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## Cranes — Classification —

### Part 3: Tower cranes

*Appareils de levage à charge suspendue — Classification —  
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.

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](http://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](http://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 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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 7, *Tower cranes*.

This second edition cancels and replaces the first edition (ISO 4301-3:1993), which has been technically revised.

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

- new approach for the classification of tower cranes and its components has been introduced, based on ISO 4301-1:2016;
- the classification has been limited on three different types of tower cranes for construction works, as defined in ISO 4306-3:2016.

A list of all parts in the ISO 4301 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](http://www.iso.org/members.html).

# Cranes — Classification —

## Part 3: Tower cranes

### 1 Scope

This document provides the classification of tower cranes for construction work as defined in ISO 4306-3, and gives specific requirements for steel supporting structure, mechanisms, ropes and further components basing on standard service conditions, mainly expressed by the following:

- the number of working cycles;
- the load spectrum factor;
- the average displacements; and
- additional values for factors to be used at the structural or mechanical calculation.

Tower cranes for construction work are exclusively equipped with a hook as load-handling device.

For tower cranes intended to be used for other purposes and/or equipped with other load handling devices, other values according to the specified usage of the tower crane may result.

### 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 4301-1:2016, *Cranes — Classification — Part 1: General*

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

ISO 20332:2016, *Cranes — Proof of competence of steel structures*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4301-1:2016 and ISO 4306-3 apply.

ISO and IEC maintain terminological 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/>

## 4 Symbols

For the purposes of this document, the symbols given in ISO 4301-1:2016, ISO 20332:2016 and [Table 1](#) apply.

**Table 1 — Main symbols**

Symbol	Description
A	Classes for group classification of cranes
A <sub>c</sub>	Classes for group classification of components and mechanisms
C	Total number of working cycles
D <sub>l</sub>	Classes for average linear displacements <sup>a</sup>
D <sub>a</sub>	Classes for average angular displacements
K <sub>p</sub>	Load spectrum factor of crane
K <sub>cp</sub>	Load effect spectrum factor of component and mechanism
k <sub>m</sub>	Stress spectrum factor of detail under consideration
l <sub>r</sub>	Number of ropes used during design life of crane
Q	Classes Q for group classification of load or stress spectrum factor <sup>b</sup>
S	Classes S for group classification of stress history parameter
U	Classes U for group classification of total number of working or stress cycles

<sup>a</sup> For unambiguous use of the classes D, the subscript l has been added to indicate all kinds of linear motions. ISO 4301-1:2016, 6.5.2 and Table 6, apply.

<sup>b</sup> To allow for a general use of the Q-classes for group classification of load and stress spectrum factors the subscript p used in ISO 4301-1:2016 has been omitted.

## 5 Classification of tower cranes

[ISO 4301-3:2021](#)

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### 5.1 General

According to ISO 4306-3, tower cranes can be divided into three different types based on their general design:

- tower cranes erected from parts;
- self-erecting tower cranes;
- mobile self-erecting tower cranes.

Even if [Tables 2](#) to [4](#) show similar or identical classifications today, these crane types should be displayed separately in order to identify known differences and to allow for taking future findings into account.

Therefore, it is essential to classify the crane type as a whole to specify the intended design life at first. The classification of the cranes' structural parts, mechanisms, ropes or components is then derived from this basic assumption considering statistical effects with the usage of those.

In addition, not only the A-class is specified, but also the minimum load spectrum factor (expressed by the Q-class) together with the corresponding total number of working cycles (expressed by the U-class) of the crane. These parameters describe the permissible design space and limit the use of a load spectrum factor deemed too low at the crane design (see [Figure 1](#)).

The crane classifications given in [Tables 2](#) to [4](#) are appropriate for defining the minimum design requirements for the proof of fatigue strength of tower cranes for construction work and its components according to the state of the art. However, in a few special cases, it can be necessary to adjust the