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

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

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Contents

Page

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 7365 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

This second edition cancels and replaces the first edition (ISO 7365:1983), which has been technically revised.

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

1 Scope

This International Standard specifies requirements for the design, operation, performance and acceptance tests of towing winches having electric, hydraulic, diesel or steam drive.

It is applicable to towing winches for deep sea use.

It does not consider fibre rope winches but does not exclude their use.

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 2408, *Steel wire ropes for general purposes — Minimum requirements*

ISO 3828, *Shipbuilding and marine structures — Deck machinery — Vocabulary and symbols*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3828 and the following apply.

3.1 General terms

3.1.1
nominal speed
maximum speed of hauling and rendering ropes maintained by winches under drum load

3.1.2
rendering load
maximum rope tension 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 Types of winches (see Figure 1)

3.2.1
right-hand winch
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

3.2.2
left-hand winch
winch where the reduction gear or drive of the drum(s) is on the left-hand side of the drum, in relation to an observer situated on the side of the motor, power supply or local controller

3.2.3
central winch
winch where the reduction gear or drive of the drum(s) is in the middle of the two drums

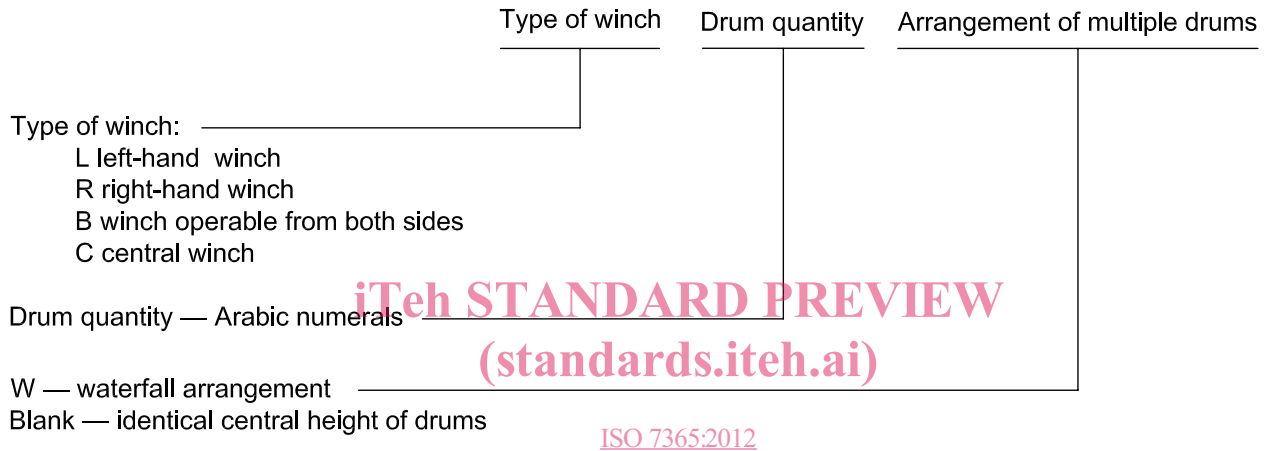
3.2.4
winch operable from both sides
winch where the reduction gear or drive of the drum(s) is on both sides of the drum

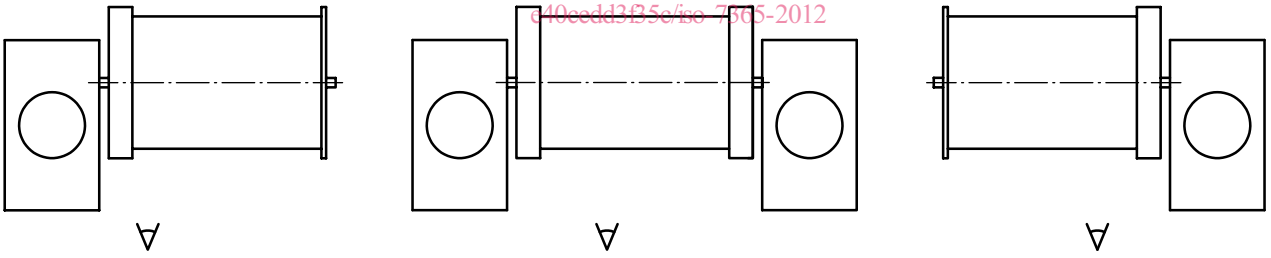
3.2.5
waterfall winch
winch where multiple drums are arranged from high to low

3.2.6
structural form of winches
code representing a winch related to the relative position of drums to power supply, drum quantity and height of drum center

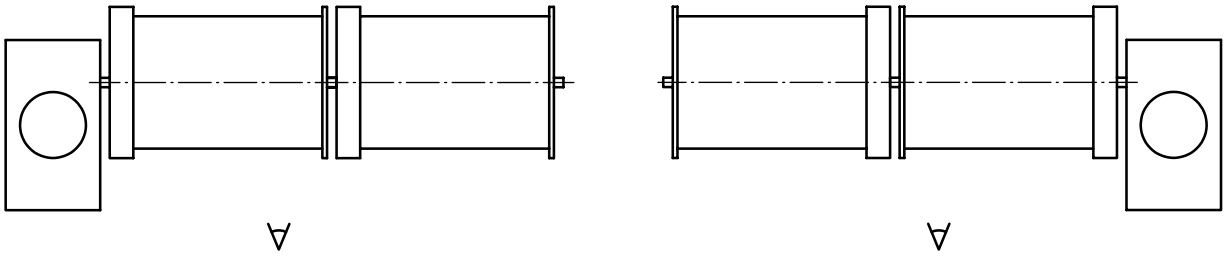
NOTE 1 Structural form codes appear in brackets next to the subheadings in Figure 1.

NOTE 2 The designation of structural form codes is shown in the diagram below.

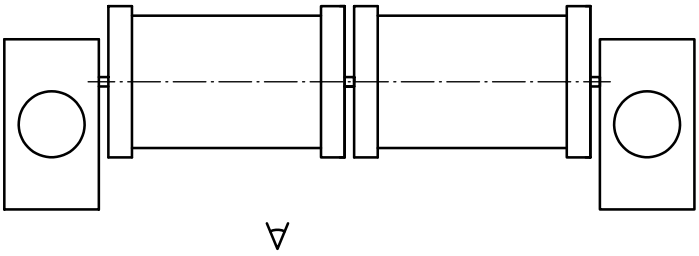




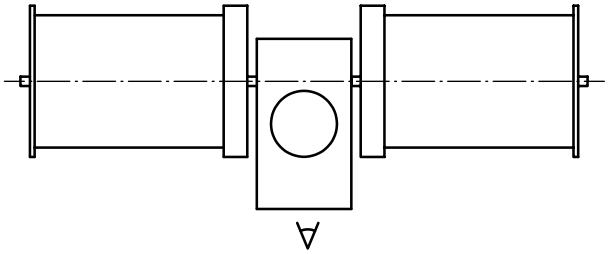
Single left-hand winch (L1) Single winch operable from both sides (B1) Single right-hand winch (R1)



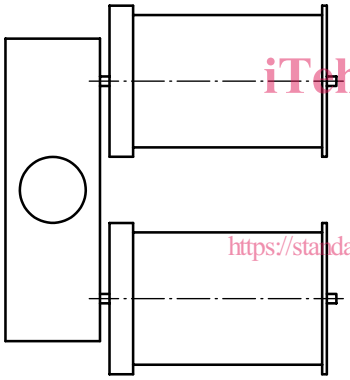
Double left-hand winch (L2) Double right-hand winch (R2)



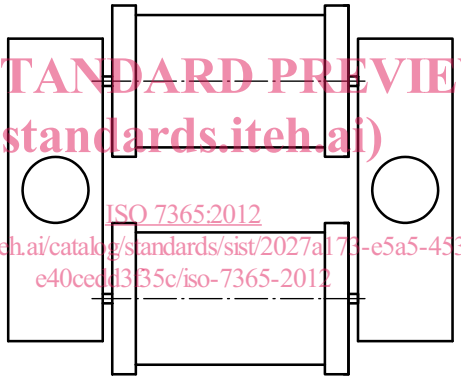
Double winch operable from both sides (B2)



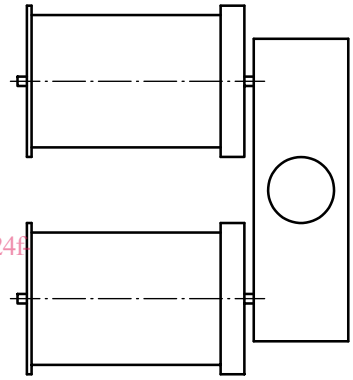
Double central winch (C2)



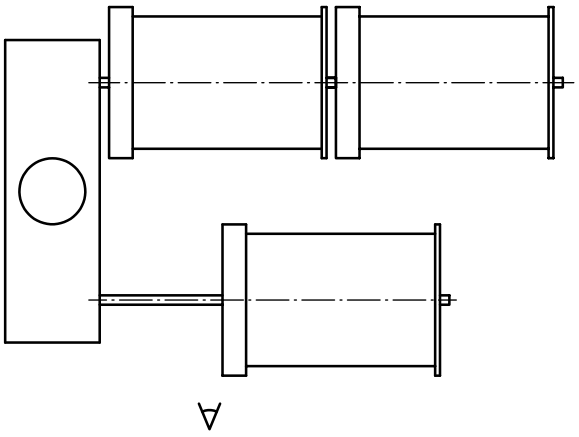
Double left-hand waterfall winch (L2W)



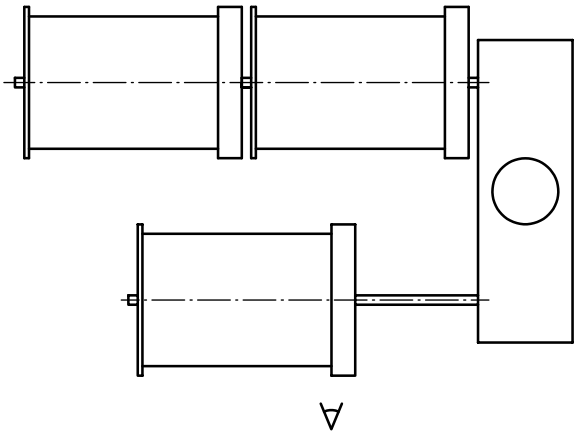
Double waterfall winch operable from both sides (B2W)



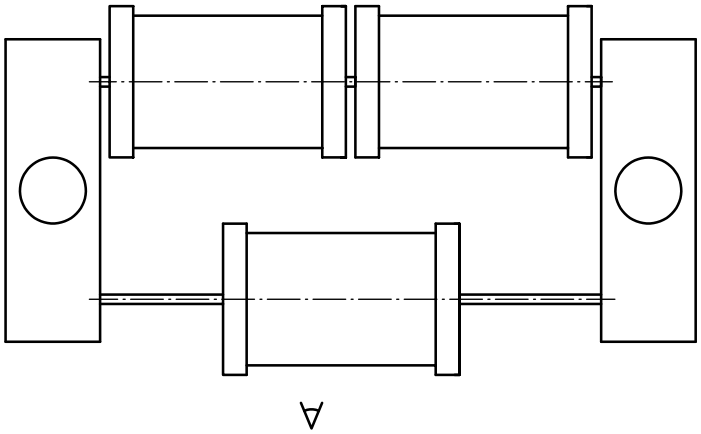
Double right-hand waterfall winch (R2W)



Triple left-hand waterfall winch (L3W)



Triple right-hand waterfall winch (R3W)



Triple waterfall winch operable from both sides (B3W)

Figure 1 — Diagrams of winch types

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 affected part of the winch, based on simple elastic theory, shall not be greater than 0,9 times the upper yield strength (R_{eH}), or 0,2 % of proof strength, of a non-proportional extension ($R_{P0.2}$) of the material.

4.2.2 Drum load of the winch

The allowable calculated stresses of any affected part of the winch, based on simple elastic theory, shall not be greater than 0,4 times the upper yield strength (R_{eH}), or 0,2 % of proof strength, of a non-proportional extension ($R_{P0.2}$) of the material.

4.2.3 Holding load of the winch

The allowable calculated stresses of any affected part of the winch, based on simple elastic theory, shall not be greater than 0,9 times the upper yield strength (R_{eH}), or 0,2 % of proof strength, of a non-proportional extension ($R_{P0.2}$) of the material.

4.3 Load alarm device

Provisions shall be made to incorporate an alarm device giving an alarm signal at 50 % of wire-breaking load.

4.4 Brakes

4.4.1 Electric winches shall be provided with an automatic braking system which operates when the controls are put in 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) with the functions of a normal brake and emergency brake. The emergency brake shall not be less than 80 % of the breaking strength of the rope, without conventional power supply. For the holding load of a normal brake, see 5.1.1. If this brake is power operated, it shall also be capable of manual operation.

4.5 Drum design

4.5.1 Design basis rope

For design purposes, the drum shall be based on an eight-strand rope manufactured from 1 770 N/mm^2 or 1 960 N/mm^2 tensile grade steel rope in accordance with Table C.10 of ISO 2408.

NOTE The above requirement does not preclude the use of other types of rope in service.

Unless otherwise agreed between the purchaser and manufacturer, the breaking strength of ropes is selected according to Table 1.

Table 1 — Relationship between rope minimum breaking strength and drum load

Drum load T	Utilization coefficient K
T ≤ 200 kN	K = 2,5
T ≥ 1 000 kN	K = 2
T = 200 approximately 1 000 kN	Linear Insertion
Breaking strength of ropes Fmax = K × T	

4.5.2 Drum diameter

The drum diameter shall not be less than 14 times the diameter of the design-basis rope (see Table 2).

4.5.3 Drum capacity

For guidance, normal capacity is given in Table 2. Individual requirements may be specified by the purchaser.

The rules of the competent authorities of flag states shall apply.

4.5.4 Drum length

The drum shall be designed to accommodate at least 50 m of steel cable on the inner layer.

4.5.5 Drum flange height

When all the rope is reeled on a drum, the flange shall project at least 1,5 times the rope diameter above the outermost layer.

4.5.6 Connection strength of rope and drum

The breaking load of the rope attachment to the drum shall be at most 15 % of the breaking strength of the rope.

4.5.7 Drum clutch

The drum shall be declutchable from the drive; the power-operated clutch shall also be declutchable manually.