

# International Standard



# 4146

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

## Shipbuilding — Inland vessels — Manholes

*Construction navale — Bateaux de navigation intérieure — Trous d'homme*

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Descriptors : shipbuilding, inland navigation, access openings, classifications, designations, dimensions.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4146 was developed by Technical Committee ISO/TC 8, *Shipbuilding*, and was circulated to the member bodies in March 1978.

It has been approved by the member bodies of the following countries :

Austria	Ireland	Spain
Belgium	Italy	Turkey
Brazil	Korea, Rep. of	United Kingdom
Bulgaria	Mexico	USSR
Czechoslovakia	Netherlands	Yugoslavia
France	Poland	
India	Romania	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Germany, F.R.  
Japan  
Sweden

# Shipbuilding — Inland vessels — Manholes

## 1 Scope and field of application

This International Standard specifies the types, principal dimensions and technical requirements for manholes used in inland vessels.

## 2 Manhole types

Manholes shall be classified as type A, B, C, D or E according to their shape and design, as follows :

- A — round, low
- B — round, flush
- C — oval, low
- D — oval, flush
- E — oval, high

Structural details of manholes are shown in figures 1, 2, 3, 4 and 5.

NOTE — The choice of manholes for every concrete ship lies within the competence of the designer.

## 3 Dimensions

3.1 The size of a manhole is determined by its clear dimensions, namely :

- for round manholes : diameter  $D$
- for oval manholes : dimensions  $L \times B$

3.2 The principal dimensions of manholes shall correspond to those indicated in tables 1, 2 and 3.

## 4 Technical requirements

4.1 Covers and flanges of manholes shall be manufactured from weldable steel having a yield point of not less than 235 N/mm<sup>2</sup>.

4.2 Packings of manholes shall meet the requirements for their intended use and shall be resistant to the action of the environment to which they are to be exposed.

4.3 Checking of manholes for tightness shall be carried out after their assembly on the vessel, simultaneously with testing of the compartment.

4.4 Bolts and nuts shall conform to the requirements of national standards.

4.5 Each manhole cover shall be provided with two M16 bolts to facilitate removal of the cover.

## 5 Marking

At the place indicated in the respective figure, each cover shall be marked to show the designation of the manhole (see clause 6).

## 6 Designation

The designation of the manhole includes its type, dimensions, cover thickness and the number of this International Standard.

Examples :

Manhole A 450 × 10 ISO 4146

for a round, low manhole, diameter  $D = 450$  mm, with cover of thickness  $S = 10$  mm.

Manhole E 500 × 400 × 24 ISO 4146

for an oval, high manhole with dimensions  $L \times B = 500$  mm × 400 mm, with cover of thickness  $S = 24$  mm.

7 Dimensions and numbers of fasteners

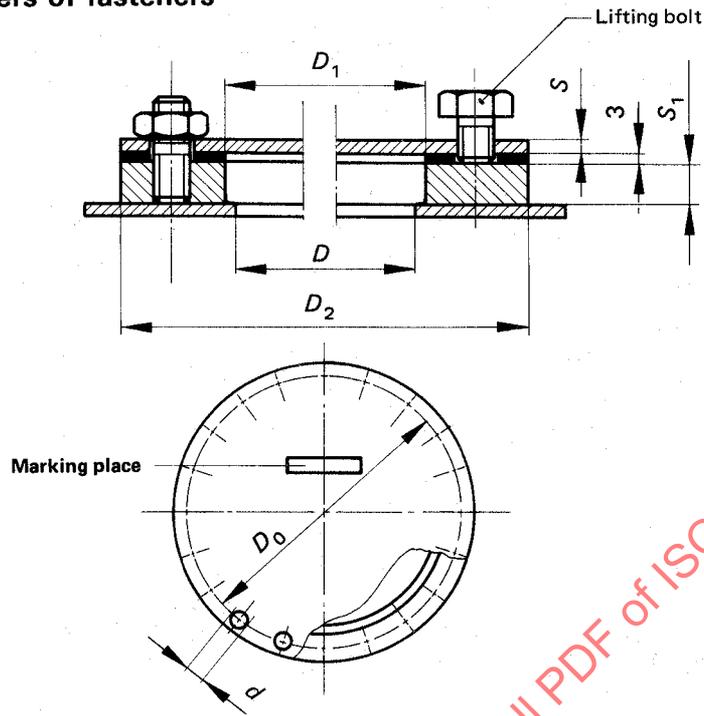


Figure 1 — Shape and principal dimensions of manholes, type A

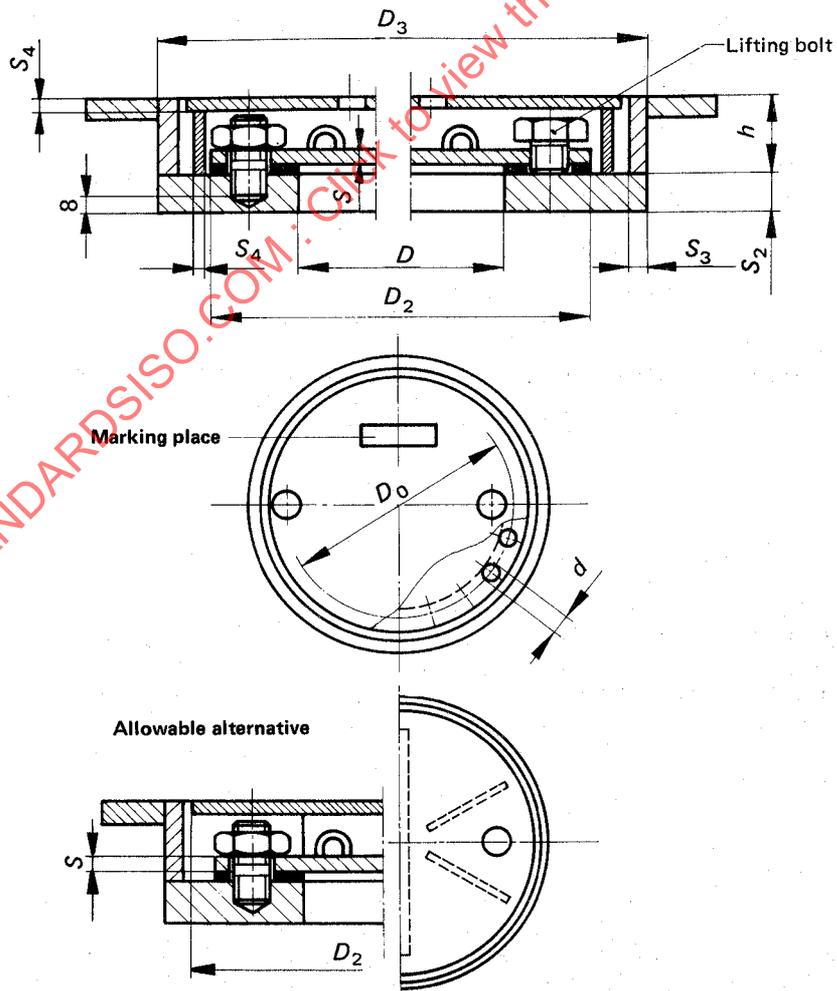


Figure 2 — Shape and principal dimensions of manholes, type B

Table 1 — Manholes, types A and B — Dimensions and number of fasteners

Dimensions in millimetres

D	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	d	h	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	Stud-bolt with nut		S
											Number	Size	
400	465	420	510	566	18	41	16	28	11	4	26	M16	4 6 8
				572					10				
	475		530	596	22	53	20	32	14	8	20	M20	12 14
				606					16 18				
450	515	470	560	616	18	41	16	28	11	4	28	M16	4 6 8
				622					10				
	525		580	646	22	53	20	32	14	8	20	M20	12 14
				654					16 18				
500	565	520	610	666	18	41	16	28	11	4	30	M16	4 6 8
				672					10				
	575		630	694	22	53	20	32	14	8	up to 24	M20	12 14
				702					16 18				
600	665	620	710	766	18	41	16	28	11	4	34	M16	4 6 8
				722					10				
	675		730	796	22	53	20	32	14	8	up to 24	M20	12 14
				804					16 18				

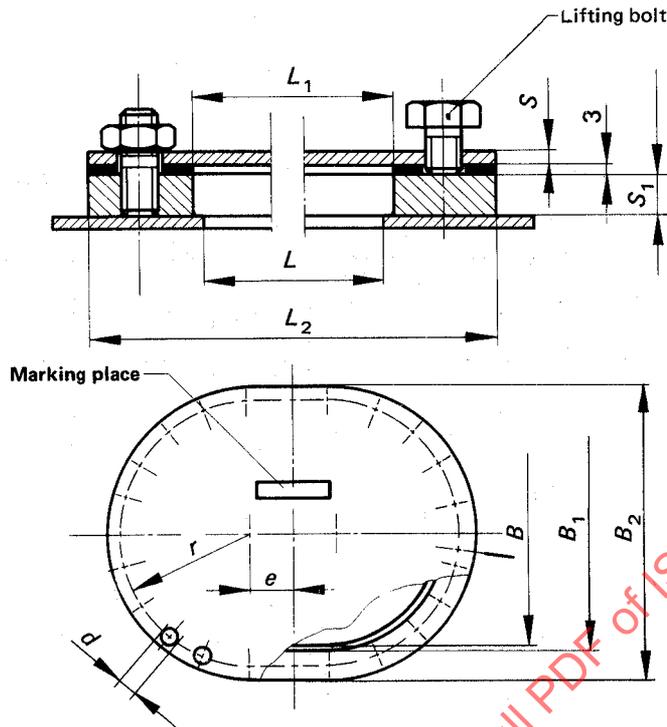


Figure 3 — Shape and principal dimensions of manholes, type C

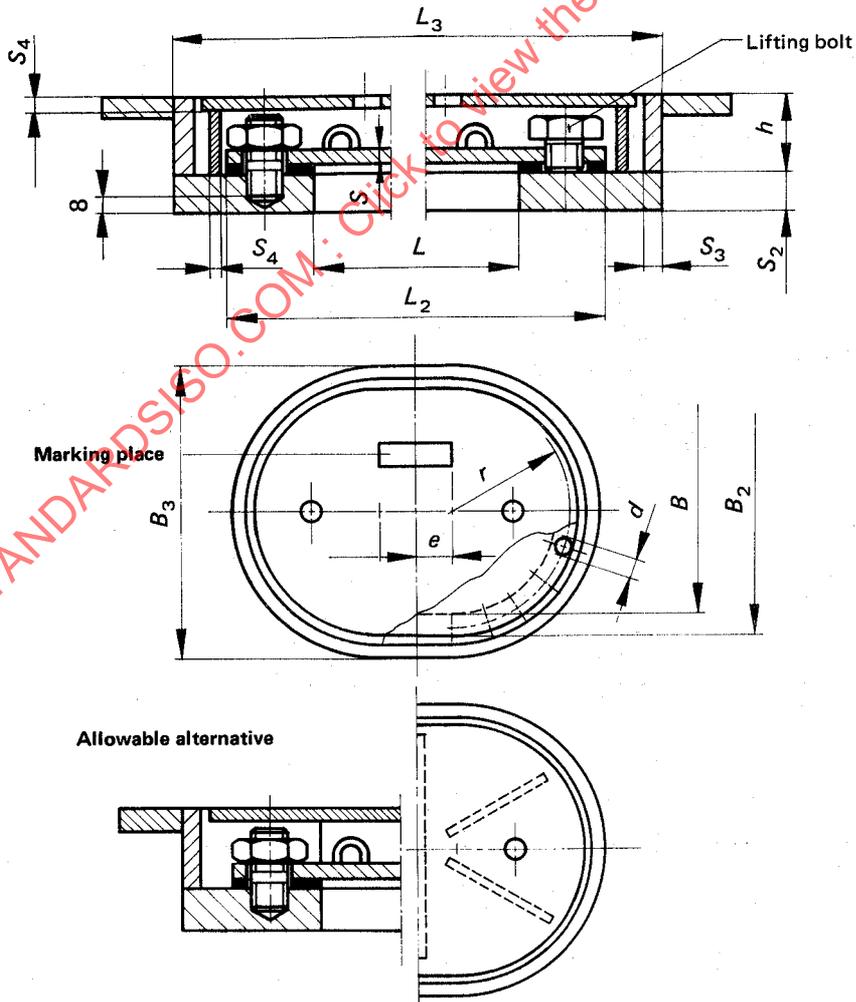


Figure 4 — Shape and principal dimensions of manholes, type D

Table 2 – Manholes, types C and D – Dimensions and number of fasteners

Dimensions in millimetres

$L \times B$	$B_1$	$B_2$	$B_3$	$L_1$	$L_2$	$L_3$	$d$	$e$	$h$	$r$	$S_1$	$S_2$	$S_3$	$S_4$	Stud-bolt with nut		$S$												
															Number	Size													
450 × 350	370	460	516	470	560	616	18	50	41	208	16	28	11	4	26	M16	4												
			522			622											6												
			546			646											8												
			544			654											10												
			480			558											580	658	22	58	213	20	32	18	20	8	20	M20	12
																													14
		578	678	63	68	30	20	22	26	28	30	20	8	20	M20	16													
																18	18												
		500 × 400	420	510	566	520	610	666	18	50	41	233	16	28	11	4	28	M16	4										
					572			672											6										
					596			696											8										
					604			704											10										
530	608				630			708											22	58	238	20	32	18	20	8	up to 24	M20	12
																													14
628	728			63	68	30	20	22	26	28	30	20	8	up to 24	M20	16													
																18	18												
600 × 450	470			560	616	620	710	766	18	75	41	258	16	28	11	4	32	M16	4										
					622			772											6										
					646			796											8										
					654			804											10										
		580	658		730			808											22	58	263	20	32	18	20	8	24	M20	12
																													14
		678	828	63	68	30	20	22	26	28	30	20	8	24	M20	16													
																18	18												
		678	828	63	68	30	20	22	26	28	30	20	8	24	M20	20													
																20	20												
		678	828	63	68	30	20	22	26	28	30	20	8	24	M20	24													
																24	24												
678	828	63	68	30	20	22	26	28	30	20	8	24	M20	28															
														28	28														
678	828	63	68	30	20	22	26	28	30	20	8	24	M20	30															
														30	30														