

# INTERNATIONAL STANDARD

# ISO 5894

Second edition  
1999-12-01

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

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



Reference number  
ISO 5894:1999(E)

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Tel. + 41 22 749 01 11  
Fax + 41 22 734 10 79  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
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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.

International Standard ISO 5894 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 8, *Structures*.

This second edition cancels and replaces the first edition (ISO 5894:1978).

The following amendments have been made to the first edition.

- a) The nominal sizes 500 mm × 400 mm and 600 mm × 450 mm for type A manholes are no longer specified.
- b) Type B, type C and type D manholes are no longer specified.
- c) The type A manhole has been renamed type O manhole (O for oval).
- d) The nominal size 800 mm × 600 mm for type O has been added.
- e) The type E manhole (E for elliptical) with nominal size 800 mm × 400 mm has been added.
- f) For the nominal sizes 600 mm × 400 mm and 450 mm × 350 mm for type O, the sizes  $a_2$  and  $b_2$  (in the 1978 edition) are reduced by 20 mm. The position of fasteners is therefore changed.
- g) The sizes for length and breadth of covers and coaming rings ( $L_2$ ,  $L_3$ ,  $b_2$  and  $b_3$ ) have been added.
- h) The designation has been added.



# Ships and marine technology — Manholes with bolted covers

## 1 Scope

This International Standard specifies requirements for watertight and oiltight manholes of the current type 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. All forms of manhole, whether of raised coaming, surface mounted or recessed cover types, shall conform to these principal particulars.

The details of the manholes shall be the responsibility of the manufacturer.

**NOTE** Users of this International Standard should note that, while observing the requirements of the standard, they should at the same time ensure compliance with such statutory requirements, rules and regulations as may be applicable to the individual ship concerned.

## 2 Normative reference

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

ISO 262: 1998, *ISO general-purpose metric screw threads — Selected sizes for screws, bolts and nuts*.

## 3 Typical forms, nominal sizes and dimensions

All dimensions are given in millimetres.

Manholes shall be classified as type O or E according to nominal sizes (see Figures 1 to 3 and Table 1).

The dimensions of the manholes and the spacing of the fasteners shall be in accordance with Figures 1 to 7 and Tables 1 and 2.

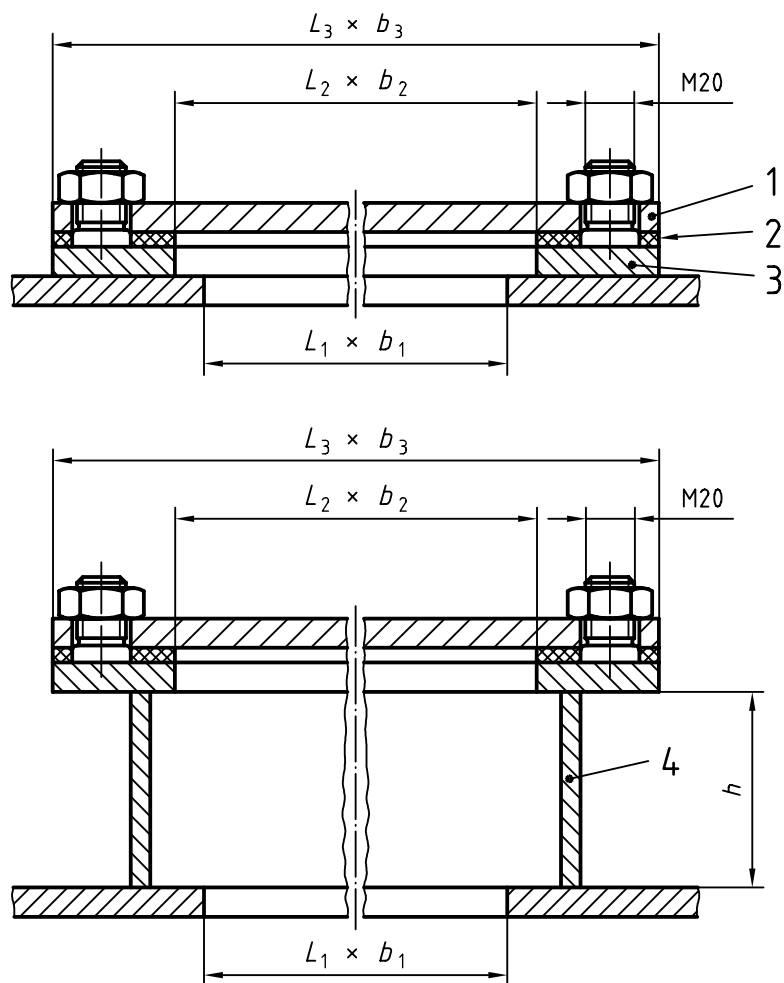
The nominal size  $L_1 \times b_1$ , shall correspond to the length and breadth of the clear opening as given in Figures 1 to 3.

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

**NOTE 1** Figure 1 shows examples of surface mounted and raised coaming forms of manholes.

The recessed form of manholes shall be similar. In order to ensure interchangeability of covers and gaskets, the dimensions of these components and the fastener coordinates shall also be as given in this International Standard.

**NOTE 2** Figure 1 shows welded studs as an example. Other reliable joints between the studs and plate ring are permissible.

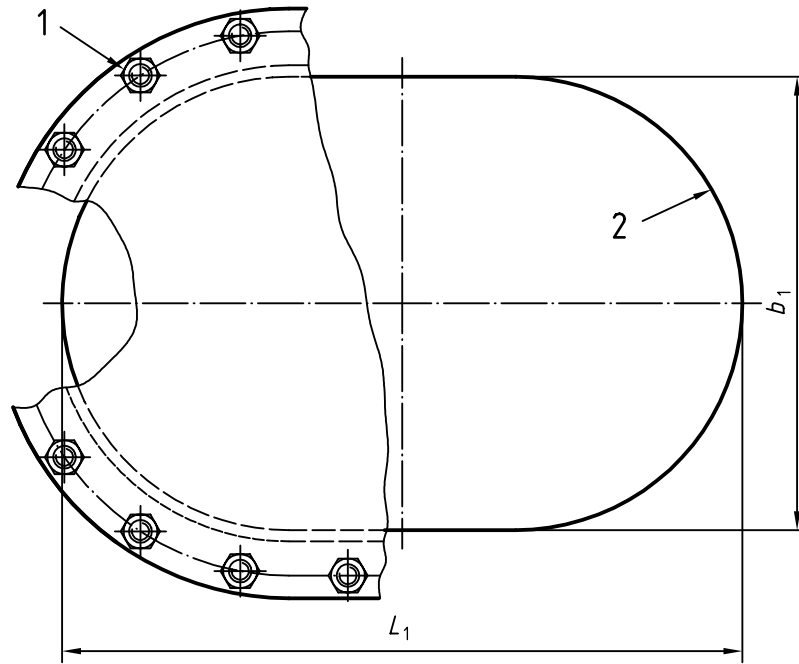


**Key**

- 1 Cover
- 2 Gasket
- 3 Plate ring
- 4 Raised coaming

NOTE  $L_1 \times b_1$  is a clear opening.

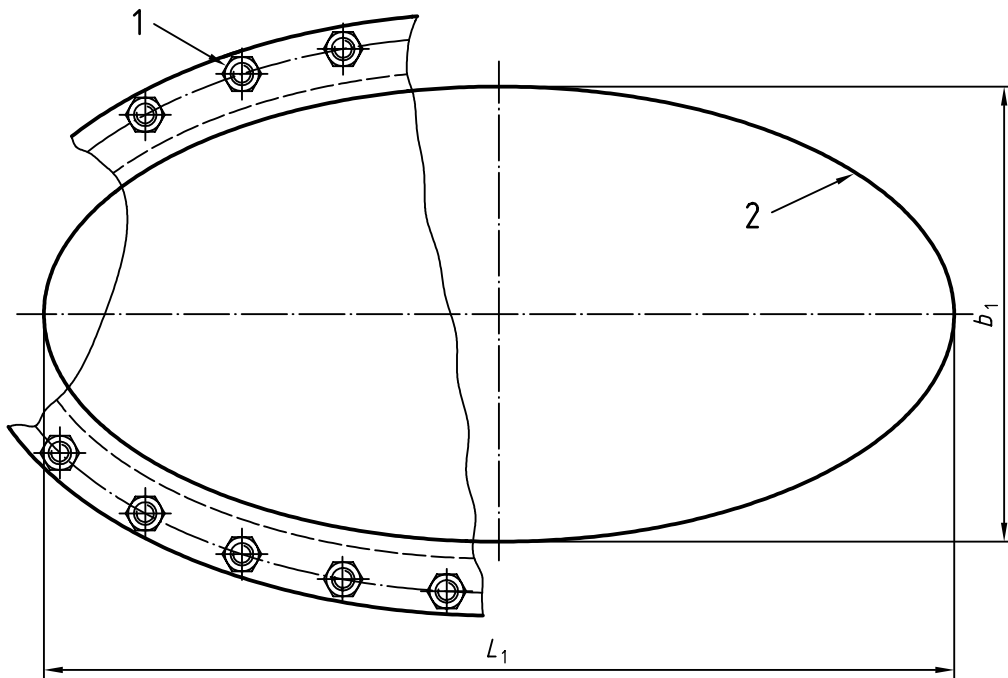
**Figure 1 — Typical sections through manholes; surface mounted and with raised coaming type**



**Key**

- 1 Fastener M20, hole  $\varnothing$  24 mm
- 2 Clear opening

**Figure 2 — Manhole with cover type O (oval)**



**Key**

- 1 Fastener M20, hole  $\varnothing$  24 mm
- 2 Clear opening

**Figure 3 — Manhole with cover type E (elliptical)**

Table 1 — Types, nominal sizes, preferences and sizes

Dimensions in millimetres

Type	Nominal size		Size					
	Preference 1	Preference 2	$L_1$	$L_2$	$L_3$	$b_1$	$b_2$	$b_3$
O	—	450 × 350 <sup>a</sup>	450	470	570	350	370	470
	600 × 400	—	600	620	720	400	420	520
	—	800 × 600	800	820	920	600	620	720
E	—	800 × 400	800	830	930	400	430	530

<sup>a</sup> Not suitable as access opening; the sizes are too small. A safe passing through cannot be ensured.

### 4 Fastening details

Details of fastener coordinates for manholes of types O and E are given in Figures 4 to 6 and in Table 2.

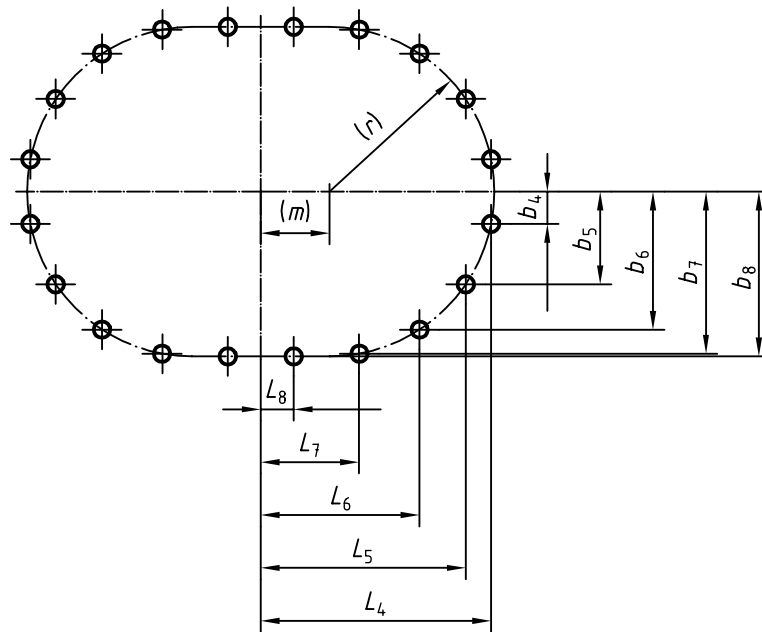


Figure 4 — Fastener coordinates for manhole type O, nominal sizes 450 mm × 350 mm and 600 mm × 400 mm (shown 600 mm × 400 mm)



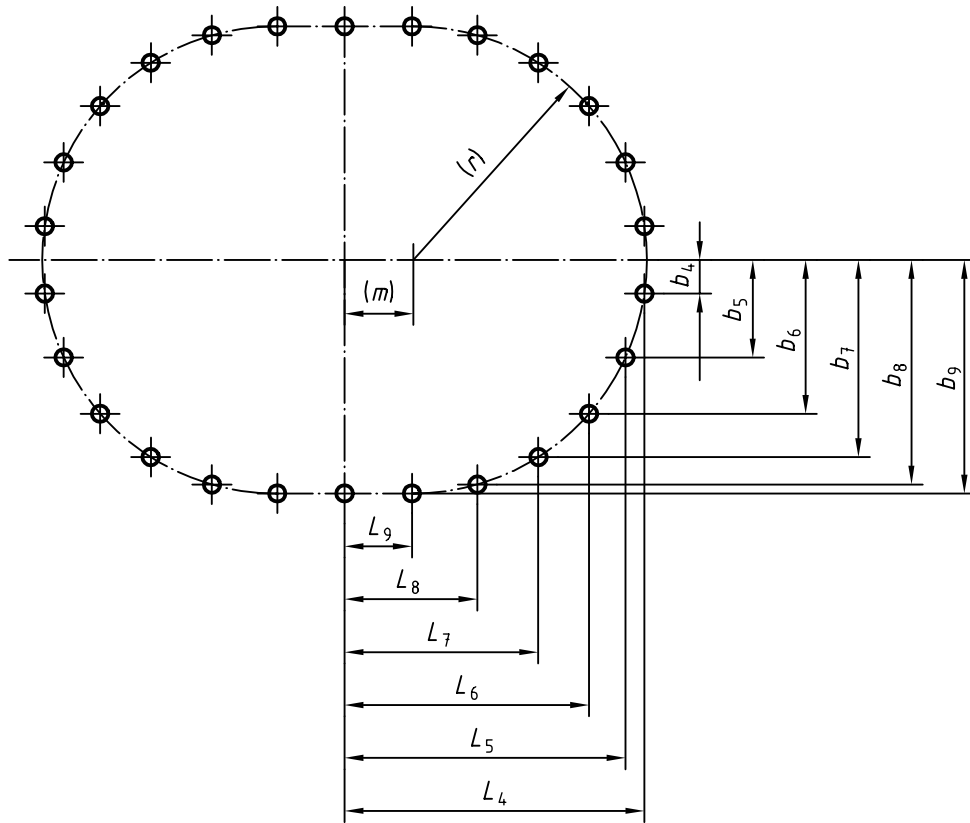


Figure 5 — Fastener coordinates for manhole type O, nominal size 800 mm × 600 mm

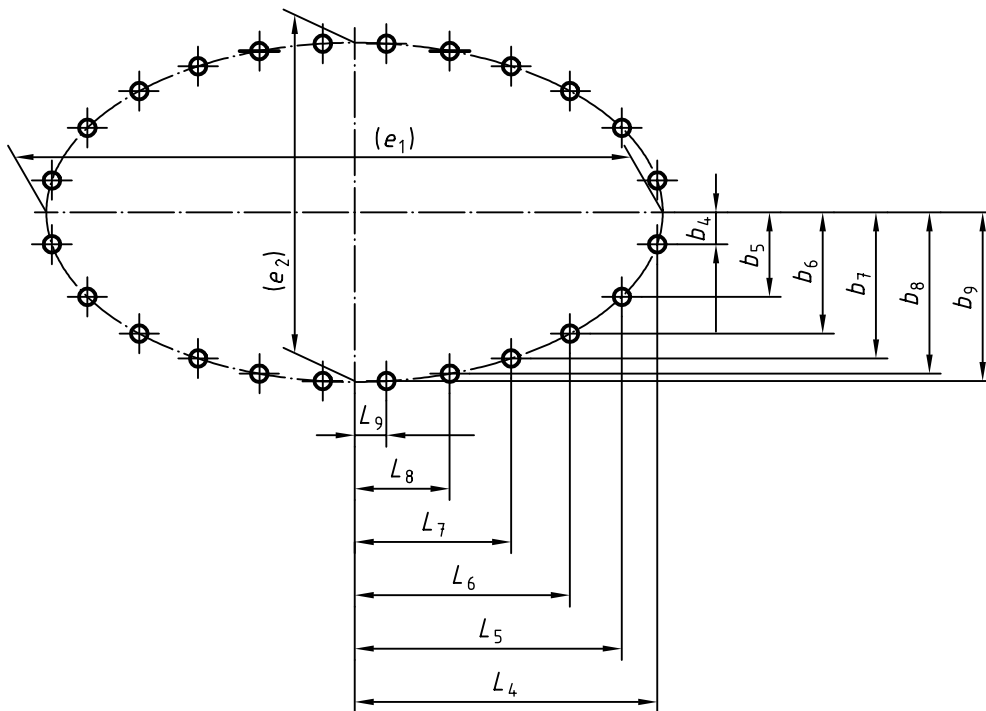


Figure 6 — Fastener coordinates for manhole type E, nominal size 800 mm × 400 mm

Table 2 — Fastener coordinates and numbers

Dimensions in millimetres

Type		O			E	
Nominal sizes		450 × 350	600 × 400	800 × 600	800 × 400	
Number of fasteners		16	20	26	24	
Coordinates of fasteners	$L_4$	± 0,5	260	335	437	437
	$b_4$	± 0,5	48	47	49	46
	$L_5$	± 0,5	218	298	409	386
	$b_5$	± 0,5	135	135	142	122
	$L_6$	± 0,5	142	231	356	311
	$b_6$	± 0,5	194	201	224	175
	$L_7$	± 0,5	48	143	282	226
	$b_7$	± 0,5	215	236	287	211
	$L_8$	± 0,5	—	48	194	137
	$b_8$	± 0,5	—	240	327	233
	$L_9$	± 0,5	—	—	98	46
	$b_9$	± 0,5	—	—	340	244
Auxiliary sizes	$(e_1)$	—	—	—	890	
	$(e_2)$	—	—	—	490	
	$(r)$	215	240	340	—	
	$(m)$	50	100	100	—	

## 5 Geometrical design of the ellipses

$\overline{AB}$ : Large axis

$\overline{CD}$ : Small axis

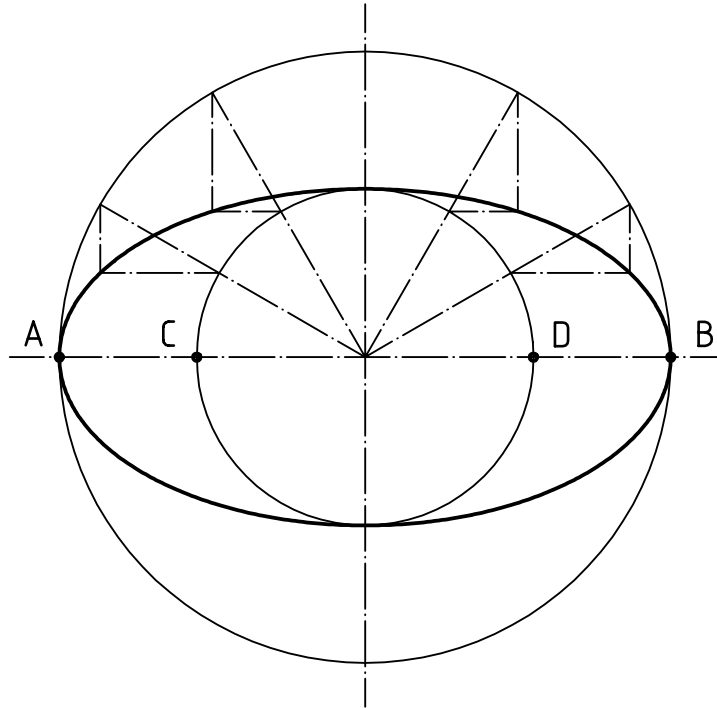


Figure 7 — Design of the ellipses

## 6 Materials

Cover plate, ring and/or coaming shall be of ship's quality mild steel or shall be of equivalent welding quality. Minimal tensile strength: 400 N/mm<sup>2</sup>.

Studs and screws shall be of steel and of mechanical property class 4.8 minimum and 4.6 minimum respectively.

Studs, screws and nuts of equivalent corrosion-resistant steel are permissible.

The gasket material shall be suitable for service in contact with oil, sea water and fresh water.

## 7 Quality of manufacture

The steel plate and sections shall be flat and free from pitting, reasonably clean and sufficiently smooth for a satisfactory joint to be made without recourse to machining the surface.

The gasket material shall have a thickness appropriate to the intended service.

The dimensional accuracy of the manhole cover, and of the gasket and of the drilling and spacing of the holes for fasteners shall be such as to ensure interchangeability of these components (see also Table 2).

The access openings shall be free from rough edges or surfaces likely to cause injury to the hands.

## 8 Designation

Manholes with bolted covers conforming to this International Standard shall be designated by the following indications, in the order given:

- a) denomination: manhole;
- b) number of this International Standard: ISO 5894;
- c) type (code letter), as specified in clause 3;
- d) nominal size, as specified in clause 3.

### EXAMPLE

Designation of a manhole with a bolted cover in accordance with this International Standard, type O, with the nominal size 600 mm × 400 mm:

Manhole ISO 5894 — O — 600 × 400



