BRITISH STANDARD

BS 7464:1991
ISO 9089:1989

Specification for

Anchor winches for mobile offshore units

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the General Mechanical Engineering Standards Policy Committee (GME/-) to Technical Committee GME/32, upon which the following bodies were represented:

British Marine Equipment Council
British Maritime Technology
British Motor Ship Owners' Association
British Waterways Board
Department of Transport (Marine Directorate)
General Council of British Shipping
Lloyd's Register of Shipping
Ministry of Defence
North East Cost Institution of Engineers and Shipbuilders
Shipbuilders' and Shiprepairers' Association

This British Standard, having been prepared under the direction of the General Mechanical Engineering Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on
30 August 1991

The following BSI references relate to the work on this standard:
Committee reference GME/32
Draft for comment 88/73329 DC

ISBN 0 580 19913 4

Amendments issued since publication

Amd. No.	Date	Comments

Contents

National foreword

This British Standard has been prepared under the direction of the General Mechanical Engineering Standards Policy Committee. It is identical with ISO 9089:1989 "*Marine structures — Mobile offshore units — Anchor winches*", published by the International Organization for Standardization (ISO).

Cross-references

International Standard	Corresponding British Standard
ISO 4413:1979	BS 4575 *Fluid power transmission and control systems* Part 1:1979 *Guide for hydraulic equipment and systems* (Identical)
ISO 8369:1986	BS 302 *Stranded steel wire ropes* Part 7:1989 *Specification for large diameter ropes for general purposes* (Technically equivalent)

The Technical Committee has reviewed the provisions of ISO 1704:1973, ISO 2408:1985, ISO 2944:1974, ISO 3828:1984, ISO 6482:1980, ISO 7825:1985 and IEC 92, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 4, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This International Standard specifies requirements of anchor winches for position keeping, and temporary and emergency anchoring of mobile offshore units, particularly drill-ships, semi-submersible drilling rigs and accommodation platforms.

These requirements do not apply to anchor winches which are used for other purposes such as hauling the vessel as is the case for pipelaying, ploughing, pile-driving and crane vessels.

NOTE 1 Where national regulations and the rules of classification societies differ from this International Standard, they take precedence.

NOTE 2 The attention of users is drawn to the mandatory adoption of some standards by international organizations or national administrations.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1704:1973, *Shipbuilding — Anchor chains.*

ISO 2408:1985, *Steel wire ropes for general purposes — Characteristics.*

ISO 2944:1974, *Fluid power systems and components — Nominal pressures.*

ISO 3828:1984, *Shipbuilding and marine structures — Deck machinery — Vocabulary.*

ISO 4413:1979, *Hydraulic fluid power — General rules for the application of equipment to transmission and control systems.*

ISO 6482:1980, *Shipbuilding — Deck machinery — Warping end profiles.*

ISO 7825:1985, *Shipbuilding — Deck machinery — General requirements.*

ISO 8369:1986, *Large diameter steel wire ropes.*

IEC 92:1965 to 1988, *Electrical installations in ships.*

3 Definitions

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

3.1
anchor winch

cable-lifters for chain cable, drum units of twin drum units for wire or textile rope or units for handling combined chain cable and wire or textile rope anchor line, collectively

3.2
anchor line

chain cable, steel wire rope or textile rope or a combination thereof handled by the anchor winch

3.3 anchor winch side

Side as defined in **3.3.1** or **3.3.2**.

3.3.1
right-hand winch

winch where, in relation to an observer on the side of the motor, power supply or controller, the drive for the cable-lifter or wire-drum is on the right of the cable-lifter or wire-drum

3.3.2
left-hand winch

winch where, in relation to an observer on the side of the motor, power supply or controller, the drive for the cable-lifter or wire-drum is on the left of the cable-lifter or wire-drum

3.4
nominal load

chain or rope tension that the winch is able to maintain continuously when hauling at nominal speed, measured either at the cable-lifter exit, or at the rope exit of the first layer in the case of a wire-drum

4 Functional and operational requirements

4.1 Hauling

The winch shall be capable of exerting a pull of at least 0,35 times the breaking strength of the anchor line at no speed for chain cable and 0,44 times the breaking strength for wire rope at the first layer on the drum.

Nominal load shall be at least 0,25 times the breaking strength for chain and 0,31 times for wire rope. Maximum values shall be agreed, if necessary, between manufacturer and purchaser.

High speed or slack rope speed shall be agreed upon between manufacturer and purchaser in each case.

4.2 Braking

4.2.1 *Static braking*

For each anchor winch, two separate static brake systems, designated first and second below, shall be operable at all times.

If a chain or wire rope stopper is installed, the static brake capacity shall be sufficient to maintain at least 0,8 times for the first system, and 0,5 times for the second system, the breaking strength of the chain or wire rope, whichever is higher.

If a chain or wire rope stopper is not installed, the static brake capacity shall be sufficient to maintain at least 1 times for the first system, and 0,5 times for the second system, the breaking strength of the chain or wire rope, whichever is higher.

When engaged, the braking systems of the anchor winch shall not be affected by a failure of the normal power supply.

If the power supply fails during operation, a residual braking force of at least 50 % of the static braking capacity given above shall be instantly and automatically applied.

For wire-rope drums with multiple layers, the requirements in **4.1** and **4.2** shall apply to the first layer.

4.2.2 *Dynamic braking for anchor deployment*

Provision shall be made for necessary braking force capacity during setting of the anchor.

4.3 Emergency release of static brakes

It shall be possible to carry out emergency release of the static brakes within 15 s even when the normal supply fails.

This emergency release shall be possible with the vessel inclined up to 35° in any direction and with a tension up to the breaking strength of the anchor line.

It shall be possible to limit the speed of the released anchor line and to apply and release one of the brakes at least once during the emergency release.

4.4 Operation

Operation of the winch shall be in accordance with ISO 7825.

When released, the operating handle shall automatically return to the stop position.

If not arranged otherwise, the winch shall be equipped with means to measure tension, length and speed of each anchor line. In addition indicators for clutches, brakes, etc., shall be supplied to ensure safe operation.

The speed shall be adjustable to zero or have a special creep speed for precise tensioning or for stowing the anchors.

5 Design and construction

Anchor winches shall meet the general requirements for deck equipment in ISO 7825, and the specific requirements given in **5.1** to **5.10**.

NOTE 3 Attention is drawn to the requirements of national administrations and relevant classification societies.

5.1 Chain cable

This International Standard is based upon the use of chain cable which shall have dimensions in accordance with ISO 1704 and breaking strength to be specified [see clause **7** g)].

5.2 Wire rope

This International Standard is based upon the use of wire ropes which shall conform to ISO 2408 and ISO 8369, having a breaking strength to be specified [see clause **7** g)].

5.3 Textile rope

When textile ropes are used, they should conform to the requirements of the relevant International Standards as closely as possible.

5.4 Warping ends

A winch may be specified with or without warping ends; their profile shall be in accordance with ISO 6482.

When warping ends are specified, the purchaser shall state whether the drum is to be declutchable. If only one warping end is specified, its position (right or left) shall also be stated in the order.

5.5 Cable-lifters

The cable-lifters shall have at least five snugs. The width of the groove shall be sufficient for a kentertype joining shackle, but it shall not exceed 1,6 times the normal chain diameter.

5.6 Wire-rope drums

The ratio between the drum core and wire rope diameter shall not be less than 15.

If the winch is not equipped with a spooling system, the drum flanges shall protrude at least 1,5 times the wire diameter beyond the top layer of wire rope on the drum.

The fastening of the wire rope to the drum shall have a strength of about 0,25 times the breaking strength of the anchor line, unless otherwise agreed by manufacturer and the wire purchaser.

Provision shall be made for easy manual removal of the wire rope from the drum.

5.7 Guide sheaves

Guide sheaves for chain cable with snugs shall comply with the requirements given for cable-lifters in **5.5**.

Guide sheaves for chain cable without snugs shall be specially considered in each case.

Guide sheaves for wire rope shall have a minimum diameter of 20 times the wire rope diameter.

5.8 Calculations

Dynamic effects due to sudden start and stop shall be closely considered when the stresses are determined.

For elements subjected to loads with a low number of load cycles, an analysis of nominal stresses is sufficient to determine the strength.

When the number of load cycles exceeds 10 000, due consideration shall be given to stress concentration factors, the load spectrum, etc., to determine the fatigue stresses.

5.9 Allowable stresses

The anchor winch shall be constructed in such a way that no stress calculated by simple elastic theory occurs which exceeds 0,9 times material 0,2 % proof stress, when subjected to a static load equal to the breaking strength of the anchor line.

Stress so calculated in the brake systems or parts being exposed to load during braking shall not exceed 0,85 times the material 0,2 % proof stress during such loads.

When emergency release is effected, the stresses shall not result in permanent deformation in any part.

The yield stress shall not be assumed higher than 0,8 times the minimum breaking strength of the material.

Components liable to fatigue shall be designed for at least 10 years life.

5.10 Drive equipment

5.10.1 Electrical drives and control equipment shall conform to the requirements of IEC 92.

5.10.2 Hydraulic drives and control equipment shall conform to the requirements of ISO 4413. Systems nominal pressure shall be selected from ISO 2944.

6 Acceptance tests

All winches shall be subjected to the following tests at the workshop or on board:

a) function of clutches, brakes, chain or wire rope stoppers, etc.;

b) calibration of instruments for tension, length, and speed;

c) no-load lost at nominal speed for 30 min in each direction, with checks for leakages, bearing temperature and abnormal noise;

d) test of maximum hauling tension.

In addition, one winch of each type shall be tested for

e) the static brake power of the brakes at a torque equal to the braking capacity as specified in **4.2.1**;

f) residual brake force as defined in **4.2.1**;

g) holding power of chain or wire rope stopper at a load corresponding to the anchor line breaking strength;

h) emergency release at a load corresponding to the anchor line breaking strength.

Which tests are to be carried out at the workshop and which on board shall be agreed upon between the manufacturer, purchaser and other parties involved.

7 Designation

Anchor winches conforming to this International Standard shall be designated as follows:

a) denomination: anchor winch;

b) the number of this International Standard: ISO 9089;

c) type of winch as follows:

CU = cable-lifter unit for chain cable,
DU = drum unit for rope,
TU = twin drum unit for rope,
CCWU = unit with a system where it is not necessary to disconnect the chain cable from the rope,
DCWU = unit with a system where chain cable and rope can be disconnected;

d) side of winch according to **3.3**:

R = right-hand,
L = left-hand;

e) type of drive:

E = electric,
H = hydraulic,
S = steam;

f) diameter of chain cable and/or wire rope or textile rope in millimetres (see ISO 1704, ISO 2408 and ISO 8369);

g) breaking strength in kilonewtons;

h) length of wire rope (if any) or textile rope (if any) in kilometres.

For combined anchor lines, the various line elements shall be described beginning at the anchor (see example 2), giving their diameter and breaking strength.

i) number and, where applicable, position of warping-ends: R or L (see **5.4**);

j) information on motive power: voltage and frequency of electric current, or hydraulic fluid pressure and flow rate;

k) type of drum connection (add X only if it is declutchable).

EXAMPLE 1

Designation of an electric-driven right-hand cable-lifter unit for chain cable of 76 mm diameter and 6 130 kN breaking force, 440 V voltage and 60 Hz frequency:

Anchor winch

ISO 9089 CU – R – E 76 × 6130 – 440/60

EXAMPLE 2

Designation of a hydraulic-driven left-hand unit for a continuous anchor line system consisting of 83 mm diameter 5 600 kN breaking force chain cable at the anchor end and 89 mm diameter rope at the other end, of 1,5 km length, with one warping end, not declutchable, on the left, 440 V voltage and 60 Hz frequency:

Anchor winch

ISO 9089 CCWU – L – H 83 × 5 600/89 × 5 600 – 1,5 – 1L – 440/60

8 Marking

Anchor winches conforming to this International Standard shall be permanently marked as follows:

a) the number of this International Standard: ISO 9089;

b) diameter of chain cable and/or wire rope or textile rope in millimetres (see ISO 1704, ISO 2408 and ISO 8369);

c) breaking strength in kilonewtons;

d) length of wire rope (if any) or textile rope (if any) in kilometres.

For combined anchor lines, the various line elements shall be described beginning at the anchor (see example 2), giving their diameter and breaking strength.

EXAMPLE 1

An anchor winch meeting conditions as for designation example 1 shall be marked:

ISO 9089 76 × 6 130

EXAMPLE 2

An anchor winch meeting conditions as for designation example 2 shall be marked:

ISO 9089 83 × 5 600/89 × 5 600 – 1,5

9 Documentation

9.1 Workshop certificate

A workshop certificate documenting the following specifications shall be delivered with each winch:

a) diameter and breaking strength of chain cable or wire rope;

b) length of wire rope;

c) static brake force for each brake (first layer);

d) holding force for chain or wire rope stopper (first layer);

e) dynamic brake capacity;

f) residual brake force;

g) maximum hauling force at no speed;

h) hauling capacity at the various speed ranges.

9.2 Instructions for use and maintenance

All information for correct installation, safe use and necessary maintenance of the winches shall be contained in an instruction manual.

In addition to the specifications given in the work-shop certificate, the instructions shall describe the function of the winch, and give procedures for normal and emergency operations.

Publication(s) referred to

See national foreword.

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