
Mobile cranes — Presentation of rated capacity charts

Grues mobiles — Présentation des tableaux de charges

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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).

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).

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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 6, *Mobile cranes*.

This second edition cancels and replaces the first edition (ISO 11661:1998), which has been technically revised.

The main changes are as follows:

- added [6.5](#) for manuals in electronic form;
- re-labelled items in [Annex A](#) as examples.

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.

Mobile cranes — Presentation of rated capacity charts

1 Scope

This document specifies a standard presentation or format for mobile crane rated capacities on rated capacity charts.

It is applicable to mobile cranes fitted with boom and boom/jib combinations as defined in ISO 4306-2.

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 4306 (all parts), *Cranes — Vocabulary — Part 2: Mobile cranes*

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

crane rating manual

collection of all *rated capacity charts* (3.2), working area definitions and diagrams, *working range diagrams* (3.3), allowable configurations, warning notes, and other information supplied by the manufacturer for crane operation

3.2

rated capacity chart

tabulation detailing a crane's lifting capacities, set-up and operational information for specific boom and boom/jib combinations, counterweight configurations, slew ranges and crane support configurations

3.3

working range diagram

side elevation view of the crane depicting the heights and radii for all allowable boom and boom/jib combinations

Note 1 to entry: It can also depict and warn about areas of instability.

3.4

working area diagram

plan (top) view of the crane depicting working areas (i.e. 360°, over side, over front) and operating limitations in these areas

4 Crane rating manual

4.1 General

The crane rating manual shall be supplied with each crane and be available to the operator when at the controls. The crane rating manual may be in electronic or physical form such as paper, plastic or metal. When electronic form is supplied, an alternative method for referencing the crane rating manual shall be supplied with the crane and shall be available to the crane operator for when the electronic system is not functional.

4.2 Content of manual

4.2.1 Boom extend modes and configurations

The crane rating manual shall contain information necessary to identify and arrange the boom extend mode configuration for each rated capacity chart. For cranes with only one boom extend mode, this can be omitted.

4.2.2 Counterweight configuration

The crane rating manual shall contain information necessary to identify and arrange the required counterweight configuration for each rated capacity chart. For cranes with only a fixed counterweight (CTWT), this can be omitted.

4.2.3 Auxiliary equipment mass table

The crane rating manual shall include a table consisting of the equivalent deductions for all auxiliary equipment that can be installed on the boom. When such equipment is installed, instructions shall be provided if these tabulated values are to be subtracted from the rated capacities in the rated capacity chart to determine the net available capacity. This table can be either at one place within the manual or included with each applicable rated capacity chart.

Auxiliary equipment is any equipment provided by the manufacturer with an individual crane that can be installed onto the crane except via the load hoist line (e.g. jibs). Equipment that is attached via the load hoist line, such as hook blocks, shall be considered as part of the load subtracted from the printed capacities on the chart. Illustrations, where deemed necessary, should accompany the mass table.

4.2.4 Working range diagrams

The crane rating manual shall include a working range diagram for each main configuration as determined by the manufacturer (see Example A.3). The diagram can be located at one place within the manual or as a corresponding diagram with each rated capacity chart on the opposite facing page. For simple cranes, where all unloaded boom instability areas can be clearly shown on a single working range diagram, it may be separately mounted and not included in the manual.

4.2.5 Forward stability

If forward stability limitations exist for any configuration in an unloaded condition, these limitations shall be clearly defined along with any requirements. An unloaded condition at a given boom length/angle is a condition where only the heaviest load block (e.g. hook block, overhaul ball) specified by the manufacturer for the specific machine is attached to the crane via the load hoist line.

4.2.6 Backward stability

If backward stability limitations exist for any configuration, these limitations shall be clearly defined on the working range diagram or on the specific rated capacity chart.

4.2.7 Working area diagram

The crane rating manual shall include a working area diagram for which rating capacities apply. The working area diagram can be either at one place within the manual or included with each applicable rated capacity chart (see Example A.4).

4.2.8 Notes

Set-up, operational information and definitions shall be provided to explain any terminology or specifications associated with the rated capacity charts presented. These are to be included at one location in the manual, unless warning notes related to a specific configuration are to be included on the same page or in the same section as the chart.

Notes, where used, shall be subdivided into informational data, warnings and definitions. Warnings shall be further subdivided into general, set-up and operational.

4.2.9 Maximum outrigger reaction

The maximum outrigger reaction that can occur when utilizing the crane shall be identified.

5 Rated capacity chart

5.1 Data required

5.1.1 The following is a list of the minimum information to be included on each rated capacity chart:

- a) crane manufacturer's model to which the ratings apply;
- b) counterweight(s) required for use with the ratings (non-removable counterweight information need not be included);
- c) boom or boom/jib combination for which ratings apply;
- d) crane support configuration for which ratings apply, i.e. on crawlers, outriggers or tires. For variable support base positions, each rating chart shall identify the required outrigger base dimensions;
- e) slew area definition for which ratings apply, i.e. 360°, over rear or other slew range;
- f) any special restrictions unique to the use of the rating chart;
- g) boom extend mode for which ratings apply.

5.1.2 Each rated capacity chart shall include all the information listed in 5.1.1. The format for presentation of the information can vary provided the information is clear and consistently presented to the operator for every rated capacity chart in the crane rating manual. Methods of presenting the required capacity information are presented in [Annex A](#).

5.1.3 Rating numbers shall include at least three significant figures. Ratings can be expressed in kilograms, pounds or tonnes, depending on what is appropriate for the size of the crane or requested by the customer.

5.1.4 Minimum boom angle and maximum boom length of the unloaded condition for a given attachment configuration and machine set-up shall be noted on each rated capacity chart. A warning shall be provided if a tipping condition exists for these configurations. If required, the mass of the manufacturer's installed hook block shall also be noted.

5.1.5 Data deviations

Where necessary, the following deviations are permitted:

- a) radius increments are a manufacturer's option;
- b) boom and boom/jib length increments are a manufacturer's option;
- c) the notes and warnings shown on the example rating charts in [Annex A](#) are typical of those that may be supplied with many construction cranes. The exact content and wording can vary according to specific use and manufacturer's requirements. Clear, precise, simple language shall be used.

6 Data publication — General requirements

6.1 General

Rated capacity charts as defined in [Clause 4](#) may be published under one cover in the crane rating manual, separately or in any combination. The grouping of documents is dictated by the type of crane involved. Means shall be provided to quickly reference rated capacity charts and other pages within the crane rating manual.

6.2 Language

If the language of the publication is different from the language of the country of origin, the final draft shall be written or edited by a technically competent person who is able to use and translate the language of publication competently.

6.3 Crane rating manuals published in physical form

6.3.1 Paper/chart

For crane rating manuals published in physical form, the rated capacity charts and other pages shall be legible and permanently marked, and shall have reasonable durability when exposed to rain, dampness, water, oil, grease or sunlight, and temperatures between $-40\text{ }^{\circ}\text{C}$ and $60\text{ }^{\circ}\text{C}$.

6.3.2 Cover

When required, the cover shall have a reasonable durability when exposed to rain, dampness or grease. The cover shall be of an appropriate size to protect the internal pages.

6.3.3 Binding

The binding or binders shall be appropriate and durable for the intended usage.

6.3.4 Page layout

Typography shall be such that information is clearly legible under normal lighting conditions with normal or corrected vision. Illustrations shall be located on the same pages or as close as possible to their references. The pages shall be numbered consecutively beginning with the left-hand page. Alternatively, a group numbering system may be used to permit intermediate additions or revisions as appropriate. Headings and sub-headings shall be used for easy reference.

6.3.5 Reproductions

The method of reproduction shall be such that the text and illustrations resist fading and smearing.

6.4 Readability and print (type) size

The type shall be definite and legible. Alphanumeric characters used on the rated capacity charts and other pages of the crane rating manual shall be no less than 8-point font size.

6.5 Crane rating manuals published in electronic form

The device used to display the rating manual shall be such that information is clearly legible either in daylight or with cab illumination at night for operators with normal or corrected vision.

7 Data location

7.1 Placement

The crane rating manual shall be located such that the operator can view the manual in the front hemisphere of the operator's visibility. The operator shall have easy access to the crane rating manual for reference.

- a) When the physical crane rating manual is permanently affixed in the crane operator's cabin, it shall be located in the front hemisphere of the operator's visibility.
- b) When the physical crane rating manual is stored out of the front hemisphere of the operator's visibility, it shall be attached in the operator's cab such that it can be viewed in the front hemisphere of the operator's visibility.
- c) For the electronic crane rating manual, the device used to display the rating manual shall be such that it can be viewed in the front hemisphere of the operator's visibility.

7.2 Fastening

The crane rating chart/manual, whether provided in electronic or paper form, shall be fastened to the cabin in such a manner that it cannot be removed without tools.

8 Data presentation

8.1 [Annex A](#) shows examples of the various formats used to present the data. For a simple crane or boom arrangement, one or two charts may suffice.

8.2 Examples A.1 and A.2 show different format types for rating charts. They include a title and a list of notes and warnings, informational data, and load ratings. The formats shown are for complex boom/jib combinations and adhere to all the requirements of this document. Example A.3 shows a working range diagram, while Example A.4 presents a working area diagram.

Annex A (informative)

Examples of data presentation formats

Table A.1 — Rated capacity chart format (Example A.1)

Boom configuration illustration (optional) 1 360 kg CTWT		Maximum allowable lifting capacities Rated lifting capacities in kilograms on fully extended outriggers					Set-up or outrigger position illustration (optional)			
11,58 m to 16,8 m main jib										
Load radius m	11,58 m			13,7 m			16,8 m			Load radius m
	Loaded boom angle °	360°	Over front	Loaded Boom angle °	360°	Over front	Loaded boom angle °	360°	Over front	
3,0	67,0	60 000	60 000	71,0	19 050	19 050	74,5	19 050	19 050	3,0
3,5	65,0	55 200	55 200	69,0	19 050	19 050	73,0	19 050	19 050	3,5
4,0	62,0	50 550	50 550	65,5	19 050	19 050	71,0	19 050	19 050	4,0
4,5	59,0	46 300	46 300	64,5	19 050	19 050	69,5	19 050	19 050	4,5
5,0	55,5	42 300	42 300	62,0	19 050	19 050	67,5	19 050	19 050	5,0
6,0	49,0	34 400	34 400	57,0	19 050	19 050	64,0	19 050	19 050	6,0
7,0	41,5	29 100	29 100	51,5	19 050	19 050	60,0	19 050	19 050	7,0
8,0	32,0	24 250	24 350	45,5	19 050	19 050	56,0	19 050	19 050	8,0
9,0				39,0	19 050	19 050	51,0	19 050	19 050	9,0
10,0	19,5	19 550	20 000				46,5	16 550	16 700	10,0
12,0				30,5	16 400	16 600	35,5	11 850	12 100	12,0
14,0							19,5	8 800	9 000	14,0
Min. jib angle/cap.	0°	11 900	11 900	0°	9 100	9 100	0°	6 500	6 500	Min. jib angle/cap.
Set-up										
<ol style="list-style-type: none"> 1) Level the machine on a firm supporting surface. Depending on the nature of the supporting surface, it can be necessary to have structural supports under the outrigger floats or tires to spread the load to a larger bearing surface. 2) For outrigger operation, outriggers shall be properly extended with tires raised free of crane mass before operating the boom or lifting loads. 3) If the machine is equipped with a front jack cylinder, the front jack cylinder shall be set in accordance with written procedure. 4) When equipped with extendible counterweight, the counterweight shall be fully extended before operation. 5) Inflate tires to the recommended pressure before lifting on rubber. 6) With certain jib and hoist tackle combinations, maximum capacities may not be obtainable with standard cable lengths. 7) Do not travel with crane fly jib erected. 										
Operation										
<ol style="list-style-type: none"> 1) Do not exceed rated loads at rated radius. 2) Rated loads include the mass of hook block, slings and auxiliary lifting devices. Subtract their masses from the listed rating to obtain the net load to be lifted. When more than the minimum required hoist reeving is used, consider the additional rope mass as part of the load to be handled. 3) Load ratings are based on freely suspended loads. Do not attempt to move a load horizontally on the ground in any direction. 4) Rated loads are for lift crane service only. 5) Do not operate at a radius or jib length where capacities are not listed. At these positions, the machine can overturn without any load on the hook. 6) When either jib length or radius or both are between values listed, use the smallest load shown at either the next larger radius or next longer or shorter jib length. 7) For safe operation, the user shall make due allowances for the particular job conditions, e.g. soft or uneven ground, out of level conditions, high winds, side loads, pendulum action, jerking or sudden stopping of loads, hazardous conditions, experience of personnel, two machine lifts, travelling with loads, electric wires. Side pull on boom or jib is extremely dangerous. 										

Table A.2 — Rated capacity chart format (Example A.2)

Boom configuration illustration (optional)		Maximum allowable lifting capacities				Set-up outrigger position illustration (optional)	
		Rated lifting capacities are in kilograms with 5 440 kg CTWT on fully extended outriggers					
33,53 m main boom + 17,07 m offset jib							
Load radius m	1° offset		15° offset		30° offset		Load radius m
	Loaded boom angle °	360°	Loaded boom angle °	360°	Loaded boom angle °	360°	
14,0	74,5	2 900					14,0
16,0	72,5	2 900					16,0
18,0	70,0	2 600	77,5	2 600			18,0
20,0	68,0	2 300	75,0	2 350			20,0
22,0	65,5	2 050	72,5	2 100			22,0
24,0	62,5	1 850	70,0	1 850	77,0	1 900	24,0
26,0	60,0	1 650	67,5	1 700	74,5	1 750	26,0
28,0	57,5	1 500	64,5	1 550	72,0	1 550	28,0
30,0	54,5	1 350	62,0	1 400	69,0	1 400	30,0
32,0	51,5	1 200	59,0	1 250	66,5	1 300	32,0
34,0	48,5	1 050	56,5	1 150	63,5	1 200	34,0
36,0	45,5	900	53,0	1 000	60,5	1 100	36,0
38,0	42,0	800	50,0	850	57,0	950	38,0
40,0	38,0	650	46	750	53,5	800	40,0
42,0	34,0	550	42,5	600	49,5	650	42,0
			38,0	500	45,5	500	

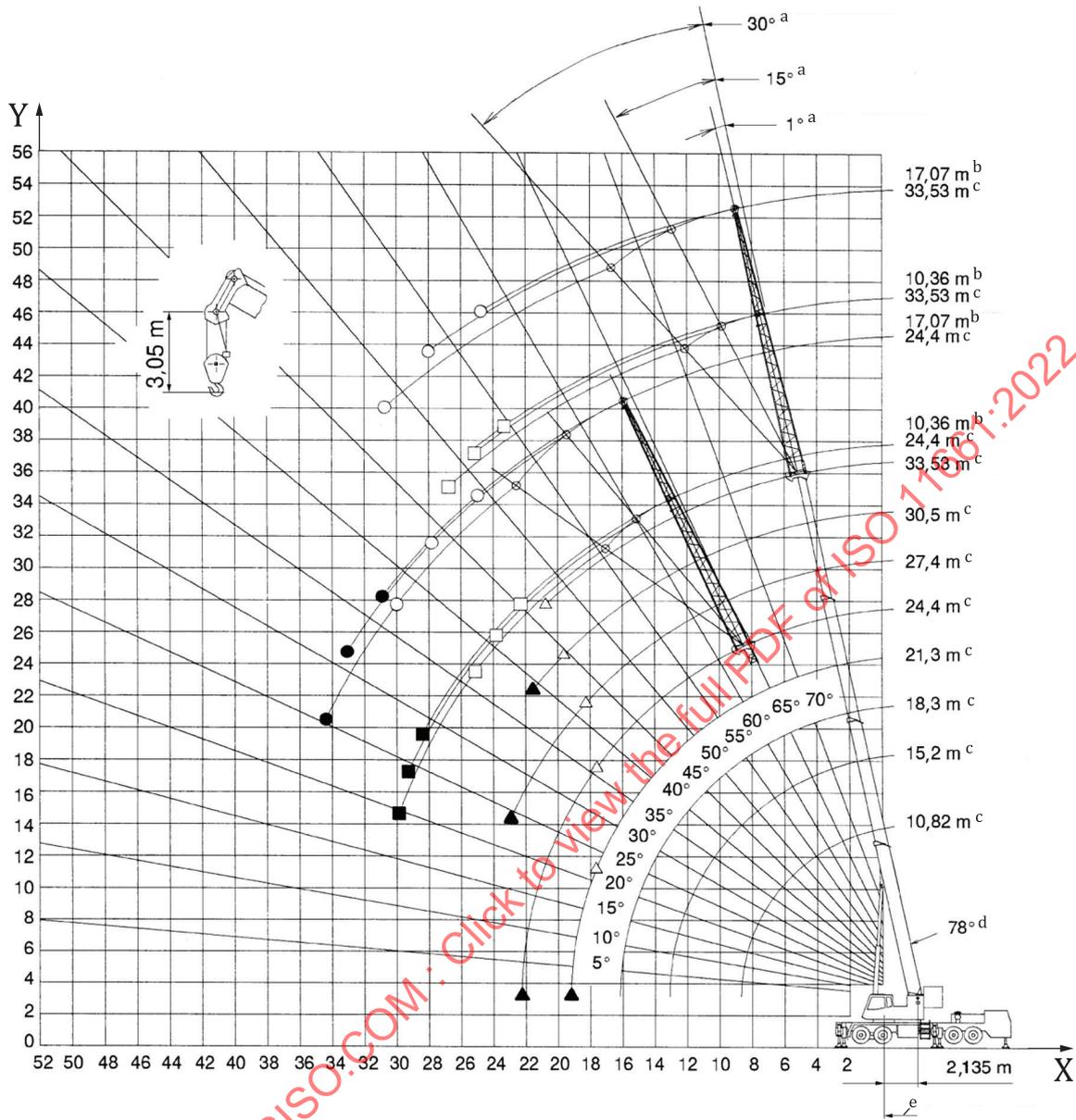
WARNING — Do not lower 17,07 m jib in working position below 20° unless main boom length is 30,1 m or less, since loss of stability will occur, causing a tipping condition.

Set-up

- 1) Level the machine on a firm supporting surface. Depending on the nature of the supporting surface, it may be necessary to have structural supports under the outrigger floats or tires to spread the load to a larger bearing surface.
- 2) For outrigger operation, outriggers shall be properly extended with tires raised free of crane mass before operating the boom or lifting loads.
- 3) If machine is equipped with a front jack cylinder, the front jack cylinder shall be set in accordance with written procedure.
- 4) When equipped with extendible counterweight, the counterweight shall be fully extended before operation.
- 5) Inflate tires to the recommended pressure before lifting on rubber.
- 6) With certain boom/jib and hoist tackle combinations, maximum capacities may not be obtainable with standard cable lengths.
- 7) Do not travel with jib erected.

Operation

- 1) Do not exceed rated loads at rated radius.
- 2) Rated loads include the mass of hook block, slings and auxiliary lifting devices. Subtract their masses from the listed rating to obtain the net load to be lifted. When more than the minimum required hoist reeving is used, consider the additional rope mass as part of the load to be handled.
- 3) Load ratings are based on freely suspended loads. Do not attempt to move a load horizontally on the ground in any direction.
- 4) Rated loads are for lift crane service only.
- 5) Do not operate at a radius or boom length where capacities are not listed. At these positions, the machine may overturn without any load on the hook.
- 6) When either boom length or radius or both are between values listed, use the smallest load shown at either the next larger radius or next longer or shorter boom length.
- 7) For safe operation, the user shall make due allowances for the particular job conditions, e.g. soft or uneven ground, out of level conditions, high winds, side loads, pendulum action, jerking or sudden stopping of loads, hazardous conditions, experience of personnel, two machine lifts, travelling with loads, electric wires. Side pull on boom or jib is extremely dangerous.



Key

- X operation radius from axis of rotation (m)
- Y height above ground (m)
- denote main boom + 56' Jib: boom mode "A"
- denote main boom + 56' Jib: boom mode "B"
- denote main boom + 56' Jib: boom mode "A"
- denote main boom + 56' Jib: boom mode "B"
- △ denote main boom: boom mode "A"
- ▲ denote main boom: boom mode "B"