

BS ISO 4568:2006



BSI Standards Publication

# Shipbuilding — Sea-going vessels — Windlasses and anchor capstans

**bsi.**

...making excellence a habit.™

**National foreword**

This British Standard is the UK implementation of ISO 4568:2006.

The UK participation in its preparation was entrusted to Technical Committee SME/32, Ships and marine technology - Steering committee.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2016.

Published by BSI Standards Limited 2016

ISBN 978 0 580 54021 9

ICS 47.040

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 29 February 2016.

**Amendments/corrigenda issued since publication**

Date	Text affected
------	---------------

---

INTERNATIONAL  
STANDARD

**ISO**  
**4568**

Third edition  
2006-12-01

---

---

**Shipbuilding — Sea-going vessels —  
Windlasses and anchor capstans**

*Construction navale — Navires de haute mer — Guindeaux  
et guindeaux-cabestans*



Reference number  
ISO 4568:2006(E)

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing 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](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

## 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 4568 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

This third edition cancels and replaces the second edition (ISO 4568:1986), which has been technically revised.



# Shipbuilding — Sea-going vessels — Windlasses and anchor capstans

## 1 Scope

This International Standard specifies requirements for the design, construction, safety, performance and acceptance testing of windlasses and anchor capstans.

This International Standard is applicable to windlasses and anchor capstans of sea-going vessels which have electric, hydraulic, steam or external drive.

For combined windlasses/mooring winches, ISO 3730 is to be used in addition to this International Standard.

NOTE 1 Where reference is made in the text to “windlass” it should be understood as “windlass and anchor capstan”, where applicable.

NOTE 2 Attention is drawn to the requirements of relevant Classification Societies or the government of the state whose flag the ship is entitled to fly.

## 2 Normative references

The following referenced documents are indispensable to 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 1704, *Ships and marine technology — Stud-link anchor chains*

ISO 3730, *Shipbuilding — Mooring winches*

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

ISO 4413, *Hydraulic fluid power — General rules relating to systems*

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

**working load of the windlass,  $F_w$**

working load, derived from the chain cable diameter and the chain cable grade, measured at the cable-lifter

### 3.2

#### **nominal size of the windlass**

size expressed in terms of chain cable diameter, in millimetres, grade of chain cable and holding load

EXAMPLE 100/3/45 is the size designation of a windlass for 100 mm diameter chain cable of IACS <sup>1)</sup> Grade 3, with a holding load of 45 % of the breaking load of the chain cable.

### 3.3

#### **overload pull**

necessary short time overload capacity of the windlass

### 3.4

#### **holding load**

maximum static load on the chain cable which the cable-lifter brake can withstand

### 3.5

#### **nominal recovery speed**

average speed of recovery of two shots of chain cable when three shots are submerged and freely suspended at the start of lifting

### 3.6

#### **symmetrical double cable-lifter windlass (type 1)**

fully powered windlass with two symmetrical cable-lifters (see Figure 1)

### 3.7

#### **single cable-lifter windlass (type 2)**

single fully powered windlass with one cable-lifter (see Figure 2)

### 3.8

#### **single cable-lifter unit (types 3 and 4)**

windlass unit in which one cable-lifter is provided with an external power source (see Figures 3 and 4)

### 3.9

#### **anchor capstan (type 5)**

machine in which the cable-lifter is mounted on a vertical shaft (see Figure 5 and ISO 3828 for the complete definition)

### 3.10 Right- and left-hand windlasses

#### 3.10.1

##### **right-hand windlass**

windlass where the drive for the cable-lifter or cable-lifter unit is on the right-hand side of the cable-lifter, in relation to an observer situated on the side of the motor, power supply or controller

#### 3.10.2

##### **left-hand windlass**

windlass where the drive for the cable-lifter or cable-lifter unit is on the left-hand side of the cable-lifter, in relation to an observer situated on the side of the motor, power supply or controller

### 3.11

#### **breaking load of the chain cable**

minimum breaking load specified by IACS for the diameter and grade of chain cable concerned

### 3.12

#### **anchorage depth**

depth measured as the water height from the sea level at the point of anchoring

---

1) International Association of Classification Societies.



## 4 Design and construction

### 4.1 Chain cable

This International Standard is based upon the use of three grades of chain cable (see 5.4 and ISO 1704).

### 4.2 Cable-lifter

**4.2.1** The cable-lifter should have at least five snugs.

**4.2.2** The cable-lifter shall be declutchable from the drive. Power-operated clutches shall also be declutchable by hand.

### 4.3 Warping ends

**4.3.1** The windlass may be designed with or without warping ends. The anchor capstan shall be designed with a warping end.

**4.3.2** Warping ends may be fitted on the intermediate shaft or on the cable-lifter shaft; for the profile of warping ends, see ISO 6482.

### 4.4 Strength requirements

**4.4.1** If a cable stopper (see ISO 6325) is fitted, the windlass with brakes engaged and cable-lifter disengaged shall withstand a pull of 45 % of the breaking load of the chain cable without any permanent deformation of the pressed parts and without brake slip.

**4.4.2** If a cable stopper is not fitted, the windlass with brakes engaged and cable-lifter disengaged shall withstand a pull of 80 % of the breaking load of the chain cable.

**4.4.3** The stresses on those parts of the windlass and the windlass frame concerned shall be below the elastic limit of the material used.

NOTE Attention is to be paid to

- a) stress concentration in keyways and other stress raisers;
- b) dynamic effects due to sudden starting or stopping of the prime mover or chain cable;
- c) calculation methods and approximations used when deriving the design stresses.

### 4.5 Braking system

#### 4.5.1 Control braking system

Electric windlasses shall be provided with an automatic braking system which goes into operation when the operating device is in the stop or braking position, or when there is no power on the windlass. The brake shall be capable of holding a load on the chain cable of 1,5 times the working load of the windlass.

For other types of drive, a suitable system of braking should be agreed upon between the purchaser and manufacturer. Such a system shall be capable of holding a load on the chain cable of least 1,3 times the working load of the windlass.

#### 4.5.2 Cable-lifter brake

Each cable-lifter shall be fitted with a hand brake, which may be remotely controlled and which is capable of applying a braking torque sufficient to maintain a load equal to the holding load given in 5.4.

## 4.6 Emergency stop

**4.6.1** Each remotely controlled windlass shall be fitted with a quick-acting, local, emergency stop mechanism which, when operated, removes power from the windlass and applies the control braking system.

**4.6.2** The emergency stop shall be located in a clearly marked and accessible position close to the windlass.

## 4.7 Protection

**4.7.1** Prime movers and gearing shall be protected against excessive torque and shock.

**4.7.2** Cable-lifter and gearing shall be protected against excessive torque developed by the prime mover.

## 4.8 Speed control

The speed of rotation of the cable-lifter shall be adjustable between "no load" speed and stop. It shall be possible to make the adjustment while the windlass is working.

## 4.9 Direction of motion of operating devices

The operation of the windlass shall be in accordance with ISO 7825.

The direction of operation of all control handles shall be clearly and permanently marked.

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

## 4.10 Drive equipment

**4.10.1** Electrical drives and control equipment shall conform to the requirements of IEC 60092. Open deck mounted enclosures shall conform to IEC 60529, and/or to the appropriate degree of protection for the service and environment in which the equipment is installed.

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

## 4.11 Remote control devices

Each remotely controlled machine part shall be operated locally by hand.

## 5 Requirements

**5.1** The requirements given in 5.4 are based on the use of one cable-lifter at a time.

**5.2** The windlasses shall be capable of continuous operation for a period of 30 min while exerting the working load and also be capable of exerting, for a period of at least 2 min at reduced speed, the overload pull stated in 5.4.

**5.3** The chain cable nominal speed shall be not less than 0,15 m/s. A standard anchor, a hawse-pipe efficiency of 70 % and a buoyancy factor of 87 % are assumed.

**5.4** The following values shall be used in determining performance data for windlasses.

a) Working load,  $F_{w1}$ , in newtons, for anchorage depth down to 82,5 m:

- Grade 1 chain cable:  $37,5d^2$ ,
- Grade 2 chain cable:  $42,5d^2$ ,
- Grade 3 chain cable:  $47,5d^2$ ,

where

$d$  is the chain cable diameter, in millimetres;

- overload pull:  $1,5F_{w1}$ .

b) Working load,  $F_{w2}$ , in newtons, for anchorage depth deeper than 82,5 m:

- $F_{w2} = F_{w1} + (D - 82,5) \times 0,27d^2$ ,

where

$d$  is the chain cable diameter, in millimetres,

$D$  is the anchorage depth, in metres;

- overload pull:  $\geq 1,5F_{w1}$ .

c) Holding load:

- with chain cable stopper, 0,45 times the breaking load of the cable;
- without chain cable stopper, 0,8 times the breaking load of the cable.

## 6 Acceptance tests

**6.1** The tests and checks specified in 6.2 to 6.5 shall be carried out on the windlass or windlass unit. When tests are required in excess of those specified in 6.2 to 6.5, they shall be agreed between the purchaser and the manufacturer at the time of contract. The location of all tests shall be agreed between the purchaser and the manufacturer at the time of contract.

**6.2** The windlass shall be run without load at a speed not less than nominal speed for 30 min, 15 min in each direction, plus 5 min in each direction on each additional gear change as soon as possible after the 30 min test.

While testing, the following shall be checked or measured:

- a) tightness against oil leakage;
- b) temperature of bearings;
- c) presence of abnormal noise.

**6.3** The windlass shall be checked to verify that the working load, nominal speed and overload pull are attainable as specified in 5.2.

While testing, the following shall be checked or measured:

- a) tightness against oil leakage;
- b) temperature of bearings;
- c) presence of abnormal noise;
- d) that the cable-lifter engages normally with chain cables.

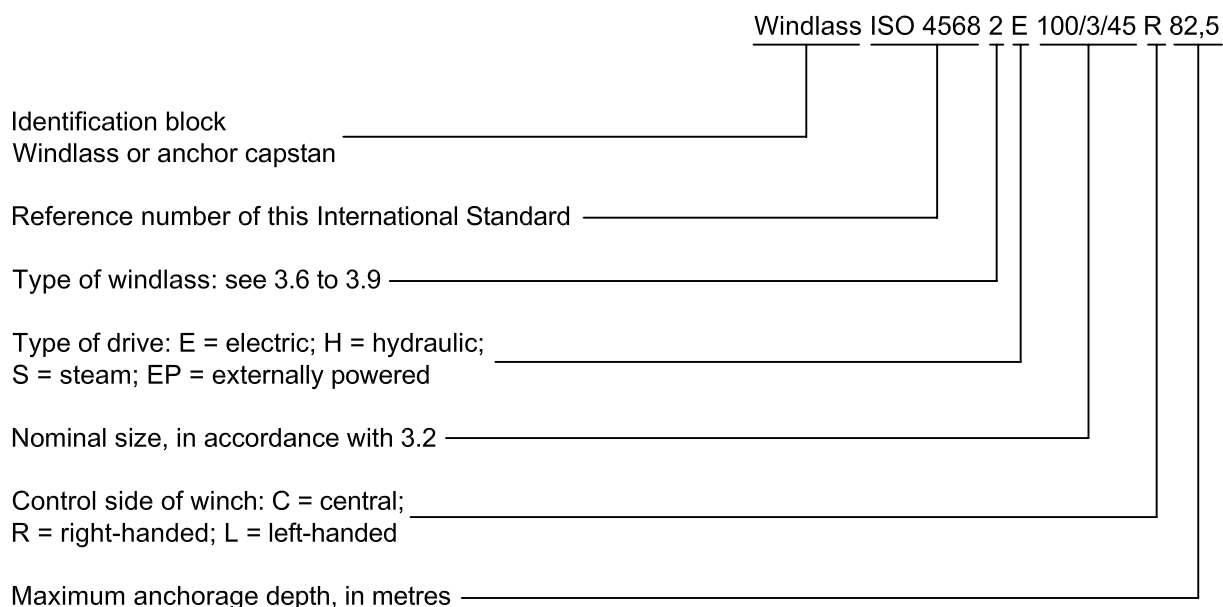
**6.4** The working condition and satisfactory operation of the control brake and the cable-lifter brake shall be tested to ensure compliance with the requirements of this International Standard (see 5.4).

The holding load of the cable-lifter brake shall be verified by calculation. The cable-lifter brake shall also be tested with the anchor dropping, controlled and stopped by the brake.

**6.5** Where remote controls or other special devices are fitted, their satisfactory operation shall be verified.

## 7 Designation

Windlasses or anchor capstans complying with this International Standard shall be designed in accordance with the following example.



## 8 Marking

Windlasses or capstans complying with this International Standard shall be permanently marked with the following information:

- a) reference number of this International Standard;
- b) nominal size, in accordance with 3.2;
- c) maximum anchorage depth, in metres.

EXAMPLE      ISO 4568-100/3/45-82,5

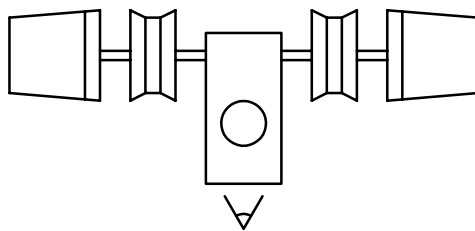
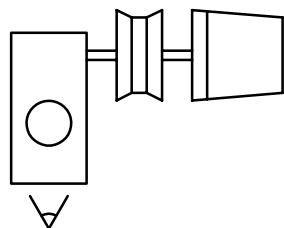
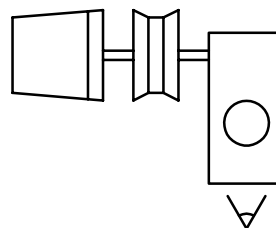


Figure 1 — Type 1: Symmetrical double cable-lifter windlass, fully powered (central model)

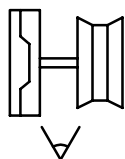


a) Left-hand model

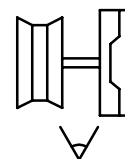


b) Right-hand model

Figure 2 — Type 2: Single cable-lifter windlass, fully powered



a) Left-hand model



b) Right-hand model

Figure 3 — Type 3: Single cable-lifter unit, externally powered

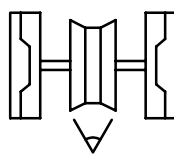


Figure 4 — Type 4: Single cable-lifter unit driven by two external prime movers (central model)

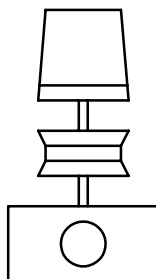


Figure 5 — Type 5: Anchor capstan

## **Annex A** (informative)

### **Information to be provided by the purchaser**

In addition the information to be supplied by the manufacturer in the designation (see Clause 7), the purchaser shall provide the manufacturer of the windlass with the following basic information at the time of the enquiry:

- a) power supply, voltage, pressure, etc., as applicable;
- b) diameter of chain cable, grade of chain cable and holding load;
- c) whether warping ends are required;
- d) relevant Classification Societies;
- e) plan of the ship showing the disposition of the windlass;
- f) whether remote control is to be fitted;
- g) direction of rotation of anchor capstans when hoisting the anchor, viewed from above.

## Bibliography

- [1] ISO 6325, *Shipbuilding — Cable stoppers*
- [2] ISO 6482, *Shipbuilding — Deck machinery — Warping end profiles*







# British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

## About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

## Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at [bsigroup.com/standards](http://bsigroup.com/standards) or contacting our Customer Services team or Knowledge Centre.

## Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at [bsigroup.com/shop](http://bsigroup.com/shop), where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

## Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to [bsigroup.com/subscriptions](http://bsigroup.com/subscriptions).

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

**PLUS** is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit [bsigroup.com/shop](http://bsigroup.com/shop).

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email [bsmusales@bsigroup.com](mailto:bsmusales@bsigroup.com).

## Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

## Copyright

All the data, software and documentation set out in all British Standards and other BSI publications are the property of and copyrighted by BSI, or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. Details and advice can be obtained from the Copyright & Licensing Department.

## Useful Contacts:

### Customer Services

**Tel:** +44 845 086 9001

**Email (orders):** [orders@bsigroup.com](mailto:orders@bsigroup.com)

**Email (enquiries):** [cservices@bsigroup.com](mailto:cservices@bsigroup.com)

### Subscriptions

**Tel:** +44 845 086 9001

**Email:** [subscriptions@bsigroup.com](mailto:subscriptions@bsigroup.com)

### Knowledge Centre

**Tel:** +44 20 8996 7004

**Email:** [knowledgecentre@bsigroup.com](mailto:knowledgecentre@bsigroup.com)

### Copyright & Licensing

**Tel:** +44 20 8996 7070

**Email:** [copyright@bsigroup.com](mailto:copyright@bsigroup.com)

## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

