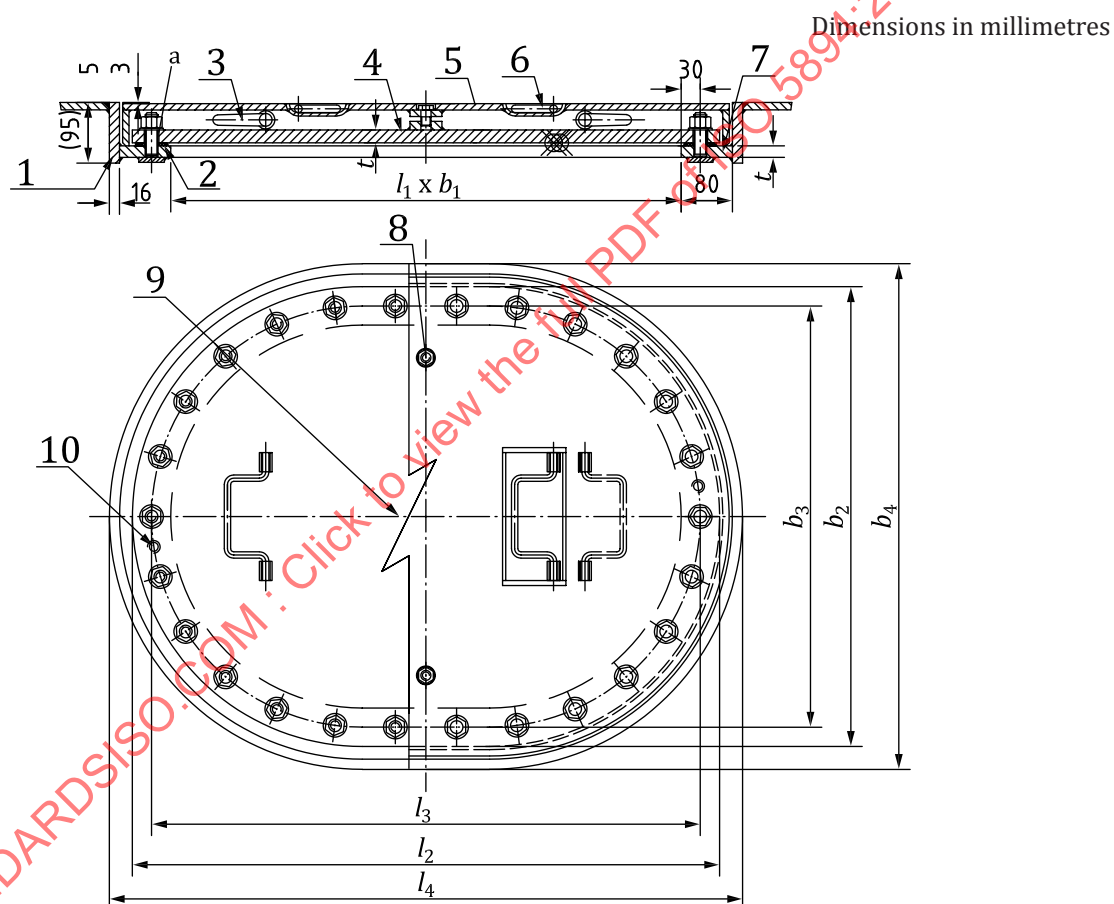
Table 5 — Type CO, nominal size

Dimensions in millimetres

Nominal size $l_1 \times b_1$	l_2	b_2	l_3	b_3	l_4	b_4	t	Fasteners	
								Diameter	Number
450 × 350	570	470	520	420	622	522	6	M20	16
600 × 400	720	520	670	470	772	572	8		20
600 × 450	720	570	670	520	772	622	8		20
800 × 600	920	720	870	670	972	772	12		26

NOTE 1 t is for minimum thickness, the thicknesses that are not displayed in the table can be designed according to builder practice.

NOTE 2 Refer to [Figure 3](#) where the dimensions are specified.

**Key**

1	coaming plate	4	cover	7	plate ring	9	marking
2	gasket	5	top cover	8	securing bolts	10	jacking-up bolt, 2 × M20
3	handle	6	handle				

The weld size and details should meet the recognized industrial standard.

Dimensions given in brackets () can be adjusted. The top of the cover, including the nut, should not protrude from the flush surface when choosing a dimension given in brackets.

NOTE 1 $l_1 \times b_1$ is a clear opening.

NOTE 2 Jacking up bolts 2 × M20 can be chosen by the user if suitable.

a Fastener M20, hole $\Phi 23$ mm.

Figure 4 — Manhole with recessed top cover type DO

Table 6 — Type D0, nominal size

Dimensions in millimetres

Nominal size $l_1 \times b_1$	l_2	b_2	l_3	b_3	l_4	b_4	t	Fasteners	
								Diameter	Number
450 × 350	570	470	510	410	642	542	6	M20	16
600 × 400	720	520	660	460	792	592	8		20
600 × 450	720	570	660	510	792	642	8		22
800 × 600	920	720	860	660	992	792	12		26

NOTE 1 t is for minimum thickness, the thicknesses that are not displayed in the table can be designed according to builder practice.

NOTE 2 Refer to [Figure 4](#) where the dimensions are specified.

5 Fastening details

Details of fastener coordinates for manholes of types AO, AE, BO, BE, CO and D0 are given in [Figures 5](#) to [11](#) and in [Table 7](#).

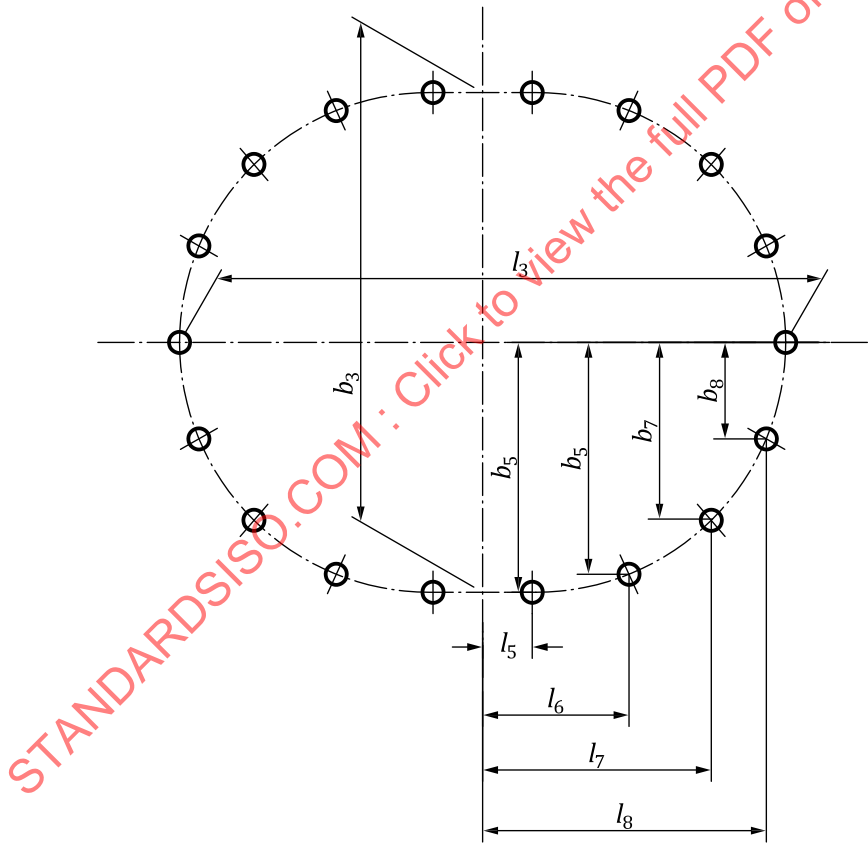


Figure 5 — AO/B0 500 × 400
AO 450 × 350

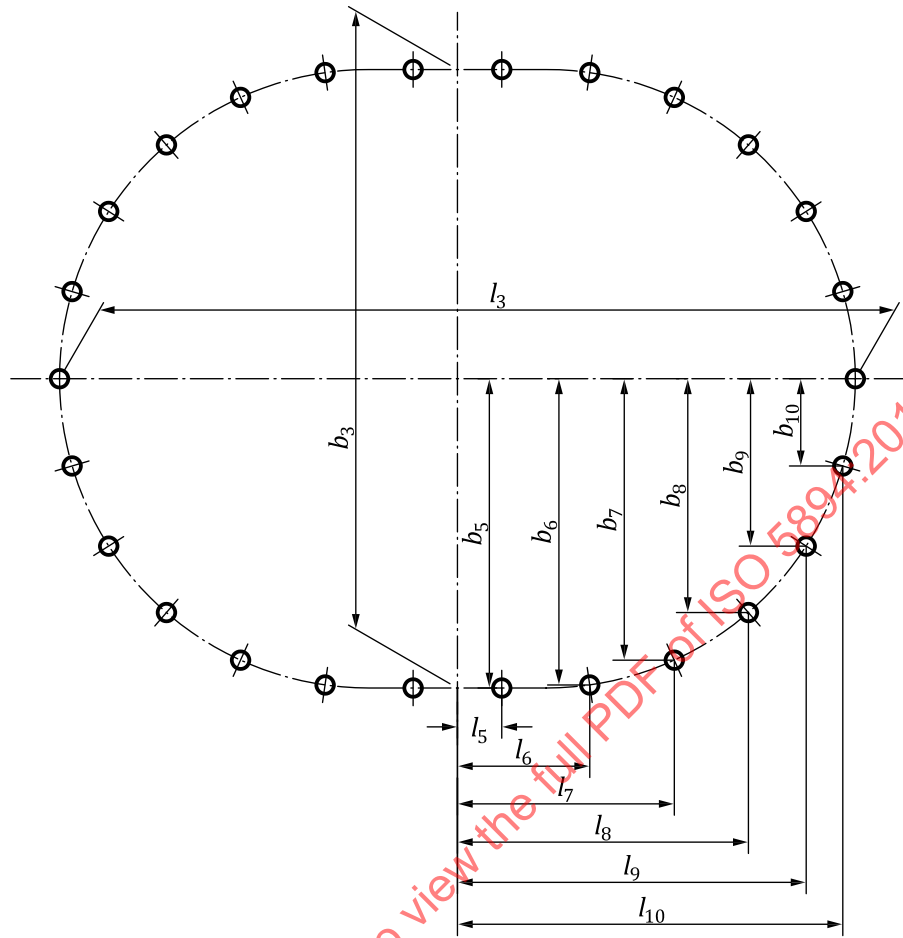


Figure 6 — A0/B0/C0/D0 800 × 600

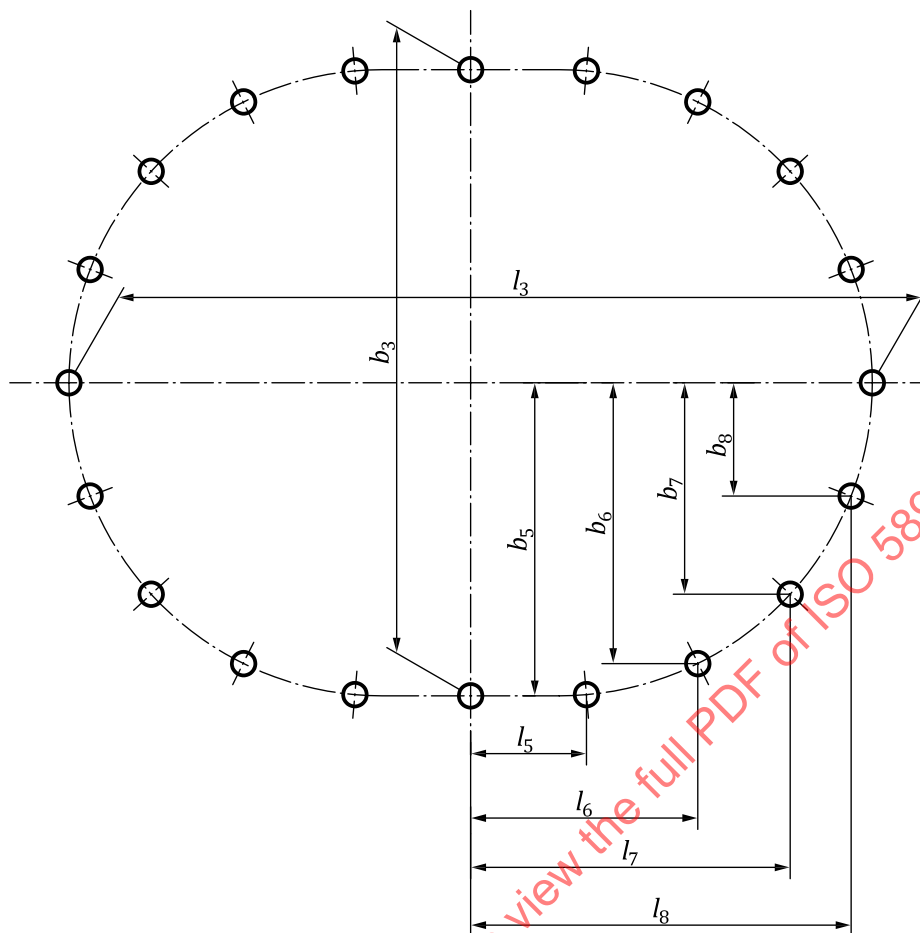


Figure 7 — A0/B0 /C0/D0 600 × 400
C0/D0 600 × 450

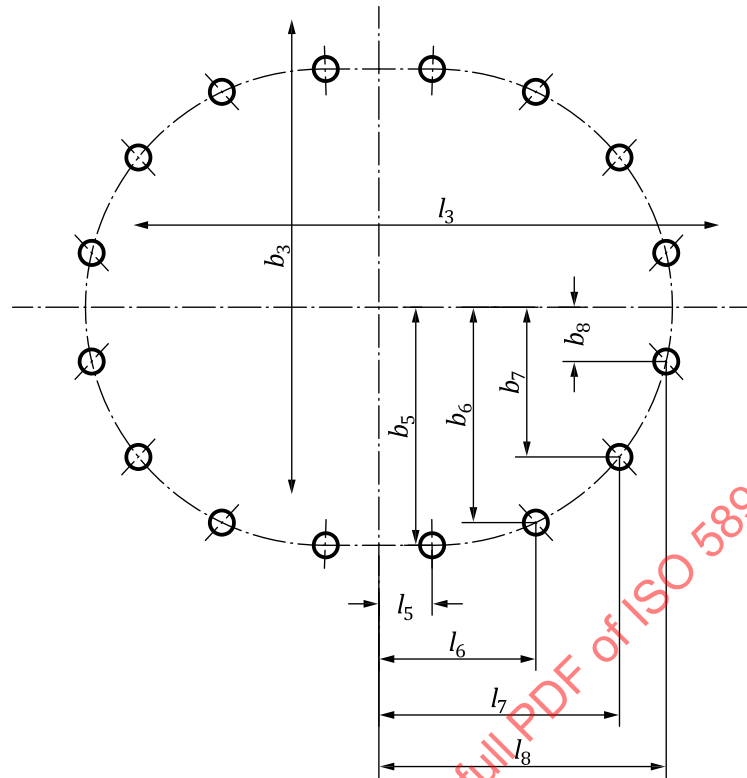


Figure 8 — B0 450 × 350

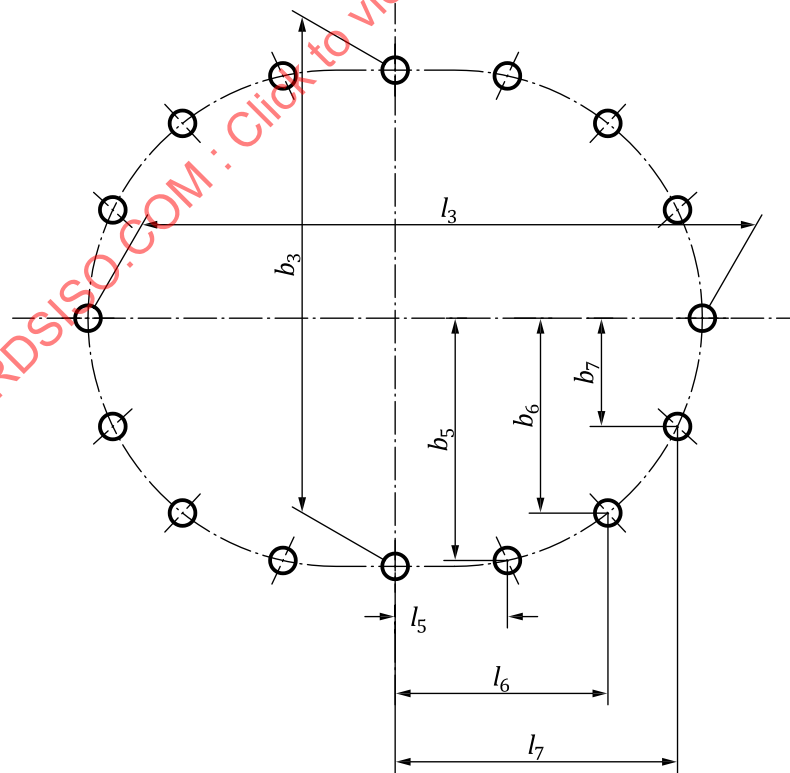


Figure 9 — C0/D0 450 × 350