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## Shipbuilding — Fixed jib cranes — Ship-mounted type for general cargo handling

*Construction navale — Grues à flèche fixe — Type de bord pour manutention de  
marchandises diverses*

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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 8431 was prepared by Technical Committee ISO/TC 8, *Shipbuilding and marine structures*.

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.

ISO 8431:1988

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# Shipbuilding — Fixed jib cranes — Ship-mounted type for general cargo handling

## 1 Scope and field of application

This International Standard specifies the requirements for permanently mounted fixed single jib cranes powered by electric or hydraulic systems, or reciprocating internal combustion (RIC) engines.

Jib cranes are capable of hoisting, lowering, level luffing or slewing general cargo. All functions may be performed separately or simultaneously, as agreed between the manufacturer and purchaser.

This International Standard does not include magnet and grabbing types, nor requirements for multicrane operation, nor details for the type of permanent mounting, e.g. on a strengthened deck, or pedestal or rotating pedestal; nor are requirements for multicrane, twin jib crane, telescopic and/or articulated jib crane or offshore operation included.

## 2 References

ISO 2374, *Lifting appliances — Range of maximum capacities for basic models.*

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

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

ISO 4301-1, *Cranes and lifting appliances — Classification — Part 1 : General.*

ISO 4306-1, *Lifting appliances — Vocabulary — Part 1 : General.*

ISO 4308-1, *Cranes and lifting appliances — Selection of wire ropes — Part 1 : General.*

ISO 4310, *Cranes — Test code and procedures.*

ISO 7363, *Cranes and lifting appliances — Technical characteristics and acceptance documents.*

ISO 7752-1, *Lifting appliances — Controls — Layout and characteristics — Part 1 : General principles.*

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

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

ISO 8686-1, *Cranes and lifting appliances — Design principles for loads and load combinations — Part 1 : General.*<sup>1)</sup>

IEC Publication 92, *Electrical installations in ships.*

IEC Publication 529, *Classification of degrees of protection provided by enclosures.*

## 3 Definitions

For the purposes of this International Standard, the definitions given in ISO 3828 and ISO 4306-1 apply, with the following additions.

**3.1 luffing:** Angular motion of the jib in a vertical plane. (Definition repeated from ISO 4306-1.)

**3.2 nominal size:** Figure corresponding to the safe working load (SWL) which a jib crane is rated to lift at the maximum operating radius at the hook, expressed in tonnes.

NOTE — It is common for this type of crane to have a constant SWL at all operating radii.

**3.3 nominal hoisting speed:** Average speed at which the safe working load (SWL) can be lifted using the hoist winch only.

**3.4 nominal luffing time:** Time taken to raise the jib with the safe working load (SWL) from the maximum operating radius to the minimum operating radius, by the use of the luffing device only.

**3.5 nominal slewing speed:** Speed which the jib crane can maintain when the jib with the safe working load (SWL) is revolved at maximum operating radius, under adverse conditions of 5° heel and 2° trim acting simultaneously.

1) At present at the stage of draft.

## 4 Design and construction

Cranes shall meet the general requirements for deck equipment in ISO 7825, and the specific requirements given in 4.1 to 4.8. For crane classification and utilization classes, see ISO 4301-1; for the selection of the wire ropes (4.3), and for further requirements, see ISO 4308-1.<sup>1)</sup>

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

### 4.1 General

4.1.1 For the design of structural parts of the jib crane, see ISO 8686-1. Marine applications are under consideration.

4.1.2 The crane shall be designed to work safely and efficiently at all angles of heel of the ship up to 5° and at all angles of trim up to 2° occurring simultaneously.

If greater angles of heel and trim are required, these shall be notified to the manufacturer by the purchaser at the time of enquiry.

4.1.3 The manufacturer shall indicate the limiting conditions for operation of the crane and shall ensure that adequate guidance is provided for stowage of the crane.

### 4.2 Design of hoist and luffing mechanisms

4.2.1 The diameter of the drums used in these mechanisms shall be not less than 18 times the diameter of the steel wire rope, measured at the bottom of the groove, if any. For standard sizes of steel wire rope, see ISO 2408.

4.2.2 The length of these drums shall be such that the rope can be fully accommodated in not more than three evenly wound layers. The arrangement shall be such that there will be not less than three turns of the rope on the drum at any position of the hook or jib.

4.2.3 The flange height shall be such that it will project not less than 2,5 times the rope diameter beyond the outermost layer, when the maximum working length of rope is fully and evenly wound on the drum, except when fitted with a special mechanical device preventing the wire jumping over the flange; in this case a lower value is allowed.

4.2.4 Hoisting and luffing mechanisms shall be provided both with a device to prevent slack rope developing and with a limit stop or switch.

### 4.3 Design ropes

Wire rope shall be suitable for the diameters of the sheaves and drums, and shall comply with galvanized steel wire rope in accordance with ISO 2408<sup>2)</sup> or with an equivalent national standard, and have a minimum breaking load not less than the maximum tension in the rope multiplied by a factor obtained from table 1.

Table 1 — Safety factor of ropes\*

Safe working load (SWL) t	Safety factor
SWL < 10	5
10 < SWL < 160	$\frac{10\,000}{(8,85\text{ SWL}) + 1\,910}$
SWL > 160	3

\* Proper allowance should be made for friction in the reeving system, particularly for lower values of the safety factor.

### 4.4 Brake system design

4.4.1 Automatic braking systems shall be provided for all motions. The automatic braking systems shall function when the operating devices return to stop or the braking position, and also when there is no power supply available to the crane.

4.4.2 The braking systems shall be capable of effectively arresting and holding a load equivalent to at least 1,5 times the safe working load when braking from the maximum design system speed or 1,25 times for slewing gears at the angles of heel and trim specified in 4.1.2.

4.4.3 Means shall be provided for controlled lowering of the load and for over-riding the brakes in the event of a power failure.

4.4.4 The braking systems shall not induce excessive shock loads, i.e. "excessive" meaning likely to cause damage to the crane structure, mechanism or ship's supporting structure.

4.4.5 Mechanical brakes shall be fitted with brake linings of incombustible material, which shall not be unduly affected by heat and moisture.

### 4.5 Control

For other requirements not covered by the specific following subclauses or by ISO 7825, see ISO 7752-1.

1) For the purposes of this International Standard, the empirical factor  $K'$  should be taken as 0,330.

2) This requirement does not preclude the use of non-galvanized steel wire rope, by agreement between the shipowner and Classification Society.