International Standard 6219

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

Shipbuilding — Inland vessels — Windlasses and anchor capstans

Construction navale — Bateaux de navigation intérieure — Guindeaux et guindeaux-cabestans

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Foreword

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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.

International Standard ISO 6219 was developed by Technical Committee ISO/TC 8, *Shipbuilding and marine structures*, and was circulated to the member bodies in July 1981.

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

Austria	India	Poland
Belgium	Italy	Portugal
Brazil	Japan	Romania
Bulgaria	Korea, Dem. P. Rep. of	Spain
Cuba	Korea, Rep. of	Thailand
Czechoslovakia	Netherlands	USSR
Egypt, Arab Rep. of	Norway	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Germany, F.R.
United Kingdom

Printed in Switzerland

Shipbuilding — Inland vessels — Windlasses and anchor capstans

1 Scope and field of application

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

2 Windlasses and anchor capstans for sea-going vessels are covered by ISO 4568.

2 References

ISO 21, *Shipbuilding — Inland navigation — Cable-lifters for anchor chains.* [1]

ISO 1704, *Shipbuilding — Stud-link anchor chains.* [2]

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

ISO 3828, *Shipbuilding and marine structures — Deck machinery — Vocabulary.* [3]

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

3 Definitions

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

Terms particularly applicable to this International Standard are defined as follows.

3.1 working load of the windlass : The working load derived from the chain diameter and chain grade, measured at the cable-lifter [see 5.5 a)].

3.2 drum load at the warping end or at the cable drum : The force in the steel or fibre rope entering the warping end or cable drum, developed by the main shaft torque appearing at the drum load in the chain cable.

3.3 overload pull : The necessary temporary overload capacity of the windlass [see 5.5 b)].

3.4 holding load : The maximum static load in the chain cable which the cable-lifter brake should withstand [see 5.5 c)].

3.5 nominal size of windlass : The size, expressed in terms of the chain diameter in millimetres, chain grade and holding load (see ISO 4568).

NOTE — In the case where studless chains are used, the letter "B" shall be added to the designation of the windlass. For example : 22/1/20/B represents a windlass for 22 mm diameter studless chain of IACS[4] grade 1, with a brake withstanding a holding load of 20 % of chain breaking load [see 5.5 c)].

1) At present at the stage of draft. (Revision of ISO/R 21-1956.)

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

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

4) International Association of Classification Societies.

3.6 nominal speed of anchor chain : The average speed of recovery measured at the working load of the windlass (see 5.3).

3.7 creep speed of the anchor chain : The greatest speed of the chain when pulling the anchor into the hawse-pipe (see 5.4).

3.8 single cable-lifter windlass — types 1, 2 : Anchor machinery with one cable-lifter and an integral power source (see figures 1 and 2).

3.9 single cable-lifter unit — type 3 : A windlass unit in which one cable-lifter is provided with an external power source (see figure 3).

NOTE — Reference should also be made to 3.6 in ISO 3828.

3.10 double cable-lifter windlass — types 4, 5, 6 : A windlass in which the two cable-lifters, symmetrically arranged, are provided with a single integral power source (see figures 4, 5 and 6).

3.11 anchor capstan — type 7 : Machinery in which the cable-lifter is mounted on a vertical shaft (see figure 7).

NOTE — See 3.2 in ISO 3828 for the complete definition.

3.12 right-hand or left-hand windlasses : Windlasses of types 1, 2, 3 and 4 may be designed as right-hand or 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 control gear when the drive for the cable-lifter unit is on the right-hand side of the cable-lifter.

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

The model of a windlass provided with two cable-lifters and one cable drum (type 4) is determined like the one of a windlass provided with one cable-lifter and a cable drum (type 2) which constitute its main unit.

3.13 remote control : A device for controlling the dropping of an anchor from the wheel-house.

3.14 breaking load of the chain : The minimum breaking load specified by IACS for the diameter and grade of chain concerned.

4 Design and construction

4.1 Chain cable

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

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 be also declutchable by hand.

4.2.3 The engagement angle of the chain cable on the cable-lifter shall be at least 117° for windlasses and 150° for anchor capstans.

4.3 Warping ends

The windlass may be designed with or without warping ends.

Warping ends may be fitted on an intermediate or on the cable-lifter shaft. The diameters and the profile dimensions of the warping ends shall be chosen in compliance with ISO 6482 depending on the power of the windlass, and the actual rope diameter according to ISO 2408.

4.4 Rope drum

The mooring rope drum shall be declutchable from the drive.

The diameter of the drum shall be chosen depending on the power of the drive and be not less than

$$d_1 = d_2 \times 16$$

where

d_1 is the drum diameter, and

d_2 is the steel wire rope diameter,

or be agreed between the purchaser and manufacturer.

4.5 Strength requirements

The design and construction of the windlass shall comply with the following requirements for the strength of the machinery as a whole and by elements :

a) the windlass with cable-lifter engaged shall withstand a pull according to 5.5 b), without any permanent deformation of the stressed parts;

b) the windlass with brakes engaged and cable-lifter disengaged shall withstand a pull according to 5.5 c), without any permanent deformation of the stressed parts and without brake slip;

c) the shaft of the warping end or the mooring rope drum shall withstand the break load of the rope, the stress being not more than 95 % of the yield point of the material.

NOTES

1 Attention is to be paid to :

a) stress concentrations 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 also drawn to the requirements of classification societies.

4.6 Braking system

4.6.1 Automatic braking system

4.6.1.1 The windlasses shall be provided with an automatic brake system which operates when the control handle is in the "off" position or when the power supply is cut off.

4.6.1.2 The automatic brake system shall be capable of sustaining a load corresponding to the overload given in 5.5 d).

4.6.2 Cable-lifter brake

4.6.2.1 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 5.5 c).

4.6.2.2 The force on the handle of the hand-brake shall not exceed the one established by the national regulations.

4.7 Emergency stop

4.7.1 Each windlass shall be fitted with a quick acting local emergency stop mechanism which, when operated, removes power from the windlass and applies the automatic brake system.

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

4.8 Protection

The prime mover system of a windlass shall be protected against excessive torque and shock.

4.9 Direction of motion of the operating devices

The direction of motion of the operating devices shall be such that the chain is hauled in by clockwise movement at the hand-wheel or crank handle or alternatively movement of a hand-lever towards the operator. The direction of operation of all control handles shall be clearly and permanently marked.

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

5 Performance

5.1 The performance requirements given in 5.5 are based on the use of one cable-lifter at a time.

5.2 The windlass 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 low speed, the overload pull stated in 5.5 b) with subsequent operation for at least 5 min at the working load.

The windlass drive shall be capable of creating a pull on the cable-lifter, at a motionless chain, equal to not less than double the working load for 30 s.

5.3 The chain nominal speed shall be not less than 0,15 m/s.

5.4 The chain low speed shall be not more than 0,116 m/s.

5.5 The following values shall be used for determining performance data for a windlass :

a) the working load, in determining which the requirements of national classification societies shall be taken into account;

b) the overload pull equal to 1,5 of the working load;

c) the holding load of a brake equal to 20 % of the breaking load of the anchor chain;

d) holding load of an automatic braking system equal to 2,0 times the working load.

6 Testing

6.1 Acceptance tests

6.1.1 The following tests shall be carried out on each windlass or windlass unit. Where tests are required in excess of those listed below, they should be agreed between the purchaser and manufacturer at the time of contract.

The place of all the tests shall also be agreed between the purchaser and manufacturer at the time of contract.

6.1.2 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 run as possible after the 30 min test.

While testing, the following shall be carried out :

a) check oil tightness;

b) measure temperature of bearings;

c) note presence of abnormal noise.

6.1.3 The windlass shall be checked to verify that the working load, nominal speed and overload pull are attainable as specified in 5.5.

While testing, the following shall be carried out :

a) check oil tightness;

b) measure temperature of bearings;

c) note presence of abnormal noise.

6.1.4 The working and satisfactory operation of the cable-lifter brake should be tested to ensure compliance with the requirements of this International Standard (see 5.5).

The holding power of the cable lifter brake may be verified by test or calculated, as agreed between purchaser and manufacturer.

The cable-lifter brake is also to be tested with the anchor dropping controlled and stopped by the brake.

6.1.5 Where remote controls or other special features are fitted, their satisfactory operation shall be verified.

6.2 Final acceptance tests

Final acceptance tests shall be carried out during the ship's anchor trials to verify satisfactory overall performance under service conditions.

Special attention should be paid to proper bedding of the chain (and shackles if fitted) in the cable-lifters, oil tightness, temperature of bearings, presence of abnormal noise as well as the performance of special devices.

7 General guidelines for different types of windlass[1)]

Figure 1 — Type 1 — Single cable-lifter windlass

Figure 2 — Type 2 — Single cable-lifter windlass with rope drum

Figure 3 — Type 3 — Single cable-lifter unit

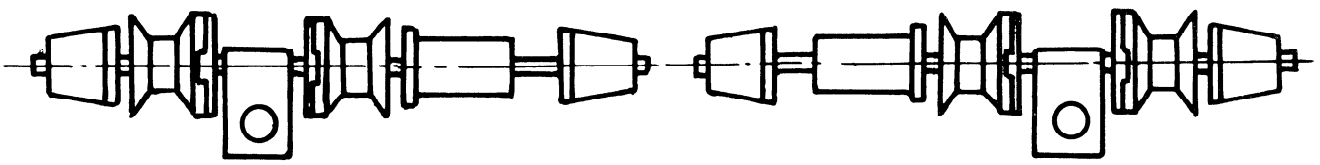

Figure 4 — Type 4 — Double cable-lifter windlass with rope drum

1) Figures in compliance with ISO 3828.