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**Shipbuilding — Deck machinery —
General requirements**

Construction navale — Auxiliaires de pont — Prescriptions générales

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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. 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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 7825:1985), which has been technically revised.

The main changes compared to the previous edition are as follows:

- environmental condition, material and construction, drums and surface protection have been revised.

Shipbuilding — Deck machinery — General requirements

1 Scope

This document specifies the characteristics common to all deck machinery of any type not detailed in the relevant specific International Standards.

This document is applicable to ships in all navigation zones.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3828, *Shipbuilding and marine structures — Deck machinery — Vocabulary and symbols*

ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 7824, *Shipbuilding and marine structures — Lubrication nipples — Cone and flat types*

ISO 8501-1, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules*

IEC 60092, *Electrical installations in ships*

IEC 60529, *Degrees of protection provided by enclosures*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

deck machinery

power-driven (including manpower) mechanical equipment installed on ship deck, such as anchoring and mooring equipment, hoisting equipment, hatch cover opening and closing equipment, survival equipment, mechanical equipment and devices which are needed in the embarking of passengers and crew and equipment for special operations

4 Environmental condition

4.1 Deck machinery shall be operated between -25 °C and $+45\text{ °C}$. If ambient temperature exceeds the above limitation, it shall be specified in the contract.

4.2 All parts of the deck machinery shall be designed taking into account the effects of specific loads resulting from extra movement, such as ship navigation, vibration, inclination and swing under normal operating conditions.

4.3 Unless otherwise specified, under the following environmental conditions, deck machinery and its attachments shall be firmly installed on deck.

Table 1 — Ship inclination

Horizontal		Longitudinal	
Heeling angle	Rolling angle	Trimming angle	Pitching angle
±15°	±22,5°	±5°	±7,5°

4.4 Unless otherwise specified, all deck machinery shall be capable of operating normally under damp conditions, salt mist and mould.

4.5 All electrical equipment, which is installed in a potentially explosive atmosphere, shall meet the requirements of applicable standards for explosion-proof electrical equipment.

4.6 Deck machinery installed on the weather deck shall be designed, taking into account the effects of additional loads, such as wave loads and wind loads.

5 Material and construction

5.1 Steel casting

When carbon steels and carbon manganese steels for mechanical structure are connected by welding, the carbon content shall not exceed 0,23 %. For non-welding steel castings, the carbon content shall not exceed 0,40 %. If steel castings of higher carbon content need to be used in a particular case, it shall be approved by the vessel inspection department or purchaser.

5.2 Forging steel

For carbon steels for shafts and mechanical structure, the carbon content shall not exceed 0,65 % and the carbon content of alloy steel forgings shall not exceed 0,45 %. Carbon steels and carbon manganese steels for welded structure shall not exceed 0,23 %. If steel forgings of higher carbon content need to be used in a particular case, it shall be approved by the vessel inspection department or purchaser.

5.3 Other materials used in special environmental conditions

Deck machinery used at a low temperature (below -25 °C) shall be specified in the contract.

5.4 Welding

A welding procedure specification for metal material shall be established and evaluated according to ISO 15607. Specific requirements shall be specified in the contract.

Manufacturers shall be responsible for the strength of all components.

Materials containing asbestos shall not be used.

6 Drums

The minimum flange diameter of drums shall depend on the diameter and length of the rope wound on the drum (steel cable or synthetic rope).

In calculation, if there is no relevant product standard, it shall meet the following conditions.

- a) Each layer of rope shall overlap, i.e. there is no half rope bias between two adjacent loops while the drum capacity is calculated.
- b) When the spooling gear is not installed, the distance between the maximum outer diameter of all ropes around the drum and the outer diameter of the drum flange is at least 1,5 times the diameter of steel cables or 1,0 times the diameter of synthetic ropes.
- c) When the spooling gear is installed, the outer diameter of the drum flange is greater than the maximum outer diameter of all ropes around the drum.

7 Operation and safety

7.1 Operating levers

The operating levers shall be fitted in accessible, readily visible positions so as to ensure complete operational safety. They shall be constructed and placed in such a way that they can be operated correctly and the signs or indications can be read clearly. If necessary, a safety device shall be provided to prevent misoperation.

The maximum movement of operating levers shall not exceed 600 mm if movable in one direction only or 300 mm to either side from a central position if movable in both directions. From the operator's normal position, they shall move towards right when hauling and towards left when paying out. Alternatively, they shall be pulled when hauling and pushed when paying out.

Generally speaking, the lever shall move in the direction of the intended movement.

For lever-operated brakes, the brake shall engage when the lever is pulled and disengage when the lever is pushed.

The manual effort on the brake for the operator shall not exceed 160 N.

7.2 Pedals

During the operation of the brake by the pedal, the maximum movement shall not exceed 250 mm, and the physical effort for the operator shall not exceed 320 N. The pedal surface shall be provided with anti-skid features.

7.3 Handwheels and crankhandles

The hand wheel or crank handle shall actuate the brake or the clutch when turned clockwise and release the brake or the clutch when turned counterclockwise.

For the brake or the clutch used in short-term operation, the maximum force for a single person applied to the hand wheel and crank handle is 500 N. For the brake or the clutch used in continuous operation, the maximum force for a single person applied to the hand wheel and crank handle is 250 N. For the brake or the clutch used in continuous hoisting operation, the maximum force for a single person applied to the hand wheel and crank handle is 160 N.

Continuous operation: The time of continuous loading operation shall be more than 1 min.

Short-term operation: The time of continuous loading operation shall be no more than 1 min.

7.4 Push-buttons

When not associated with automatic sequential control, separate push-buttons shall be provided for each direction of operation to ensure the reliability and validity. In all cases, actuate the machine by

pressing the push-buttons and stop the machine by releasing the push-buttons. Where appropriate, the above push-buttons can be replaced by two buttons "Start" and "Stop".

7.5 Operational marks

All control elements shall be permanently marked for identification, unless their functions are clearly recognized. If required, instructions shall be permanently marked in a readily visible position.

7.6 Safety protection

Adequate protection shall be provided for all external gears and all moving surfaces. An electrical cable and all electrical equipment exposed to shocks and chafing by ropes or cargo shall be protected by pipes or other means.

Except for the hydraulic system, suitable protection shall be provided for preventing persons from coming into contact with surfaces having temperatures over 50 °C.

8 Inspection access

Adequate and easy access shall be provided for inspection of reduction gears, bearings, brakes, etc.

9 Lubrication

Adequate and easily accessible manual lubrication points shall be provided, both for oil and grease, in order to ensure that all parts are correctly lubricated. Nipples shall be standard type and in accordance with ISO 7824. Nipples shall be fitted so as not to be damaged by mechanical shocks and chafing, and protected against dirt and/or upsetting of paint. Moreover, the nipples shall always be easily accessible.

Gear-boxes shall be provided with easily accessible means for level checking and drainage plugs. Lubrication shall also be efficient when machinery is inclined at any angle up to 15° in any direction.

10 Surface protection

Metallic surfaces shall be free from any trace of moisture, grease, dirt, weld spatter, burrs or other flaws and sand blasting shall be carried out before a protective finish is applied. The anti-rust grade shall meet the requirements of Sa2 1/2 grade in ISO 8501-1. Manual or power tools shall be used for rust removal when spray facility is structure-limited and not available. The antirust grade shall meet the requirements of the St3 grade in ISO 8501-1.

The coatings of the substrate and surface and the coating thickness shall be agreed upon between manufacturer and customer.

11 Hydraulic pressure and electrical

Hydraulic drive and control system shall meet the relevant requirements of ISO 4413.

Electrical facilities shall meet the relevant requirements of IEC 60092.

The lowest protection grade of electrical equipment on the weather deck is IP56 according to IEC 60529.

12 Markings

All machinery shall be permanently marked with the following data and information:

- a) name of product, name and country of manufacturer;