INTERNATIONAL STANDARD

ISO 18289

First edition
2014-10-01

Ships and marine technology — Navigation and shallow-water engineering vessels — Anchor winches

Navires et technologie marine — Vaisseaux d'ingénierie de navigation en eau peu profonde — Treuils d'ancres

Reference number
ISO 18289:2014(E)

© ISO 2014



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **iv**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**
3.1 Technical terms ... 1
3.2 Types of winches ... 2

4 Design and operation ... **2**
4.1 General requirements ... 2
4.2 Strength requirements ... 2
4.3 Material stresses ... 2
4.4 Steel wire ropes ... 3
4.5 Drum design ... 3
4.6 Warping-ends ... 4
4.7 Brakes ... 4
4.8 Safety and protection ... 4
4.9 Speed control ... 4
4.10 Operating devices ... 4
4.11 Drive equipment ... 5

5 Detailed specification ... **5**
5.1 Performance specifications of anchor winches ... 5
5.2 Overload pull ... 7
5.3 Working load ... 7
5.4 Nominal recovery speed ... 8
5.5 Light line speed ... 8
5.6 Holding load ... 8

6 Acceptance tests ... **8**
6.1 General ... 8
6.2 Type test ... 8
6.3 Individual test ... 9

7 Designation system ... **10**
7.1 Designation of product models ... 10
7.2 Nameplate ... 10

© ISO 2014 – All rights reserved

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

© ISO 2014 – All rights reserved

Ships and marine technology — Navigation and shallow-water engineering vessels — Anchor winches

1 Scope

This International Standard specifies requirements for the design, construction, operation, safety, performance, and inspection rules of anchor winches.

It is applicable to anchor winches, with hydraulic or electric drive, installed at the stern of seagoing transport ships. It can be used as a reference for shallow-water engineering vessels and inland ships.

It is only applicable to anchor winches with wire ropes used for anchor handling.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2408:2004, *Steel wire ropes for general purposes — Minimum requirements*

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

ISO 4413, *Hydraulic fluid power — General rules for the application of equipment to transmission and control systems*

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

ISO 7825, *Shipbuilding — Deck machinery — General requirements*

IEC 60092 (all parts), *Electrical installations in ships*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

3 Terms and definitions

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

3.1 Technical terms

3.1.1
nominal size of anchor winches
represented by 1/10 of the weight (kg) of the ordinary stockless anchor applicable to anchor winches

3.1.2
working load of anchor winches
F_W
maximum pull measured at the drum exit as the winch anchors at the nominal recovery speed with a rope wound on the drum in a single layer

3.1.3
nominal recovery speed
recovery speed measured when the pull of the anchor winch is the working load with a rope wound on the drum in a single layer

© ISO 2014 – All rights reserved

3.1.4
light line speed
recovery speed measured when the winch is bearing the pull not less than 25 % of the working load with a rope wound on the drum in a single layer

3.1.5
overload pull
maximum anchoring pull that the drum of the winch can bear for a short period of time

Note 1 to entry: Such pull is measured with a rope wound on the drum in a single layer.

3.2 Types of winches

3.2.1
left-hand anchor winch
winch where the reduction gear or drive of the drum is on the left-hand side of the drum, in relation to an observer situated on the side of the motor, power supply, or controller

Note 1 to entry: See Figure 1.

3.2.2
right-hand anchor winch
winch where the reduction gear or drive of the drum is on the right-hand side of the drum, in relation to an observer situated on the side of the motor, power supply, or controller

Note 1 to entry: See Figure 2.

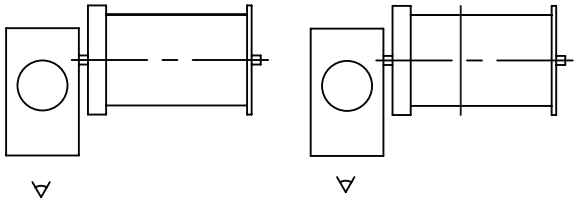


Figure 1 — Left-hand anchor winch

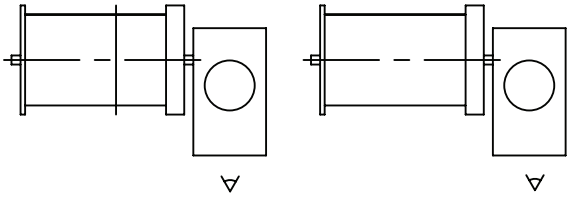


Figure 2 — Right-hand anchor winch

4 Design and operation

4.1 General requirements

Anchor winches shall meet the general requirements for deck equipment in ISO 7825.

NOTE Attention is drawn to the existence of safety regulations in certain countries and organizations affecting anchor winch controls.

4.2 Strength requirements

The strength of the component parts of the winch shall be capable of withstanding all loads of the respective nominal sizes of anchor winches as specified in Table 1 and Table 2.

4.3 Material stresses

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

© ISO 2014 – All rights reserved

4.3.2 With the maximum torque of the prime mover or set pressure of the safety valve, the allowable stresses of any affected part shall not be greater than 0,9 times the upper yield strength (R_{eH}) or the 0,2 % proof strength, non-proportional extension ($R_{P0,2}$) of the material.

4.3.3 The allowable calculated stresses of any affected part under the holding load shall not be greater than 0,9 times the upper yield strength (R_{eH}) or the 0,2% proof strength, non-proportional extension ($R_{P0,2}$) of the material.

4.4 Steel wire ropes

4.4.1 Construction of steel wire ropes

Steel wire ropes shall have the construction of applicable use. For design purposes, the drum shall be based on 6 × 36WS-IWRC or 6 × 41WS-IWRC steel rope manufactured from 1 960 N/mm^2 or 1 770 N/mm^2 tensile grade wire in accordance with of ISO 2408, C.9. The above requirement does not preclude the use of other types of rope in service.

4.4.2 Minimum breaking strength of steel wire ropes

The minimum breaking strength of steel wire ropes is 9~10 times the calculated value of the overload pull in 5.2.

4.5 Drum design

4.5.1 Drum diameter

The drum diameter shall be not less than 16 times the diameter of the design rope.

4.5.2 Drum capacity

The normal capacity is 110 m, and the high capacity is 200 m.

NOTE It does not preclude the use of drums with other drum capacity in service.

4.5.3 Drum length

The drum length shall meet the following requirements.

a) The drum length of normal-capacity drums shall be such that the total length of the design rope can be accommodated in not more than five layers. The overload pull can at most be applied to the fourth layer.

b) The length of the running part of the drum shall be enough for winding of at least 10 turns on each layer.

4.5.4 Drum flange height

a) 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.

b) When calculating the drum size, layers of rope shall be superimposed directly upon each other without a half rope diameter offset between adjacent layers.

4.5.5 Drum clutch

The clutch shall be mounted between the drum and drive equipment. It shall be provided with a reliable locking device; if it is power driven, the manually operated device shall be provided as well.

© ISO 2014 – All rights reserved

4.6 Warping-ends

The anchor winch may be designed to be provided with or without warping-ends; the profile of warping-ends shall conform to the requirement of ISO 6482.

4.7 Brakes

4.7.1 Automatic braking system

4.7.1.1 Electric anchor winches shall be provided with an automatic braking system which operates when bringing the operating device to the stop or braking position. The brake shall be capable of holding a load on the hawser of 1,5 times the working load and of stopping the drum rotation from its maximum speed without suffering damage.

4.7.1.2 For anchor winches of other drive types, a proper automatic braking system shall be used if agreed between the purchaser and manufacturer. The braking system shall be capable of holding a load on the hawser of at least 1,3 times the working load.

4.7.2 Drum brakes

Each drum shall be provided with a manual brake; if this brake is power operated, it shall also be capable of manual operation. The braking torque shall be enough for maintaining the holding load specified in 5.6.

4.8 Safety and protection

4.8.1 When being subjected to the impact or over-torque, the prime mover and drive shall be provided with the following safety protection:

a) overpressure protection for hydraulic drives;

b) torque-limiting device between the motor and drive;

c) overload protection for motors.

4.8.2 The minimum ingress protection of electrical equipment on the weather deck is IP56 of IEC 60529, or the ingress protection applicable to the installation and operation environment of the equipment.

4.8.3 The safety and protection devices of anchor winches shall also conform to the requirements of ISO 7825.

4.9 Speed control

a) 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.

b) The drum brake shall be capable of controlling the rendering speed during the non-powered anchoring.

4.10 Operating devices

4.10.1 The operating device of anchor winches shall conform to the requirements of ISO 7825.

4.10.2 For anchor winches remotely operated, emergency stop mechanisms shall be installed beside the winch, to cut off the power of the winch and automatically brake if the power sources fail.

4.10.3 Every remotely operable control component shall be able to be operated manually beside the winch.

© ISO 2014 – All rights reserved

4.10.4 Emergency stop mechanisms shall be arranged in the accessible place for the operator, and the specific installation position may be determined in the agreement.

4.10.5 Whatever the form of motive power, the operating devices shall, when under manual control, be arranged to return to the braking or stop position automatically, unless otherwise agreed between the purchaser and manufacturer.

4.11 Drive equipment

4.11.1 Electrical drives and control equipment shall conform to the requirements of IEC 60092.

4.11.2 Hydraulic drives and control equipment shall conform to the requirements of ISO 4413.

4.11.3 The prime mover of winches shall meet the following conditions:

a) anchor winches shall be driven with an independent prime mover, and be able to control the hauling, veering, and speed of the rope;

b) having the capacity of running for 30 min continuously under working load at nominal recovery speed, and running for 2 min continuously under overload pull at reduced speed.

5 Detailed specification

5.1 Performance specifications of anchor winches

For performance specifications of anchor winches, see Tables 1 and 2. The overload pull and working load shall be the minimum values.

Rope diameter and minimum breaking strength in Tables 1 and 2 are recommended values; the use of other diameters or strength grades of steel wire rope is not precluded in service, if agreed between the purchaser and manufacturer.

Table 1 — Performance specifications of anchor winch with 1 770 N/mm² tensile grade wire

Nominal size	Overload pull kN	Working load kN	Design rope diameter mm	Design minimum breaking strength of rope kN	Holding load kN	
					With rope stopper	Without rope stopper
18	8,283	4,142	11	76,2	34,3	61,0
24	11,093	5,546	13	106	47,7	84,8
30	13,770	6,885	14	124	55,8	99,2
36	16,660	8,330	16	161	72,5	128,8
42	19,599	9,799	18	204	91,8	163,2
48	22,105	11,052	18	204	91,8	163,2
57	26,343	13,172	20	252	113,4	201,6
66	30,628	15,314	22	305	137,3	244,0
78	36,227	18,114	24	363	163,4	290,4
90	41,858	20,929	26	426	191,7	340,8
102	46,870	23,435	26	426	191,7	340,8
114	52,578	26,289	28	494	222,3	395,2
129	59,693	29,847	30	567	255,2	453,6

© ISO 2014 – All rights reserved