
**Cranes — Requirements for
mechanisms —**

**Part 3:
Tower cranes**

*Appareils de levage à charge suspendue — Prescriptions pour les
mécanismes*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Partie 3: Grues à tour

ISO 10972-3:2003

<https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003>



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 10972-3:2003](https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003)

<https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003>

© ISO 2003

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

	Page
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Specific provisions for tower cranes	2
4.1 Design criteria	2
4.2 Power (motors)	3
4.3 Coupling	4
4.4 Brakes	4
4.5 Out-of-service devices for slewing mechanisms	6
4.6 Hydraulic and pneumatic systems	6
4.7 Gear drives	8
4.8 Rope and chain requirements	8
4.9 Maintenance and instructions	10

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 10972-3:2003](https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003)

<https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003>

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 10972-3 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 7, *Tower cranes*.

ISO 10972 consists of the following parts, under the general title *Cranes — Requirements for mechanisms*:

- Part 1: *General*
- Part 3: *Tower cranes*

ITeH STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003>

Introduction

This part of ISO 10972 applies the principles given in ISO 10972-1 to tower cranes, and establishes minimum requirements of good practice for mechanisms in order to enhance safety. It is acknowledged that innovations and new materials may enable new mechanisms that are not addressed here. This part of ISO 10972 is not intended to prohibit such innovations provided they furnish equivalent safety.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 10972-3:2003](https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003)

<https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 10972-3:2003

<https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003>

Cranes — Requirements for mechanisms —

Part 3: Tower cranes

1 Scope

This part of ISO 10972 establishes requirements which apply specifically to the mechanisms and related components of tower cranes, in addition to the general requirements given in ISO 10972-1.

These additional requirements concern

- a) the arrangement, features and characteristics of the crane mechanisms, and
- b) the minimum requirements for certain mechanism components.

Rules for the proof of competence calculation regarding different limit states (yield strength, fatigue, wear) are excluded from this part of ISO 10972.

This part of ISO 10972 is not applicable to the climbing mechanisms and related components used on tower cranes, nor to the climbing frame.

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 4301-3, *Cranes — Classification — Part 3: Tower cranes*

ISO 4302, *Cranes — Wind load assessment*

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

ISO 4306-3, *Cranes — Vocabulary — Part 3: Tower cranes*

ISO 4413, *Hydraulic fluid power — General rules relating to systems*

ISO 9374-3, *Cranes — Information to be provided for enquiries, orders, offers and supply — Part 3: Tower cranes*

ISO 10972-1, *Cranes — Requirements for mechanisms — Part 1: General*

IEC 60204-32, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4306-1 and ISO 4306-3 and the following apply.

3.1

coupling

device that connects two components and transmits torque between them

3.2

maximum working pressure

maximum pressure in any hydraulic circuit or individual component during normal operation

4 Specific provisions for tower cranes

4.1 Design criteria

4.1.1 Hoist winches

Powered hoist winches are used for lifting and lowering loads at controlled speeds. Movements due to gravity alone are not allowed.

The group classification of the hoisting winch mechanism shall be in accordance with ISO 4301-3.

4.1.2 Luffing mechanisms

Powered luffing mechanisms shall derrick the jib with the load at controlled speed. Movements due to gravity alone are not allowed.

The group classification of the luffing mechanism shall be in accordance with ISO 4301-3.

4.1.3 Hydraulic systems

<https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003>

The characteristics of the hydraulic systems and relative components shall be designed to comply with ISO 4413.

4.1.4 Trolley-travelling mechanisms

The mechanisms shall allow horizontal or inclined motion of the trolley along the jib with the load applied.

If the mechanism provides hoisting of the load, it shall also comply with the standards relative to lifting mechanisms.

The system shall ensure the controlled motion of the trolley with load in both directions, in accordance with the geometric configuration of the crane jib (whatever the inclination).

Movements determined by gravity alone are not permitted.

The group classification of the trolley travelling mechanism shall be in accordance with ISO 4301-3.

4.1.5 Crane-travelling mechanisms

If a travelling mechanism is fitted, tower cranes can travel on

- a) straight rails,
- b) rails featuring curves.

The travelling mechanisms shall provide driving mechanisms at least at two corners, consisting of an electric motor, a coupling, a brake, a speed reducer and wheels for running on the rails.

Provision shall be made to allow greasing.

The diameter and number of wheels shall be assessed in accordance with the load per corner.

The crane shall be equipped with means for anchoring against dragging, when it is out-of-service.

This resistance shall be assessed in relation to the dragging force of the wind, in out-of-service conditions, in accordance with ISO 4302.

The group classification of the crane-travelling mechanism shall be in accordance with ISO 4301-3.

4.1.6 Slewing mechanisms

The slewing mechanisms shall enable the positioning of the hook and the load in the desired position.

The power should be supplied by means of a slip ring. When no slip ring is used, the jib rotation shall be limited, in both directions. The cable shall be arranged in such a manner that it cannot be damaged.

The group classification of the slewing mechanism shall be in accordance with ISO 4301-3.

4.2 Power (motors)

4.2.1 Hoist winches and luffing winches

The selection of electric motors shall be in accordance with IEC 60204-32.

The position of the motor shall allow sufficient ventilation.

<https://standards.iteh.ai/catalog/standards/sist/fc3096d7-bdbd-4544-9085-08bb8f96d8cd/iso-10972-3-2003>

4.2.2 Trolley-travelling mechanisms

The power and torque of the motor shall be sufficient to allow the movement of the trolley in all operating and test conditions, taking into account the following:

- a) the influence of the jib's angle of inclination (the jib is never perfectly horizontal);
- b) resistance to rolling;
- c) any friction on the rims of the wheels;
- d) the friction caused by the load-hoisting ropes;
- e) the lifting of the load (inclined-jib cranes without systems for horizontal load trajectory);
- f) the influence of the wind;
- g) the inertia and the performance of the mechanism.

4.2.3 Crane-travelling mechanisms

The motors shall provide the power required, assessed on the basis of

- a) maximum friction and mass,
- b) lateral friction between rail and wheel,
- c) minimum gradient tolerated by the rails,
- d) number of starts in the unit of time,
- e) force of the wind when the structure is in service.