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ISO 10972-1

Cranes — Requirements for mechanisms —

Part 1: General

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

Partie 1: Généralités

Second edition
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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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 document 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).

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For an explanation of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 9, *Bridge and gantry cranes*.

This second edition cancels and replaces the first edition (ISO 10972-1:1998), which has been technically revised.

The main changes are as follows:

— in 4.4, the requirement for cranes intended for transportation of molten metals or similar hazardous materials has been moved to a new Clause 5;

— in 4.8, the requirement of rope drives has been revised according to ISO 16625;

— in 4.11, the requirement of load lifting attachment has been revised according to EN 13135:2013+A1:2018;

— a new Clause 5 on high-risk applications has been added.

A list of all parts in the ISO 10972 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document establishes design requirements and guidance that reflect the present state of the art in the field of crane machine design. This document enables cranes to fulfil the essential safety requirements and ensures adequate service of their components. It is acknowledged that new technologies, materials, etc. can bring about new solutions that result in equal or improved safety and durability.

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Cranes — Requirements for mechanisms —

Part 1: General

1 Scope

This document establishes requirements for mechanisms and related components of cranes as described in ISO 4306 series, concerning:

a) general layout and design of mechanisms;

b) selection and/or design requirements of components.

This document does not provide requirements for proof of competence calculation regarding different limit states (yield strength, fatigue, wear).

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 3077, *Short-link chain for lifting purposes — Grade T, (types T, DAT and DT), fine-tolerance hoist chain*

ISO 4301-1, *Cranes — Classification — Part 1: General*

ISO 4306 (all parts), *Cranes — Vocabulary*

ISO 16625, *Cranes and hoists —Selection of wire ropes, drums and sheaves*

ISO 4302, *Cranes — Wind load assessment*

ISO 4310, *Cranes — Test code and procedures*

ISO 4347, *Leaf chains, clevises and sheaves — Dimensions, measuring forces, tensile strengths and dynamic strengths*

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

ISO 4414, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 4779, *Chain components for lifting purposes — Forged eye hook with point and latch — Grade 4, stainless steel, solution annealed*

ISO 6336-1, *Calculation of load capacity of spur and helical gears — Part 1: Basic principles, introduction and general influence factors*

ISO 6336-2, *Calculation of load capacity of spur and helical gears — Part 2: Calculation of surface durability (pitting)*

ISO 6336-3, *Calculation of load capacity of spur and helical gears — Part 3: Calculation of tooth bending strength*

ISO 6336-5, *Calculation of load capacity of spur and helical gears — Part 5: Strength and quality of materials*

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ISO 7752-1, *Cranes — Control layout and characteristics — Part 1: General principles*

ISO 7752-2, *Cranes — Control layout and characteristics — Part 2: Basic arrangement and requirements for mobile cranes*

ISO 7752-4, *Cranes — Controls — Layout and characteristics — Part 4: Jib cranes*

ISO 7597, *Forged steel lifting hooks with latch, grade 8*

ISO 8686 (all parts), *Cranes — Design principles for loads and load combinations*

ISO 10300-1, *Calculation of load capacity of bevel gears — Part 1: Introduction and general influence factors*

ISO 10300-2, *Calculation of load capacity of bevel gears — Part 2: Calculation of surface durability (macropitting)*

ISO 10300-3, *Calculation of load capacity of bevel gears — Part 3: Calculation of tooth root strength*

ISO 12210, *Cranes — Anchoring devices for in-service and out-of-service conditions*

ISO/TS 14521, *Gears — Calculation of load capacity of worm gears*

ISO 17440, *Cranes — General design — Limit states and proof of competence of forged steel hooks*

ISO 20332, *Cranes — Proof of competence of steel structures*

ISO 21940-11, *Mechanical vibration — Rotor balancing — Part 11: Procedures and tolerances for rotors with rigid behaviour*

ISO 23778, *Proof of competence of hydraulic cylinders in crane applications*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
in-service braking
stopping or slowing the crane motion with the motor disconnected, through an immediate and easy control by the operator from the normal working position

3.2
out-of-service braking
avoiding unwanted starts for indefinite periods of time

Note 1 to entry: Actuation may be automatic or manual.

3.3
emergency braking
backup braking
safety braking
stopping the crane motion in case of loss of power or pressure supply through engagement with a limiting device or the activation of an emergency stop switch

3.4
control braking
maintaining a desired speed, automatically or by the operator, with the motor engaged

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