International Standard 4568

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

Shipbuilding — Sea-going vessels — Windlasses and anchor capstans

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

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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.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4568 was prepared by Technical Committee ISO/TC 8, *Shipbuilding and marine structures.*

This second edition cancels and replaces the first edition (ISO 4568-1978), clauses 4.5, 4.7, 4.9, 5.3 and 5.4 of which have been technically revised; clauses 3.12 and 7 are new.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Shipbuilding — Sea-going vessels — Windlasses and anchor capstans

1 Scope and field of application

This International Standard specifies requirements for the design, construction, safety, performance and acceptance testing of windlasses and anchor capstans of sea-going vessels, including supply vessels, having electric, hydraulic, steam or external drive (see ISO 3828).

NOTES

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

2 Windlasses and anchor capstans for inland navigation are dealt with in ISO 6219.

3 For combined windlasses/mooring winches, refer to ISO 3730 in addition to this International Standard.

2 References

ISO 1704, *Shipbuilding — Stud-link anchor chains.*[1]

ISO 3730, *Shipbuilding — Mooring winches.*

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

ISO 6325, *Shipbuilding — Cable stoppers.*

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

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

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 3828 and the following shall apply.

3.1 working load of the windlass, F_w : Working load, derived from the cable diameter and the cable grade, measured at the cable-lifter (see 5.4).

3.2 nominal size of windlass : Size expressed in terms of cable diameter, in millimetres, cable grade and holding load.

Example : 100/3/45 is the size designation of a windlass for 100 mm diameter cable of IACS[2] grade 3, with a holding load of 45 % of the breaking load of the cable (see 5.4).

3.3 overload pull : Necessary overload capacity of the windlass (see 5.4).

3.4 holding load : Maximum static load on the chain cable which the cable-lifter brake shall withstand (see 5.4).

3.5 nominal speed : Average speed of recovery of two shots of chain cable when three shots are submerged and freely suspended at commencement of lifting (see 5.3).

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). (Reference should also be made to ISO 3828.)

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-hand [left-hand] windlasses : Windlasses of types 2 and 3 may be designated as right-hand [left-hand] models.

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

A left-hand windlass when similarly observed has the drive for the cable-lifter on the left-hand side of the cable-lifter.

1) At present at the stage of draft. (Revision of ISO 1704-1973.)

2) International Association of Classification Societies.

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.

4 Design and construction

NOTE — Attention is drawn to the existence of national safety regulations in certain countries affecting windlass controls.

4.1 Chain cable

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

4.2 Cable-lifter

4.2.1 The cable-lifter shall 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

The windlass may be designed with or without warping ends; for the profile of warping ends, see ISO 6482.

NOTE — Warping ends may be fitted on the intermediate shaft or on the cable-lifter shaft.

4.4 Strength requirements

The manufacturer of the windlass shall be responsible for determining the strength requirements of the component parts of the windlass so that

a) if a cable stopper (see ISO 6325) is fitted, the windlass with brakes engaged and cable-lifter disengaged will withstand a pull of 45 % of the breaking load of the chain without any permanent deformation of the stressed parts and without brake slip;

b) if a cable stopper is not fitted, the windlass is to comply with the requirements of the Classification Societies;

c) the stresses in those parts of the windlass and the windlass frame concerned are below the elastic limit of the material used.

NOTES

1 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.

2 Attention is drawn to the requirements of the Classification Societies.

4.5 Braking system

4.5.1 Control braking system

Electric windlasses shall be provided with an automatic braking system which comes into operation when bringing the operating device to the stop or braking position, and also when there is no power on the windlass. The brake shall be capable of holding a load on the cable of 1,3 times the working load.

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 cable of 1,3 times the working load.

4.5.2 Cable-lifter brake

Each cable-lifter shall be fitted with a hand-brake, which may be remotely controlled, 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, 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.

5 Performance

NOTE — Attention is drawn to the requirements of the Classification Societies.

5.1 The performance 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 windlass :

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

— Grade 1 cable : 37,5 d^2

— Grade 2 cable : 42,5 d^2

— Grade 3 cable : 47,5 d^2

where d is the chain cable diameter, in millimetres.

Overload pull : 1,5 F_{w1}

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

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

where

d is the chain cable diameter, in millimetres;

D is the anchorage depth, in metres.

Overload pull : no special requirement, but at least 1,5 F_{w1}

c) Holding load

— with cable stopper : 0,45 × the breaking load of cable

— without cable stopper : in accordance with the requirements of the Classification Societies.

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. Where tests are required in excess of those listed below, 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.

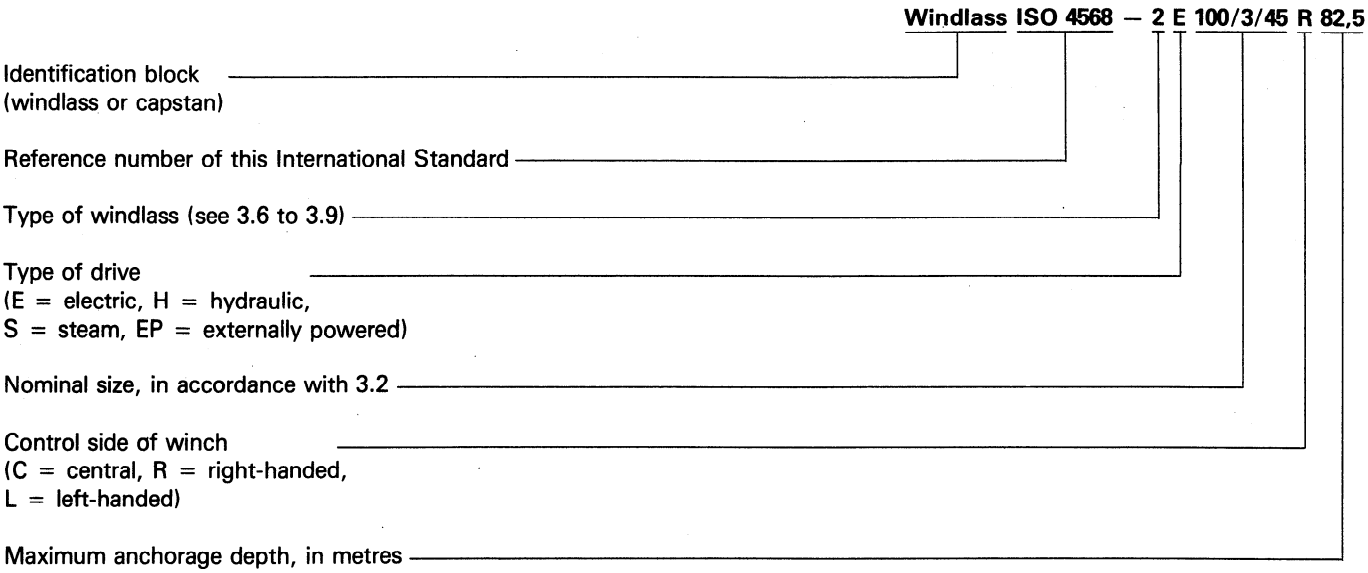
6.4 The working and satisfactory operation of the control brake and the cable-lifter brake shall be tested to ensure compliance with the requirements of this International Standard (see 5.4).

The holding load of the cable-lifter brake may be verified by test or calculation as agreed between manufacturer and purchaser. 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 features are fitted, their satisfactory operation shall be verified.

7 Designation

Windlasses or capstans complying with this International Standard shall be designated 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) the reference number of this International Standard;

b) the nominal size, in accordance with 3.2;

c) the maximum anchorage depth, in metres.

Example of marking :

ISO 4568-100/3/45-82,5

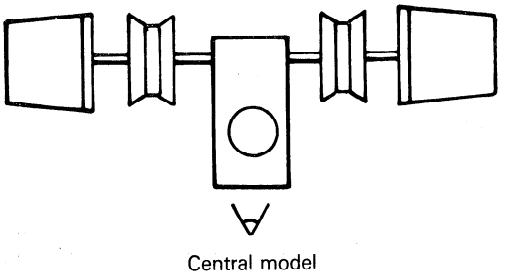


Figure 1 — Type 1 — Symmetrical double cable-lifter windlass, fully powered

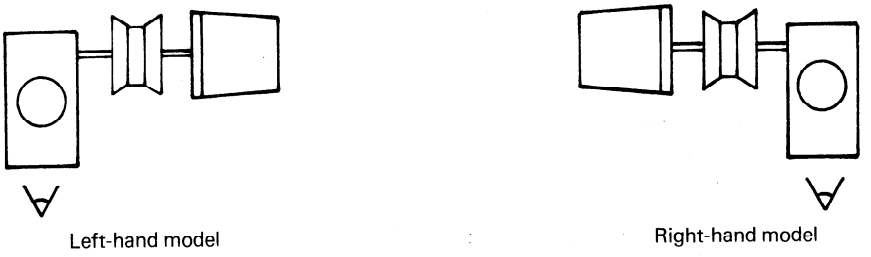


Figure 2 — Type 2 — Single cable-lifter windlass, fully powered

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

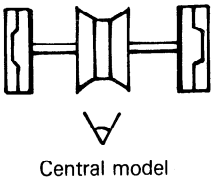


Figure 4 — Type 4 — Single cable-lifter unit driven by two external prime movers

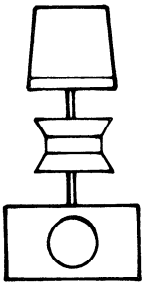


Figure 5 — Type 5 — Anchor capstan

Annex

Information to be provided by the purchaser

(This annex does not form an integral part of the Standard.)

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 and where located;

d) relevant Classification Societies;

e) a plan of the ship showing the disposition of the windlass;

f) whether remote control is to be fitted;

g) the direction of rotation of anchor capstans when hoisting the anchor, viewed from above.