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**Ships and marine technology—Ship's
mooring and towing fittings—Steel rollers**

*Navires et technologie maritime — Corps-morts et ferrures de
remorquage de navires — Rouleaux en acier*

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Reference number
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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13755 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

Introduction

The steel roller is a type of ship's mooring fitting installed on board to lead the mooring rope from the ship's inboard to outboard as shipside roller fairleads and to change the direction of ropes as pedestal fairleads.

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Ships and marine technology — Ship's mooring and towing fittings — Steel rollers

1 Scope

This International Standard specifies the design, size and technical requirements for steel rollers installed to lead the mooring rope of a ship.

2 Normative references

The following referenced documents are indispensable for the application 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 13767, *Ships and marine technology — Ship's mooring and towing fittings — Shipside roller fairleads*

ISO 13776, *Ships and marine technology — Ship's mooring and towing fittings — Pedestal fairleads*

IMO Circular MSC/Circ.1175, *Guidance on shipboard towing and mooring equipment*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

safe working load

SWL

maximum load in kN on the rope that should normally be applied in service conditions

4 Classification

4.1 Type

Depending on the construction, steel rollers shall be classified as the following three types:

- type A: made of steel casting without upper dust cover;
- type B: made of steel casting with upper dust cover;
- type C: made of steel plate with dust cover.

4.2 Nominal sizes

The nominal sizes, D_n , of steel rollers are denoted by reference to the outside diameter of the roller in millimetres from a basic series of preferred numbers.

The nominal sizes are: 150, 200, 250, 300, 350, 400, 450 and 500.

5 Dimensions

Steel rollers have dimensions and particulars in accordance with Tables 1, 2, 3 and 4, and Figures 1, 2, 3, 4, 5, 6, 7 and 8.

6 Materials

The materials of the following components shall be used for manufacturing the steel rollers:

- Roller: steel casting having a yield point of not less than 205 N/mm² or steel plates having a yield point of not less than 235 N/mm².
- Axle: weldable steel casting having a yield point of not less than 350 N/mm² or equivalent.
- Bush: brass, bronze or equivalent.

7 Construction

7.1 The rollers of the steel rollers (Type C) shall be constructed from steel tubes or formed from plate.

7.2 The foundation of the steel rollers shall be determined by the manufacturer in accordance with ISO 13767 and ISO 13776. The foundation and welding connections shall be guaranteed reliable transmission of the maximum loading of the steel rollers to hull construction without any plastic deformation or cracks.

8 Manufacturing and inspection

8.1 All surfaces of the steel rollers, including welding, shall be free from any visible flaws or imperfections.

8.2 All surfaces in contact with the ropes shall be free from surface roughness or irregularities likely to cause damage to the ropes by abrasion.

8.3 The steel rollers shall be coated externally with an anti-corrosion protective finish.

8.4 All rotating parts are to be provided with greasing.

9 Marking

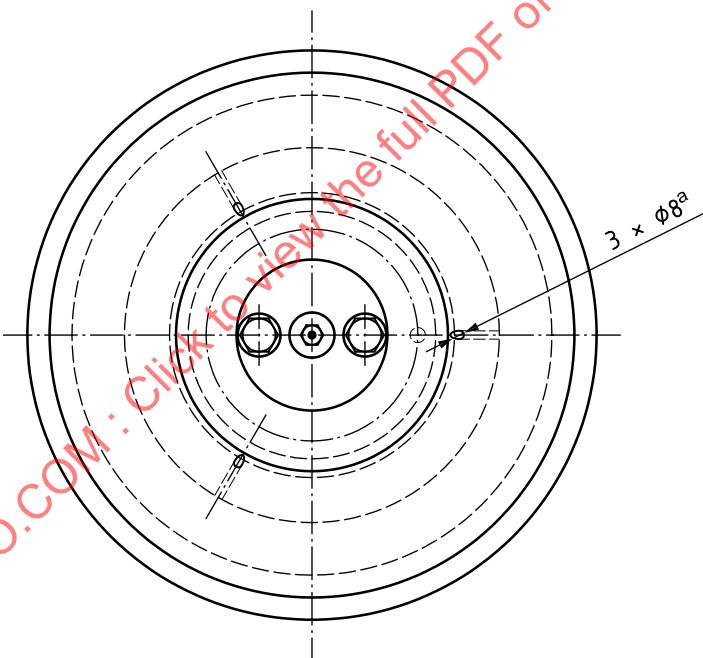
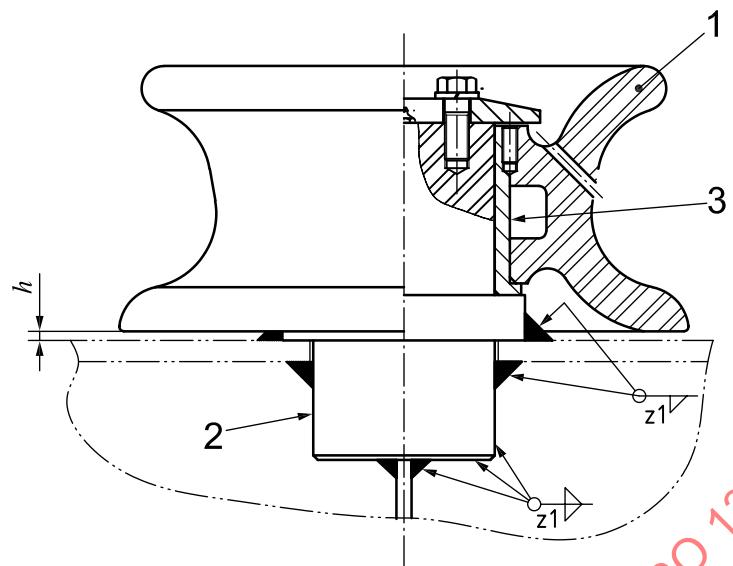
9.1 The safe working load (SWL) for the intended use for the steel rollers shall be noted in the towing and mooring plan available on board for the guidance of the shipmaster as specified in MSC/Circ.1175.

9.2 The actual SWL on board shall be determined by considering the foundation and under deck reinforcement, and it shall be marked on the towing and mooring plan. The actual SWL shall not be over the SWL indicated in this International Standard.

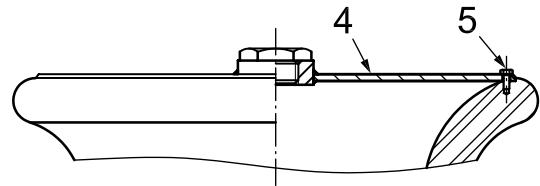
9.3 The steel rollers shall be clearly marked on their seat or foundation with their SWL by weld bead or equivalent. The SWL shall be expressed in tonnes (letter 't') and be placed so that it is not obscured during operation of the fitting.

EXAMPLE SWL XXX t

Dimensions in millimetres



a) Type A



b) Type B

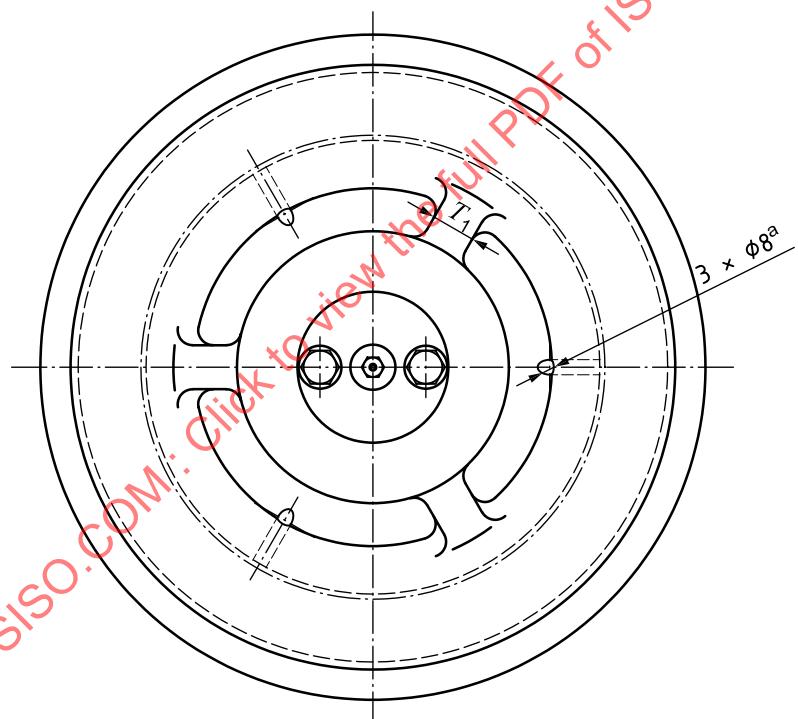
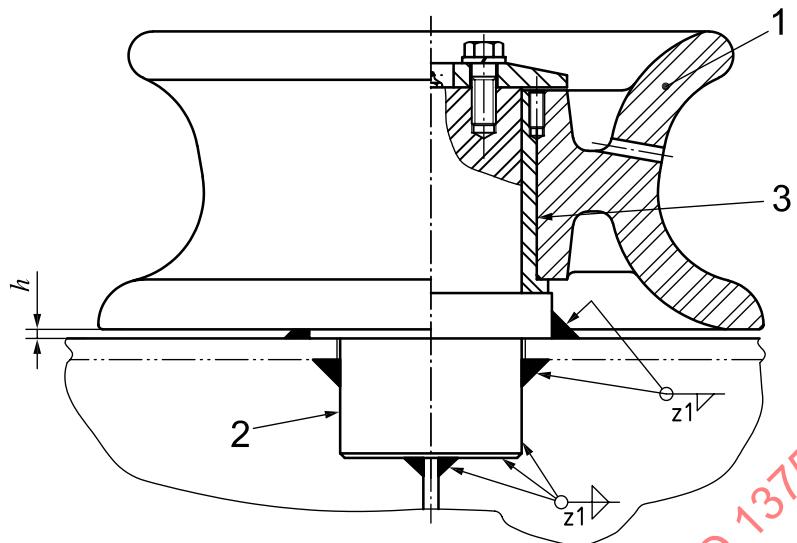
Key

- 1 roller
- 2 axle
- 3 bush
- 4 dust cover to apply on type B only
- 5 N-M6 bolt
- a Drain hole.

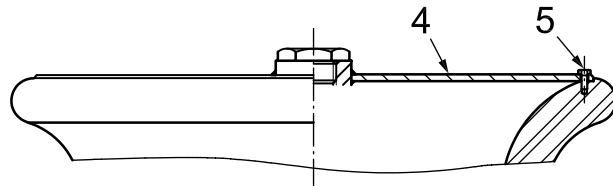
Figure 1 — Assembly of steel rollers for nominal sizes 150, 200 and 250 (type A and type B)

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Dimensions in millimetres



a) Type A

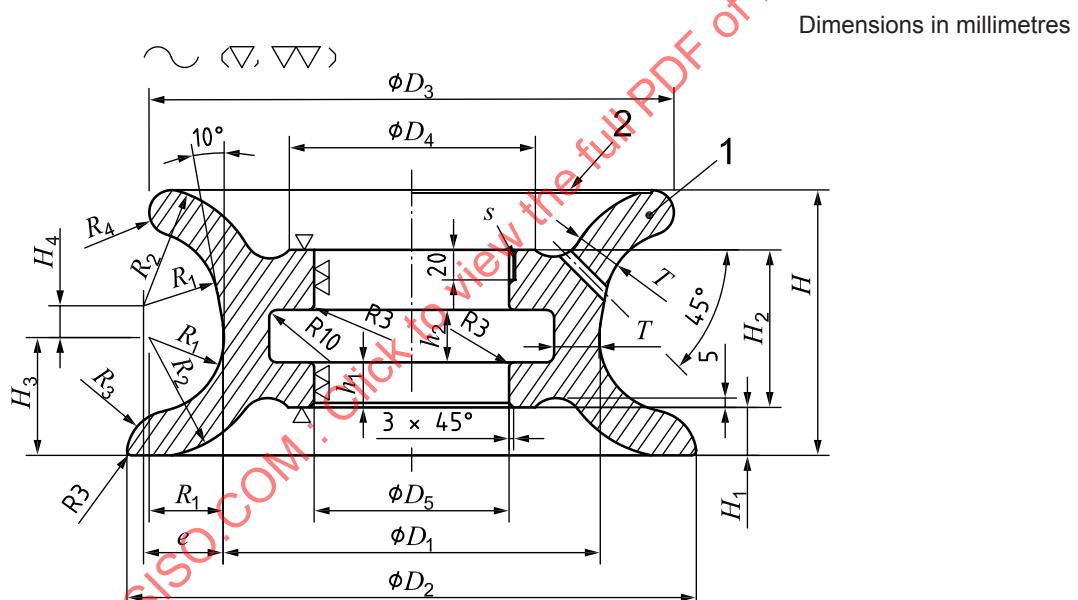


b) Type B

Key

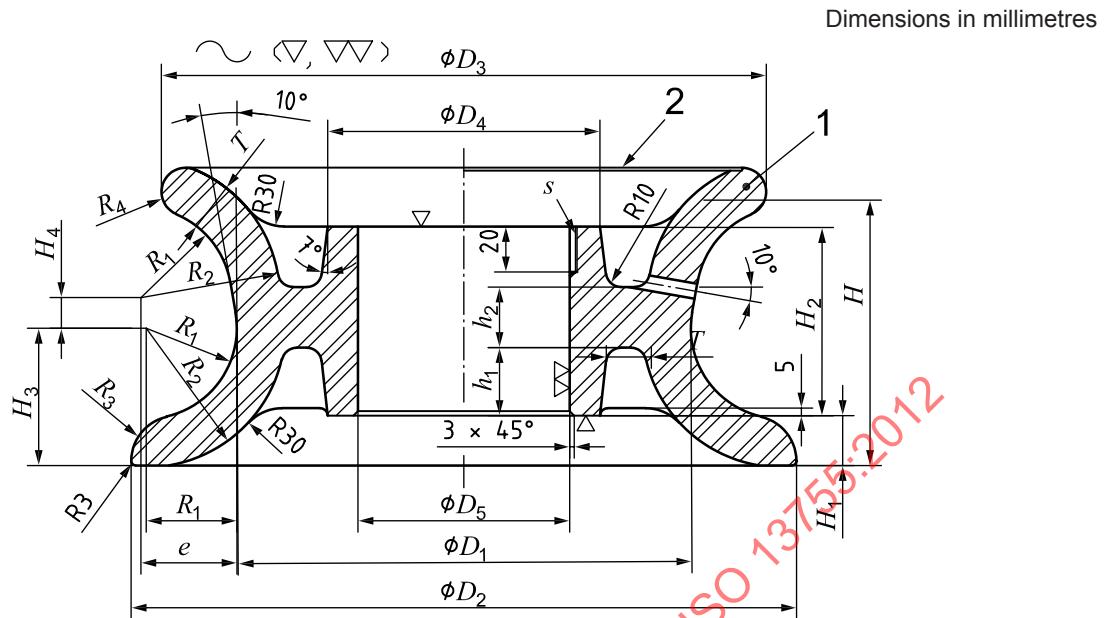
- 1 roller
- 2 axle
- 3 bush
- 4 dust cover to apply on type B only
- 5 N-M6 bolt
- a Drain hole.

Figure 2 — Assembly of steel rollers for nominal sizes 300 and above (type A and type B)

**Key**

- 1 roller
- 2 dust cover to apply on type B only

Figure 3 — Detail of steel rollers for nominal sizes 150, 200 and 250 (type A and type B)

**Key**

1 roller
2 dust cover to apply on type B only

Figure 4 — Detail of steel rollers for nominal sizes 300 and above (type A and type B)**Table 1 — Dimensions and SWL of steel rollers for type A and type B**

Dimensions in millimetres

Nominal size <i>D_n</i>	<i>D₁</i>	<i>D₂</i> +2/0	<i>D₃</i> +2/0	<i>D₄</i>	<i>D₅</i> H7	<i>R₁</i>	<i>R₂</i>	<i>R₃</i>	<i>R₄</i>	<i>H</i>	<i>H₁</i>	<i>H₂</i>	<i>H₃</i>	<i>H₄</i>	<i>e</i>
150	150	230	216	110	90	30	52	15	11	137	25	84	44,7	43,38	37,7
Nominal size <i>D_n</i>	<i>h</i>	<i>h₁</i>	<i>h₂</i>	Set screw	<i>T</i>	<i>T₁</i>	<i>N</i>	Welding leg length		SWL ^b				Calculated weight ^c (kg/set)	
<i>D_n</i>				<i>s</i>				<i>z₁</i>		(kN)	(t)	(kN)	(t)	Type A	Type B
150	5	35	25	M6	22	-	6	8		265	27	186	19	23	24
200	5	38	35	M6	26	-	6	10		441	45	314	32	42	43
250	6	40	35	M8	30	-	6	11		579	59	412	42	77	80

^a θ is the relative angle of ropes on the steel roller (refer to Annex A).^b The SWL is the maximum applicable rope tension based on 90° ($\theta = 90^\circ$) and 180° ($\theta = 0^\circ$) deflection of rope direction by steel roller.

The SWLs shown in this table are for reference only. These are based on the loadings as mentioned in Annex A.

The "SWL" may be adjusted depending on the actual loading conditions, and the actual marking shall be as agreed between the user and the manufacturer.

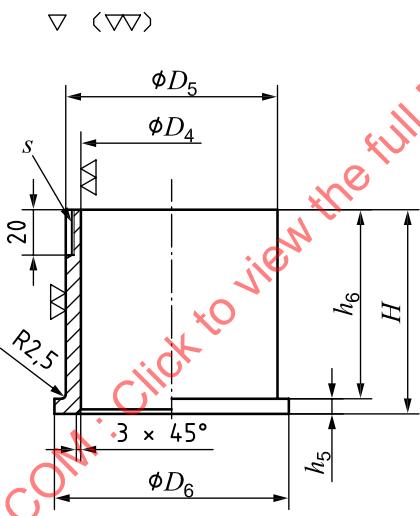
^c The calculated weight is for reference only.

Table 1 (continued)

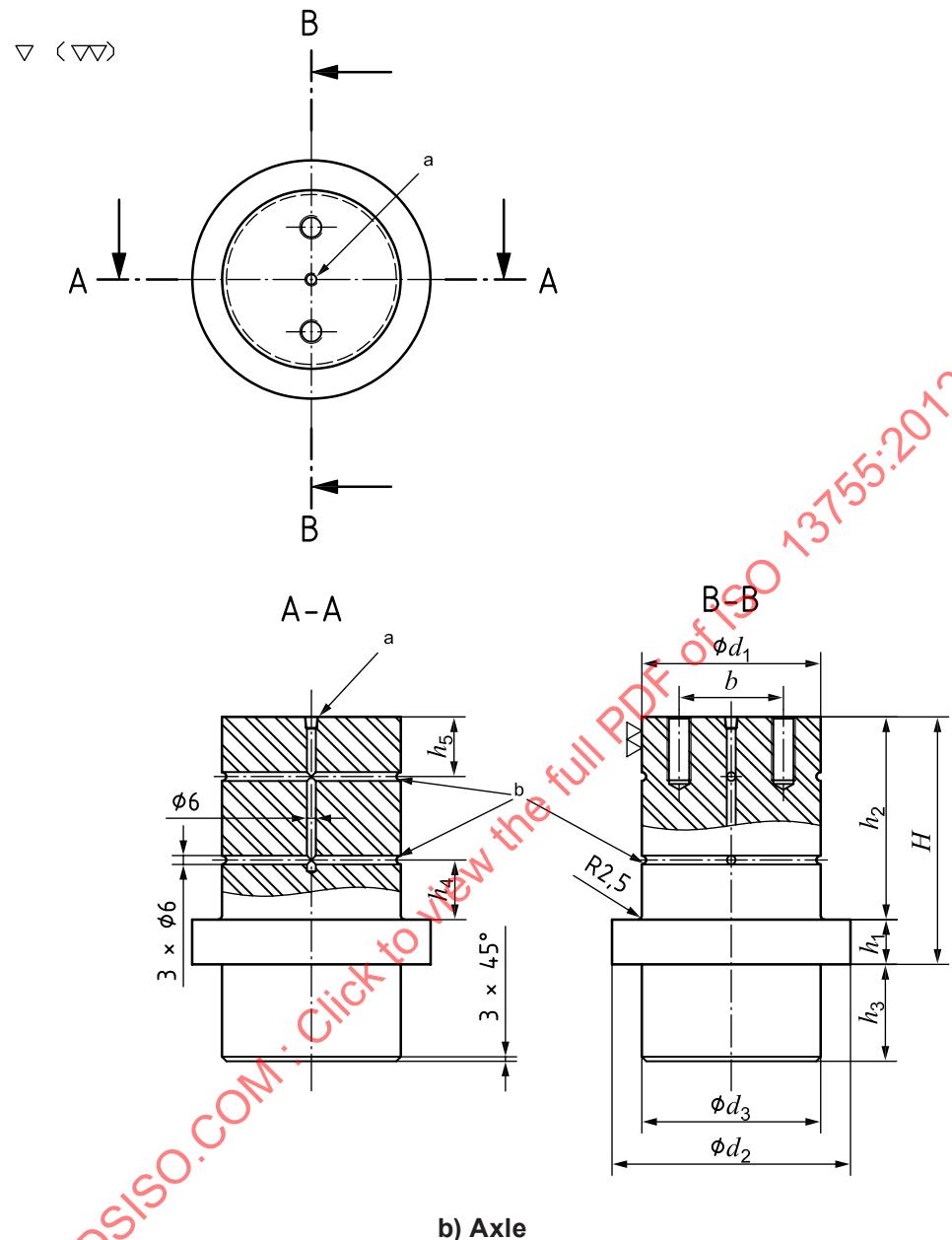
Nominal size D_n	D_1	D_2 +2/0	D_3 +2/0	D_4	D_5 H7	R_1	R_2	R_3	R_4	H	H_1	H_2	H_3	H_4	e
300	7	45	40	M8	32	29	8		12	726	74	510	52	109	112
350	7	50	45	M8	34	29	8		15	1 040	106	736	75	154	160
400	7	53	49	M8	36	30	12		17	1 246	127	883	90	207	215
450	7	57	53	M8	38	32	12		20	1 599	163	1 128	115	275	286
500	7	65	60	M8	40	34	12		23	1 942	198	1 373	140	360	374

^a θ is the relative angle of ropes on the steel roller (refer to Annex A).
^b The SWL is the maximum applicable rope tension based on 90° ($\theta = 90^\circ$) and 180° ($\theta = 0^\circ$) deflection of rope direction by steel roller.
The SWLs shown in this table are for reference only. These are based on the loadings as mentioned in Annex A.
The "SWL" may be adjusted depending on the actual loading conditions, and the actual marking shall be as agreed between the user and the manufacturer.
^c The calculated weight is for reference only.

Dimensions in millimetres



a) Bush



a Thread for grease nipple.
 b Grease way.

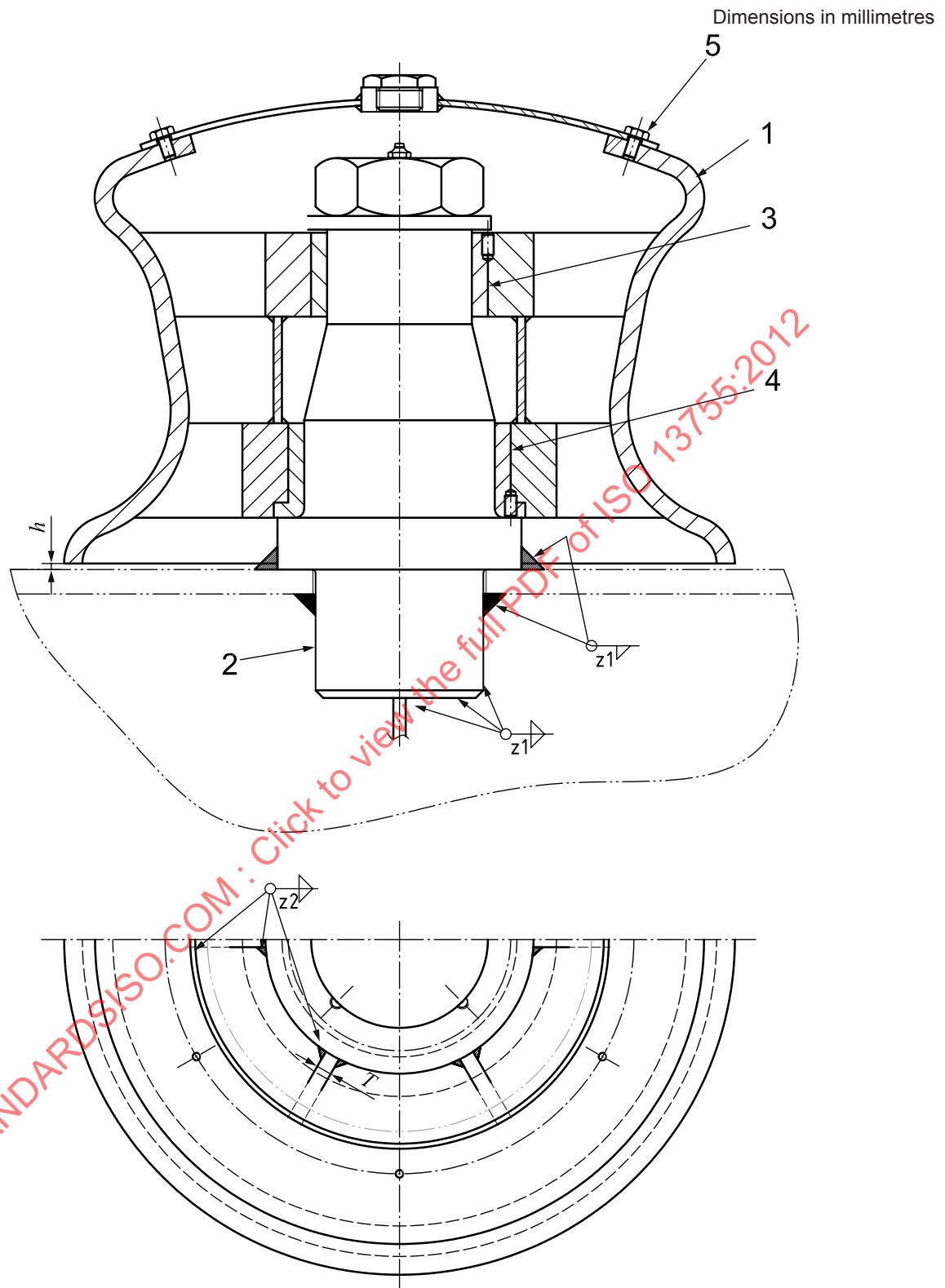
Figure 5 — Detail of axle and bush for steel rollers (type A and type B)

Table 2 — Dimensions of axle and bush for steel rollers (type A and type B)

Dimensions in millimetres

Nominal size D_n	Axe										Bush							
	d_1 f6	d_2	d_3	H	h_1	h_2	h_3	h_4	h_5	b	$m \times d$	D_4 H7	D_5 m6	D_6	H	h_5	h_6	s
150	71	105	71	115	22	93		25	7	50	M10 × 20	71	90	105	92,5	8	84,5	M6
200	93	135	93	135	27	108	100	27	7	55		93	115	135	107,5	8	99,5	
250	113	155	113	144		114		28	9	65	M16 × 30	113	135	155	113,5	8	105,5	M8
300	128	175	128	166	30	136	125	30	12	75		128	150	175	135,5	10	125,5	
350	145	190	145	181		151		35	13	85	M20 × 40	145	167	190	150,5	10	140,5	
400	154	200	154	201		161		37	14	90		154	177	200	160,5	10	150,5	
450	167	220	167	213	40	173	150	40	15	105	M24 × 50	167	190	220	172,5	10	162,5	
500	178	235	178	232		191		45	16	110		178	205	235	190,5	10	180,5	

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**Key**

- 1 roller
- 2 axle
- 3 upper bush
- 4 lower bush
- 5 N-M6 bolt

Figure 6 — Assembly of steel rollers for type C

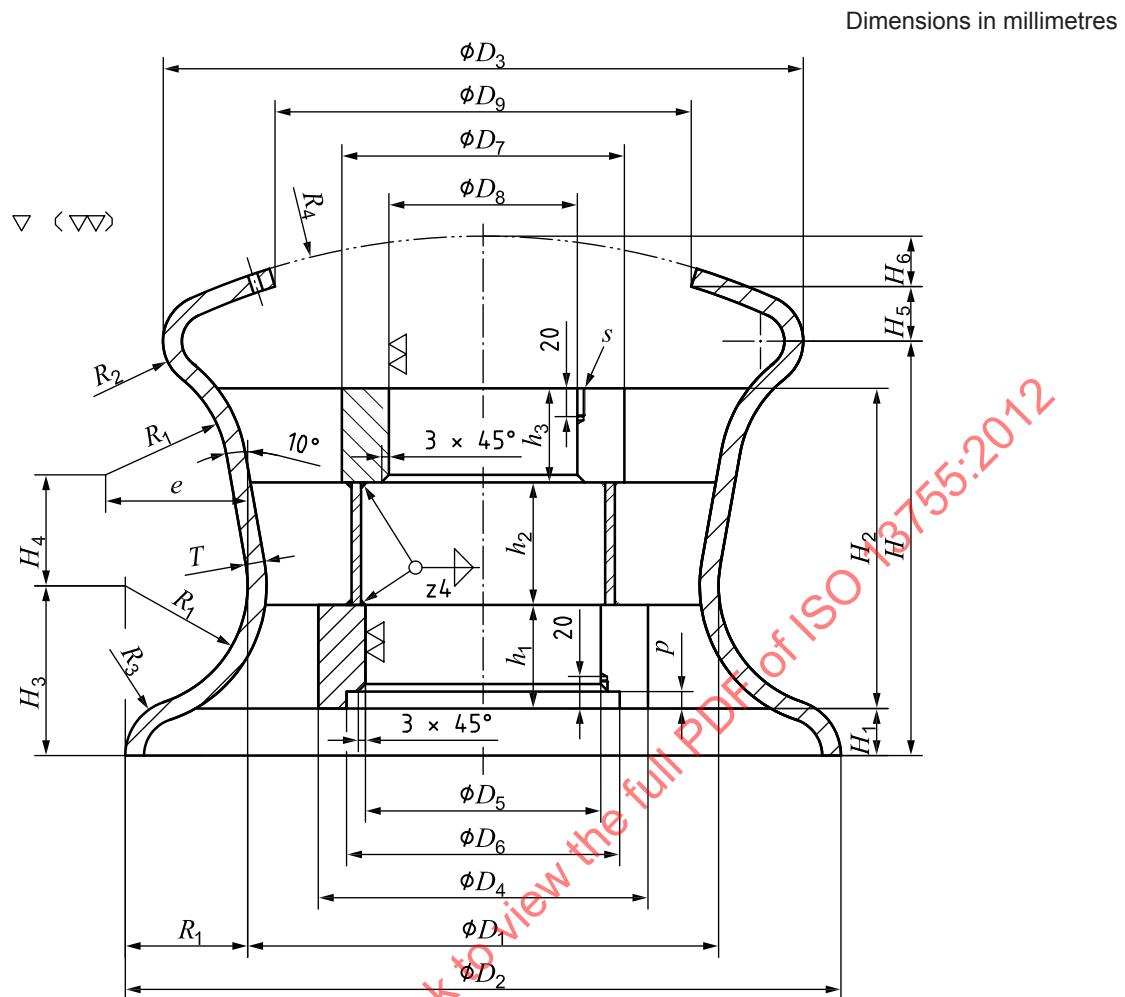


Figure 7 — Detail of steel rollers for type C

Table 3 — Dimensions and SWL of steel rollers for type C

Dimensions in millimetres

Nominal size <i>D_n</i>	<i>D₁</i>	<i>D₂</i> +2/0	<i>D₃</i> +2/0	<i>D₄</i>	<i>D₅</i> H7	<i>D₆</i>	<i>D₇</i>	<i>D₈</i> H7	<i>D₉</i>	<i>R₁</i>	<i>R₂</i>	<i>R₃</i>	<i>R₄</i>	<i>H</i>	<i>H₁</i>
150	150	230	220	121	95	110	121	69	140	40	17	20	214	150	16
200	200	300	280	162	118	140	144	86	190	50	21	25	279	185	21
250	250	370	340	186	136	160	162	97	250	60	25	30	327	220	25
300	300	430	400	209	149	180	175	114	300	65	28	32	446	240	30
350	350	490	455	236	172	195	198	130	350	70	30	35	537	260	35
400	400	560	520	254	184	207	215	145	400	80	40	40	680	280	40
450	450	620	580	269	199	225	230	160	450	85	45	42	797	292	45
500	500	680	640	293	217	240	254	178	500	90	50	45	885	305	50
Nominal size <i>D_n</i>	<i>H₂</i>	<i>H₃</i>	<i>h₄</i>	<i>H₅</i>	(<i>H₆</i>)	<i>e</i>	<i>h</i>	<i>h₁</i>	<i>h₂</i>	<i>h₃</i>	<i>p</i>	Set screw	<i>T</i>	<i>T₁</i>	<i>N</i>
												<i>s</i>			
150	115	56,6	44,92	18,0	22,4	47,9	5	35	45	35	7	M6	10	10	6
200	140	70,7	56,27	22,8	27,3	59,9	5	45	55	40	8	M6	10	10	6
250	170	84,9	67,89	26,4	35,7	72,0	6	55	65	50	9	M8	10	10	6
300	187	91,6	74,25	26,3	38,8	78,1	7	62	70	55	10	M8	12	12	8
350	203	99,0	82,6	23,8	46,3	84,6	7	68	75	60	11	M8	16	16	8
400	220	113,1	71,3	29,0	50,0	92,6	7	75	80	65	11	M8	19	19	12
450	238	119,9	67,31	33,8	52,3	96,9	7	87	81	70	11	M8	19	19	12
500	251	127,3	63,7	36,9	58,0	101,2	7	87	89	75	12	M8	21	21	12

Table 3 (continued)

Dimensions in millimetres

Nominal size <i>D_n</i>	Welding leg length		SWL ^b				Calculated weight ^c (kg/set)
			$\theta = 90^\circ$ ^a		$\theta = 0^\circ$		
	<i>z₁</i>	<i>z₂</i>	(kN)	(t)	(kN)	(t)	Type C
150	8	7	265	27	186	19	21
200	10	8	441	45	314	32	37
250	11	8	579	59	412	42	56
300	12	10	726	74	510	52	86
350	15	10	1 040	106	736	75	127
400	17	12	1 246	127	883	90	174
450	20	12	1 599	163	1 128	115	215
500	23	14	1 942	198	1 373	140	253

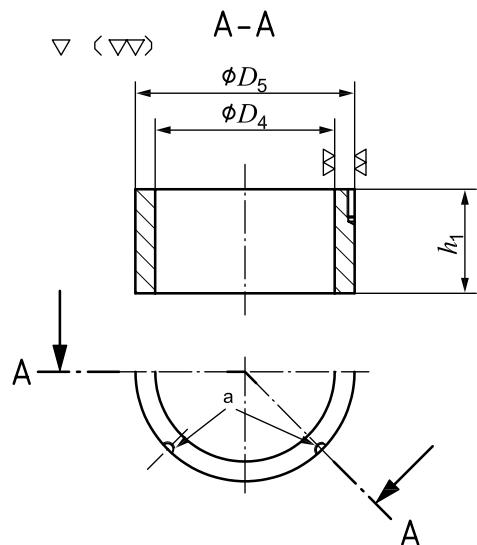
^a θ is the relative angle of ropes on the steel roller (refer to Annex A).^b The SWL is the maximum applicable rope tension based on 90° ($\theta = 90^\circ$) and 180° ($\theta = 0^\circ$) deflection of rope direction by steel roller.

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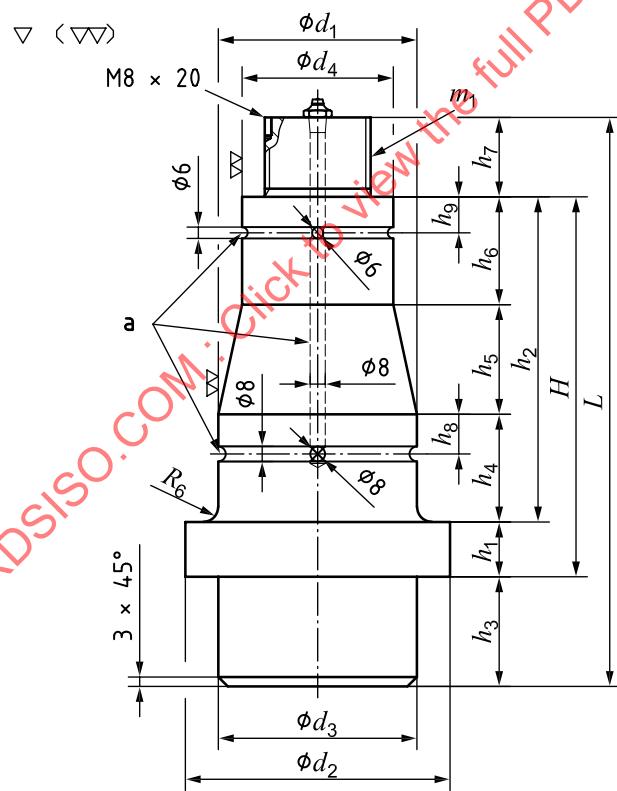
^c The calculated weight is for reference only.

Dimensions in millimetres



a) Upper bush

a 4-set screw.



b) Axle

a Grease way.