
International Standard



7365

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

Shipbuilding and marine structures — Deck machinery — Towing winches for deep sea use

Construction navale et structures maritimes — Auxiliaires de pont — Treuils de remorque en haute mer

First edition — 1983-07-01

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UDC 621.864 : 629.12

Ref. No. ISO 7365-1983 (E)

Descriptors : shipbuilding, decks, machinery, winches, characteristics, acceptance inspection.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (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 authorized 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.

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International Standard ISO 7365 was developed by Technical Committee ISO/TC 8, *Shipbuilding and marine structures*, and was circulated to the member bodies in April 1982.

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

Austria	France	Netherlands
Belgium	Germany, F.R.	Norway
Brazil	India	Poland
China	Italy	Romania
Cuba	Japan	United Kingdom
Czechoslovakia	Korea, Dem. P. Rep. of	USSR
Egypt, Arab Rep. of	Korea, Rep. of	
Finland	Mexico	

No member body expressed disapproval of the document.

Shipbuilding and marine structures — Deck machinery — Towing winches for deep sea use

1 Scope and field of application

This International Standard specifies the characteristics of towing winches, having electric, hydraulic, diesel or steam drive, which fulfill the functions of hauling, veering, holding and storing towing rope on drum(s). Bollard pull is stated in the table.

It does not consider fibre rope handling gear but does not exclude its use.

2 References

ISO 2408, *Steel wire ropes for general purposes — Characteristics*.

ISO 3828, *Shipbuilding and marine structures — Deck machinery — Vocabulary*.¹⁾

ISO 6482, *Shipbuilding — Deck machinery — Warping end profiles*.

3 Definitions

For the purpose of this International Standard, the definitions given in ISO 3828 apply, with the following exceptions.

3.1 nominal size : Nominal size, which corresponds to the drum load as given in table 2, is used as a designation of a winch in accordance with this International Standard.

3.2 Loads

3.2.1 rendering load : The maximum rope tension, in kilonewtons, at the drum exit when the drum just starts to rotate in the opposite direction to the applied driving torque, the prime mover being set for limited torque, with a first layer of the rope wound on the drum.

3.2.2 maximum bollard pull (MBP) : The maximum static pull which the vessel can produce in a harbour trial measured against a bollard.

3.3 Types of winches (see the figure)

3.3.1 right-hand winch : A winch where the reduction gear or drive of the drum(s) is on the right-hand side of the drum(s), in relation to an observer situated on the side of the motor, power supply or local controller (in the case of a symmetrical winch).

3.3.2 left-hand winch : A winch where the reduction gear or drive of the drum(s) is on the left-hand side of the drum(s), in relation to an observer situated on the side of the motor, power supply or local controller (in the case of a symmetrical winch).

3.3.3 A towing winch may be designed in different forms :

— single (L1 and R1);

— double in line or waterfall (L2, R2, C2, L2W and R2W);

— triple (R3W, L3W and B3W).

4 Design and operation

4.1 Material stresses

The manufacturer of the winch shall be responsible for determining the strength requirements of the component parts of the winch to withstand all loads of the respective nominal sizes, as specified in table 2.

4.2 Basic calculation

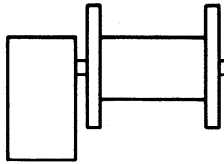
4.2.1 Stalling load of the winch

The allowable calculated stresses of any part of the winch, based on simple elastic theory, shall not be greater than 0,55 times the 0,2 % proof stress of the material.

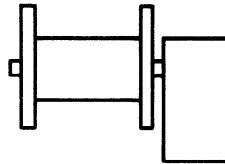
4.2.2 Rendering load of the winch

The allowable stresses in the affected parts shall not be greater than 0,85 times the 0,2 % proof stress of the material.

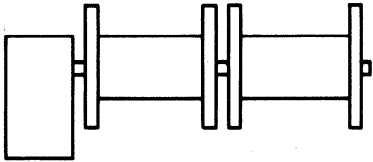
¹⁾ At present at the stage of draft. (Revision of ISO 3828-1976.)



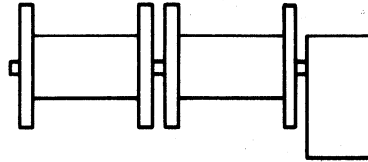
Single left-hand winch (L1)



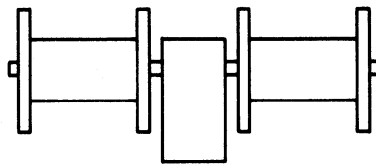
Single right-hand winch (R1)



Double left-hand winch (L2)



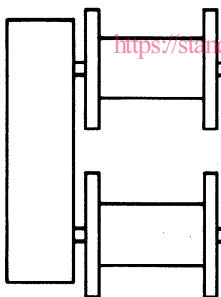
Double right-hand winch (R2)



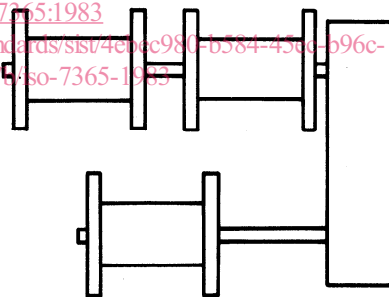
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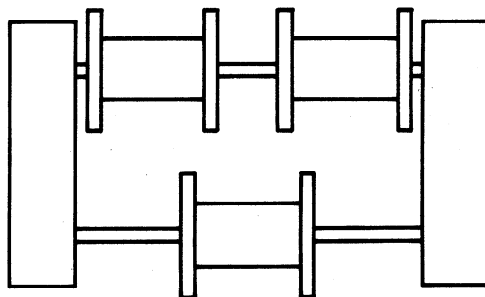
Double central winch (C2)



Double left-hand waterfall winch (L2W)



Triple right-hand waterfall winch (R3W)



Triple waterfall winch operable from both sides (B3W)

Figure — Examples of winch arrangements

4.2.3 Holding load of the winch

The allowable calculated stresses of the affected parts shall not be greater than 0,70 times the 0,2 % proof stress of the material.

NOTE — If the loading conditions detailed in 4.2.2 and 4.2.3 can occur simultaneously the allowable stresses for these combined conditions shall not exceed 0,85 times the 0,2 % proof stress of the material.

4.3 Load limiting device

Provision shall be made to incorporate a load limiting device to reduce the rendering load to a maximum of 0,5 times the breaking strength of the rope in service (see 4.5.1.1 and 5.1.2).

4.4 Brakes

4.4.1 Electric winches shall be provided with an automatic braking system which operates when the controls are put to the stop or braking position, and also when there is no tension on the winch. The brake shall be capable of holding a load of 1,25 times the drum load and of stopping the rotation of the drum from its maximum speed without suffering damage. For other types of drive, a suitable braking system shall be agreed upon between the manufacturer and purchaser. Such a system shall be capable of holding a load of 1,25 times the drum load.

4.4.2 All winches shall be provided with a drum brake (towing brake) capable of maintaining a load of 2,5 times the maximum static bollard pull (see 3.2.2) without torque from the prime mover, with a minimum not less than the breaking strength of the rope according to table 2. If this brake is power operated it shall in addition be capable of manual operation (see 4.5.1.2 and table 2).

4.5 Drum design

4.5.1 Design basis rope

4.5.1.1 For design purposes the drum shall be based on a Warrington-Seale steel-cored rope manufactured from 1 770 N/mm² tensile grade steel rope in accordance with table 10 (column 8) of ISO 2408.

NOTE — This requirement does not preclude the use of other types of rope in service.

4.5.1.2 The design basis rope size shall be such that its minimum breaking strength in kilonewtons shall be as given in table 1.

Table 1 — Rope minimum breaking strength

Maximum bollard pull (MBP) kN	Minimum breaking strength
< 300	3,5 × MBP
300 to 800	2,75 × MBP
> 800	2,25 × MBP

4.5.2 Drum diameter

The drum diameter shall not be less than 16 times the diameter of the design basis rope, as specified in column 10 of table 2.

4.5.3 Drum capacity

For guidance, normal capacity is given in column 11 of table 2. Individual requirements may be specified by the purchaser.

4.5.4 Drum length

The drum shall be designed to accommodate at least 50 m of steel cable on the inner layer so that during towing operation there is enough frictional resistance of the steel cable to enable a sufficient length to be paid out during unintentional brake slip.

4.5.5 Drum flange height

The flanges shall be sufficiently high to reel in the appropriate rope length.

4.5.6 Rope attachment

The rope attachment to the drum shall be sufficiently weak to break if the rope has to be released in an emergency.

4.5.7 Drum clutch

The drum shall be declutchable.

4.6 Auxiliary equipment

4.6.1 Rope guide

An automatically or manually controlled rope guide may be fitted on the drum if agreed between the manufacturer and the purchaser.

4.6.2 Warping ends

A winch may be specified with or without warping ends. If warping ends are fitted for manual handling of hawser or steel rope, the pull on these shall not exceed 100 kN. The diameters shall be according to ISO 6482.

4.6.3 Load measuring device

Winches shall be so designed and/or instrumented, if agreed between the manufacturer and purchaser, that it is possible at any time to determine the loads on the steel rope from the drum during hoisting, rendering or braking operations.

Instruments showing this load shall be located on the winch control panel and in the wheel-house.

4.7 Speed control

4.7.1 Winch speed

The speed of the winch shall be adjustable between stop and maximum within each gear step. It shall be possible to adjust the speed while the winch is working.

4.7.2 Direction of motion of operating devices

The rope shall be hauled in by a clockwise movement of a hand-wheel or crank handle, or alternatively by movement of a hand-lever towards the operator.

4.7.3 Return to stop position

Unless agreed otherwise between manufacturer and purchaser, whatever the type of motive power, the operating device shall be designed to return to the stop position automatically when the operator releases the control.

4.8 Emergency release

4.8.1 The winch shall be designed to allow drum release in an emergency when hauling or rendering, or when the drum brake is applied. A maximum delay of 10 s from the moment the release is actuated to the drum being disengaged is acceptable.

4.8.2 Emergency means of releasing the drums shall be provided in the wheel-house, if agreed between the manufacturer and purchaser.

When the ship has a wide wheel-house, it shall be possible to effect emergency release from either starboard or port. Furthermore, all winch control panels shall be equipped to effect emergency release.

4.8.3 The emergency release shall be effected by the actuation of one identical control in all situations, even if the usual power sources should fail.

It shall always be possible to carry out the emergency release sequence (application of brake/emergency release), even during a black-out.

4.8.4 After an emergency release, the winch brakes shall again function normally at once. The winch motor shall not re-engage automatically after an emergency release.

4.8.5 Control handles, buttons etc. for emergency release shall be protected against unintentional operation.

NOTE — Attention is drawn to the existence in certain countries of national safety regulations affecting winch control and emergency release.

5 Performance

5.1 Load requirements

The towing winch shall be capable of exerting hauling, holding,

stalling and rendering loads according to its nominal size, as specified in table 2 and within the limitations given in 5.1.1 and 5.1.2.

5.1.1 Holding load

The holding load shall not be less than 2,5 times the maximum bollard pull (see 3.2.2) of the ship, with a minimum not less than the breaking strength of the rope according to table 2 (see 4.4.2).

5.1.2 Rendering load

The rendering load shall not be more than 0,5 times the breaking strength of the rope in service.

5.2 Speeds

Speeds shall be in accordance with table 2.

6 Acceptance tests

The following factory tests shall be carried out before acceptance by the purchaser (see note 1).

6.1 Drum brake holding test

The drum shall not rotate when a torque on the drum equal to the stated brake holding torque is applied.

6.2 Operation under load

The drum load of the winch shall be hauled and veered for 15 min continuously.

During the test the following shall be checked :

- measurement of actual speed;
- abnormal temperature of bearings;
- power consumption;
- operation of controls;
- abnormal noise;
- proper operation of rope guide, if so equipped.

6.3 Control gear

The proper operation of control gear, automatic braking systems and measuring instruments (if so equipped) shall be checked.

6.4 Emergency control

Emergency release from towing force and with the brakes fully applied shall be tested from all the operating positions from which the emergency release can be actuated, with the towing line to both sides and aft.

Emergency release shall also be demonstrated when the winch is hauling and rendering.

NOTES

- 1 These tests may take place at the factory or on board, as agreed by the manufacturer and purchaser.
- 2 Attention is drawn to the requirements of national authorities or classification societies.

7 Designation

Towing winches conforming to this International Standard shall be designated as follows, in the order given :

- towing winch;
- number of this International Standard;

- type of drive (E - electric, H - hydraulic, S - steam, RICE - reciprocating internal combustion engine);
- nominal size (according to table 2);
- operating side of winch (see 3.3.3) (B - both sides, C - central, R - right-handed, L - left-handed);
- drum arrangement (see 3.3.3) (1 - single drum, 2 - double drum in line, 2W - double drum waterfall, 3 - triple drum in line, 3W - triple drum waterfall).

Example :

Designation of a towing winch for deep sea use, hydraulically powered, of nominal size 25, right-handed, with a double waterfall drum :

Towing winch ISO 7365 - H - 25 - R - 2W

Table 2 – Performance data

1	2	3	4	5	6	7	8	9	10	11
Nominal size	Drum load	Nominal speed	Light line speed	Creep speed	Maximum bollard pull (MBP) (see 3.2.2)	Design basis rope diameter (see 4.5.1)	Breaking strength of rope (see 4.5.1)	Holding load (see 5.1.1)	Drum diameter (see 4.5.2)	Drum capacity (see 4.5.3)
	kN	min. m/s	min. m/s	max. m/s	kN	mm	min. kN	min. kN	min. mm	mm
10	100	0,125	0,25	0,05	87	22	305	305	352	450
16	160	0,125	0,25	0,05	141	28	494	494	448	500
20	200	0,125	0,25	0,05	162	30 ¹⁾	567	567	480	500
25	250	0,125	0,25	0,05	184	32	646	646	512	550
32	320	0,125	0,25	0,05	233	36	817	817	576	600
40	400	0,08	0,16	0,04	367	40	1 010	1 010	640	750
56	560	0,08	0,16	0,04	527	48	1 450	1 450	768	750
63	630	0,08	0,16	0,04	596	52	1 710	1 710	832	850
80	800	0,08	0,16	0,04	880	56	1 980	2 200	896	1 000
100	1 000	0,08	0,16	0,04	1 278	64 ²⁾	2 875	3 195	1 024	1 000
125	1 250	0,08	0,16	0,04	1 528	70 ²⁾	3 439	3 820	1 120	1 200
140	1 400	0,08	0,16	0,04	1 850	77 ²⁾	4 162	4 625	1 232	1 200
160	1 600	0,08	0,16	0,04	2 149	83 ²⁾	4 835	5 373	1 328	1 200

1) Not covered by ISO 2408.

2) Not covered by ISO 2408 – 1 970 N/mm² tensile grade wire.

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