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Cranes — Limiting and indicating devices —

Part 3: Tower cranes

Appareils de levage à charge suspendue — Limiteurs et indicateurs —

Partie 3: Grues à tour

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 10245-3 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 7, *Tower cranes*.

This second edition cancels and replaces the first edition (ISO 10245-3:1999), which has been technically revised.

ISO 10245 consists of the following parts, under the general title *Cranes — Limiting and indicating devices*:

— *Part 1: General*

— *Part 2: Mobile cranes*

— *Part 3: Tower cranes*

— *Part 4: Jib cranes*

— *Part 5: Overhead travelling and portal bridge cranes*

Cranes — Limiting and indicating devices —

Part 3:
Tower cranes

1 Scope

This part of ISO 10245 gives requirements specific to tower cranes for limiting and indicating devices. It is applicable to tower cranes as defined in ISO 4306-3.

It is not applicable to end stops such as buffers used to stop trolleying, travelling or derricking movements, nor to erection, dismantling operations or the changing of a crane's configuration.

NOTE General requirements for the devices are given in ISO 10245-1.

2 Normative references

The following referenced documents are indispensable for the application 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 4306-3, *Cranes — Vocabulary — Part 3: Tower cranes*

ISO 10245-1:2008, *Cranes — Limiting and indicating devices — Part 1: General*

IEC 60204-32:—[1)], *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 61310-1:2007, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10245-1 and the following apply.

3.1
rated capacity
net load that a crane is designed to lift for a given operating condition such as the position of the load, and a given configuration such as the length of the jib

NOTE For the definition of net load, see ISO 4306-1:2007, 6.1.3.

1) To be published.

3.2
radius indicator
device that indicates the horizontal distance between the centreline of a crane and the centreline of the suspended load

3.3
working space limiter
device to prevent, on a single crane, the risk of moving loads and/or crane parts into a protected space

3.4
protected space
space in which movement of the load and/or any crane part is absolutely not allowed

NOTE Generally, when out of service, the jib and the counter-jib are permitted to move into the protected space.

4 Rated capacity limiters and indicators — General requirements

4.1 Rated capacity limiters and indicators shall be provided on all cranes having a rated capacity of 1 000 kg or above, or an overturning moment of 40 000 N·m or above due to the load.

4.2 Features shall be incorporated to minimize the risk of accidental change of any manual setting device (e.g. by locking, double action).

4.3 In addition to the requirement of ISO 10245-1:2008, 4.2.4, rated capacity limiters and indicators may require adjustment after a change in the crane configuration out of normal operation, e.g. reassembly or adding of crane parts like jib extensions.

4.4 ISO 10245-1:2008, 4.2.6, is not applicable to tower cranes.

4.5 The design and installation of rated capacity indicators and rated capacity limiters shall take into account the need to test the indicator or limiter. Where it is necessary to disconnect parts of the devices during testing, facilities shall be provided to check and/or reset the devices after the test.

4.6 If interruption of the power occurs, the setting of limiters and indicators shall be retained.

5 Rated capacity limiters

5.1 Tower cranes shall be equipped with rated capacity limiters as described in ISO 10245-1:2008, 4.3.

5.2 The rated capacity limiter shall activate at not less than 102 % and not more than 110 % of the rated capacity.

5.3 Provision for overriding the rated capacity limiter shall not be provided.

Use of the alternative setting of the standard rated capacity limiter foreseen by the manufacturer is not considered as overriding if the crane is kept within its designed and stated capacity as given in the instruction handbook.

6 Rated capacity indicators

6.1 Tower cranes shall be fitted with a rated capacity indicator in accordance with ISO 10245-1:2008, 4.4.

6.2 As the crane approaches its rated capacity, the rated capacity indicator shall give clear and continuous visual and/or audible warning to the operator. The warnings shall commence at not less than 90 % and not more that 95 % of the rated capacity.

6.3 On tower cranes provided with remote controls, this rated capacity indicator may be installed on the crane. It shall give a visual warning signal.

6.4 The rated capacity indicator shall give a clear and continuous warning when the rated capacity is exceeded. The warning shall be visual at the operator's control station and audible to the crane operator and to those in the vicinity of the crane. The warnings shall commence at not less than 102 % and not more than 110 % of the rated capacity.

6.5 Systems shall enable periodic functional checks to be carried out to verify that indicators are operating correctly.

6.6 No provision shall be made for the crane operator to cancel a warning from the control station, except when both audible and visual warnings are used for the same situation, in which case the audible warning has been active for 5 s. If such a cancellation facility is used, the warning shall automatically operate if the crane subsequently returns to a condition requiring an audible warning.

NOTE Provision may be made to cancel the audible warning during calibration and testing of the crane.

6.7 There shall be a clear difference between the warning for approach and the warning for overload, e.g. a visual warning may be one colour for the approach and another colour for overload.

6.8 Warnings shall be in accordance with IEC 60204-32:—, 10.2.2, 10.3 and 10.8, and IEC 61310-1:2007.

7 Motion and performance limiting devices

7.1 Motion limiters

7.1.1 Motion limiters shall be provided in accordance with of ISO 10245-1:2008, 4.5.1, and Table 1, below.

Table 1 — Motion limiters

Type	Required to be provided	
Hoisting limiter	YES	
Lowering limiter	YES	
Slack rope limiter	NO	
Slewing limiter	NO if power supply via a slipping assembly	
Travelling limiter	YES	
Derricking limiter	YES	
Telescoping limiter	NO during erection	YES, if under working conditions
Control station position limiter	YES, if the control station is moved during service	
Working space limiter [a]	Not mandatory, at the request of the user	
Anti-collision device [b]	Not mandatory, at the request of the user	
Trolleying limiter	YES	

[a] A working space limiter and a crane being interdependent of one another, the power supply shall be such that when the crane is "on", the working space limiter is automatically "on".

[b] See Annex A.

7.1.2 Where a secondary (“back-up”) limiter needs to be provided for a single motion; it shall not be possible to operate the limited motion in both directions after the second limiter has been activated until a reset action has been carried out. This reset action shall not be readily available to the crane operator at the control position. The indication and reset action are not required when the second limiter is a fixed stop designed to absorb the energy of the motion.

7.1.3 Each tower crane shall be capable of being equipped with an anti-collision device. If parts of a crane and/or loads are in a certain space, this device shall stop motions from following cranes to avoid collision in this space and allow the reverse movement.

The crane manufacturer shall determine the connection points necessary for the action of the device on the movement or function of the crane.

The choice of these connection points and the given orders shall be such that the device actions are compatible with the normal use of the crane mechanisms (decelerating before stopping high-inertia motions, mechanical brakes application).

All connection points necessary for the installation of the device on the crane motion shall be assembled in a specific collector or on a dedicated cable. This specific collector or dedicated cable shall be installed on all cranes except on self-erecting cranes.

NOTE Annex A provides some guidance for the anti-collision device.

7.1.4 The tower crane shall be capable of being equipped with a working space limiter. This device shall be designed to stop motions in order to avoid entering a forbidden area and allow the reverse movement.

7.1.5 When it is necessary to override motion limiters in normal operation (e.g. change of the fall number, storage of the trolley) provision may be at the control station.

The overriding devices shall be hold-to-run types and the crane components and the crane’s stability shall not be endangered.

7.2 Performance limiters

If a risk exists that the load speed could exceed the maximum authorized speed, without automatic braking, the tower cranes shall be fitted with the following performance limiting devices to ensure that the speed of operation remains within the design limits:

a) hoisting speed limiter;

b) lowering speed limiter;

c) derricking speed limiter where derricking motion is provided.

8 Motion and performance indicating devices

8.1 The tower cranes shall be provided with indicators in accordance with Table 2. The choice is given between the solutions marked with an “X”. Other means of providing equivalent information can also be used.

NOTE Indicators for the actual radius and the actual load give a more precise indication than the plates on the jib.

Table 2 — Indicators

	Horizontal jib non telescopic		Telescopic jib		Folding jib		Luffing jib	
	Tower cranes assembled from components parts	Self-erecting tower cranes	Tower cranes assembled from components parts	Self-erecting tower cranes	Tower cranes assembled from components parts	Self-erecting tower cranes	Tower cranes assembled from components parts	Self-erecting tower cranes
Indicators for actual radius and actual load.	X	X	X	X	X	X	X	X
Plates on the jib. The load ratio between two succeeding steps is not more than 1,5, including the value of the maximum load at the maximum authorised radius and the value of the load at the maximum radius.	X	X						
Plates on the jib indicating the value of the maximum load at the maximum authorised radius and the value of the load at the maximum radius.				X		X		X

8.2 Other indicating devices as described in ISO 10245-1 are recommended, as the indications of parameters shown in data sheets for the crane provide a valuable aid to the operator.

8.3 Indicators shall be in accordance with IEC 60204-32:—, 10.2.2, 10.3 and 10.8, and IEC 61310-1:2007.

8.4 The response time of indicators shall be appropriate to the rate of change of the parameter indicated, so that they always show the current position.

9 Anemometer

Tower cranes shall be provided with an anemometer, except for self-erecting cranes with a height under hook of less than 30 m measured with a horizontal jib.

Annex A
(informative)

Requirements for provision of anti collision devices on tower cranes

A.1 Introduction

This annex specifies the requirements for the installation of anti-collision devices on tower cranes.

The purpose of an anti-collision device is to avoid the risk of collision between several cranes in motion.

NOTE The decision to install such a device on a crane is under the responsibility of the user and depends on the risk analysis when the cranes are erected on the job site.

A.2 Power supply

The anti-collision devices installed on various cranes shall operate on each crane as long as at least one crane is in service.

The power supply for the anti-collision device may be taken from the crane.

A.3 Indications to be given

A.3.1 To the operator

When there is a cabin, indications shall be provided to the crane operator to allow him to maintain control during driving and to avoid dangerous areas.

Stopping of system functioning due to a fault or neutralization of the system shall be indicated.

This indication may be given by sound or by visual means in the field of vision of the crane operator.

A.3.2 To people nearby

Stopping of system functioning due to a fault or neutralization of the system on a crane shall be indicated to people in proximity by a white flashing light visible from the worksite.

Bibliography

[1] ISO 4306-1:2007, *Cranes — Vocabulary — Part 1: General*

[2] ISO 8686-1, *Cranes — Design principals for loads and load combinations — Part 1: General*

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