

INTERNATIONAL
STANDARD

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Cranes — Maintenance manual —
Part 1:
General

Appareils de levage à charge suspendue — Manuel de maintenance —
Partie 1: Généralités



Reference number
ISO 12478-1:1997(E)

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.

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.

International Standard ISO 12478-1 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 5, *Use, operation and maintenance*.

ISO 12478 consists of the following parts under the general title *Cranes — Maintenance manual*:

- *Part 1: General*
- *Part 2: Mobile cranes*
- *Part 3: Tower cranes*
- *Part 4: Jib cranes*
- *Part 5: Overhead travelling and portal bridge cranes*

Annexes A, B and C of this part of ISO 12478 are for information only.

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet: central@iso.ch
X.400: c=ch; a=400net; p=iso; o=isocs; s=central

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Cranes — Maintenance manual —

Part 1: General

1 Scope

This part of ISO 12478 establishes guidelines on the general requirements necessary for the preparation and presentation of maintenance manuals for cranes.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 12478. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 12478 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 31-0:1992, *Quantities and units — Part 0: General principles*.

ISO 4306-1:1990, *Cranes — Vocabulary — Part 1: General*.

ISO 4306-2:1985, *Lifting appliances — Vocabulary — Part 2: Mobile cranes*.

ISO 4306-3:1991, *Cranes — Vocabulary — Part 3: Tower cranes*.

ISO 9927-1:1994, *Cranes — Inspections — Part 1: General*.

3 Presentation of the manual

3.1 General

A maintenance manual shall be provided by the crane manufacturer. This manual

- a) should be simple to understand and have adequate explanatory notes;
- b) shall incorporate the use of internationally recognized symbols, if established;
- c) should be easy to use, compact and made of durable hardwearing material;
- d) shall be compiled in the language normally used by the manufacturer, unless a specific language has been agreed on between the parties to the contract.

The manual is a working tool which should be both convenient and complete. The text should be simple and adapted to the individuals who will use it, with all information being explicit and comprehensive.

Illustrations, diagrams, graphs and tables should be used in preference to written text to avoid the risk of misunderstanding. They should be clear and simple, and be placed adjacent to any corresponding text.

The terms (see ISO 4306), definitions, units (see ISO 31) and symbols shall comply with the relevant International Standards. When the units specified differ from those in common use, this should be noted in the manual in brackets or by means of a footnote.

Only those items relative to the particular crane and its application shall be included.

3.2 Preliminary information

The following information shall be given on the front or back cover, or on the first pages of the manual:

- a) title of the manual;
- b) reference number of the manual (if any);
- c) identification (designation, type, series, model, etc.) of the crane with which the manual is intended to be used;
- d) serial number or numbers of crane or, where appropriate, range of serial numbers covered;
- e) name and full address of the crane manufacturer and/or his agent;
- f) table of contents and/or index;
- g) basic characteristics of the crane.

3.3 Number of volumes

The maintenance manual, with the other manuals particular to the crane in question, (for example driver's manual, user's manual, etc.) may be published in one or more volumes. The choice of the volume and grouping of the parts should be suitable for the type of product, its normal application and personnel requirements. Where appropriate, cross-reference to other volumes should be made so that the same information is not repeated unnecessarily.

4 Maintenance

4.1 General

According to the level of maintenance dealt with in the manual, it may be necessary for a clear understanding of maintenance operations that such points as:

- description of the working principles of units
- working sequences of units
- test values to measure

should be explained and that necessary schematics, charts (e.g. switching sequences) and check lists should be included.

4.2 Preventive maintenance

The maintenance operations and their frequency, together with an indication of the labour requirement, shall be grouped in a table, for which examples of typical column headings are shown in table 1. The frequencies shall be established so that several operations can be performed at the same time, to facilitate maximum utilization of the crane and manpower.

Table 1

Operation and location	Part name/nomenclature	Estimated hours labour	Interval 1	Interval 2	(Etc.)

4.3 Wear limit

The wear limit of parts which are considered to be items which may need replacing during maintenance shall be given in a table, with examples of column headings as suggested in table 2.

Table 2

Designation	Reference of part number	Original size	Wear size limit	Reference of the control gauges

4.4 Corrective maintenance

The maintenance instructions shall be organized by sections with constituent illustrations relating to major assemblies and systems, and shall deal with the following:

- a) troubleshooting procedures;
- b) sequential disassembly and assembly, including specification of relevant torques, preloads and other assembly hints;
- c) specification of parts and assemblies which require checking of wear, elongation and cracking, together with any discard criteria for e.g. brakes, clutches, chains, ropes, etc.;
- d) specification of necessary special tools and equipment;
- e) special requirements for the lifting and handling of crane components.

4.5 Test and inspection procedures

The requirements given in ISO 9927-1 shall apply.

5 Lubrication and fluids

5.1 Data concerning lubricants and fluids

The following information shall be included and should normally be located in an annex:

- a) specification of the lubricants, fluids etc. to be used. Their designation should be made in accordance with the relevant International Standard;
- b) tank and circuit capacities (in litres);
- c) list of manufacturer's recommended lubricant types and/or brands (where appropriate).

An example of a typical table for lubricant specification is given in table 3:

Table 3

Part (Mechanism)	Capacity litres	Ambient temperature °C	Recommended ISO classification	Standard symbol or reference mark

5.2 Lubrication schedule

This schedule shall cover the crane lubrication requirements, indicating time intervals at which these are to be carried out. It shall include a diagram showing which parts require lubrication (a typical example is shown in annex A).

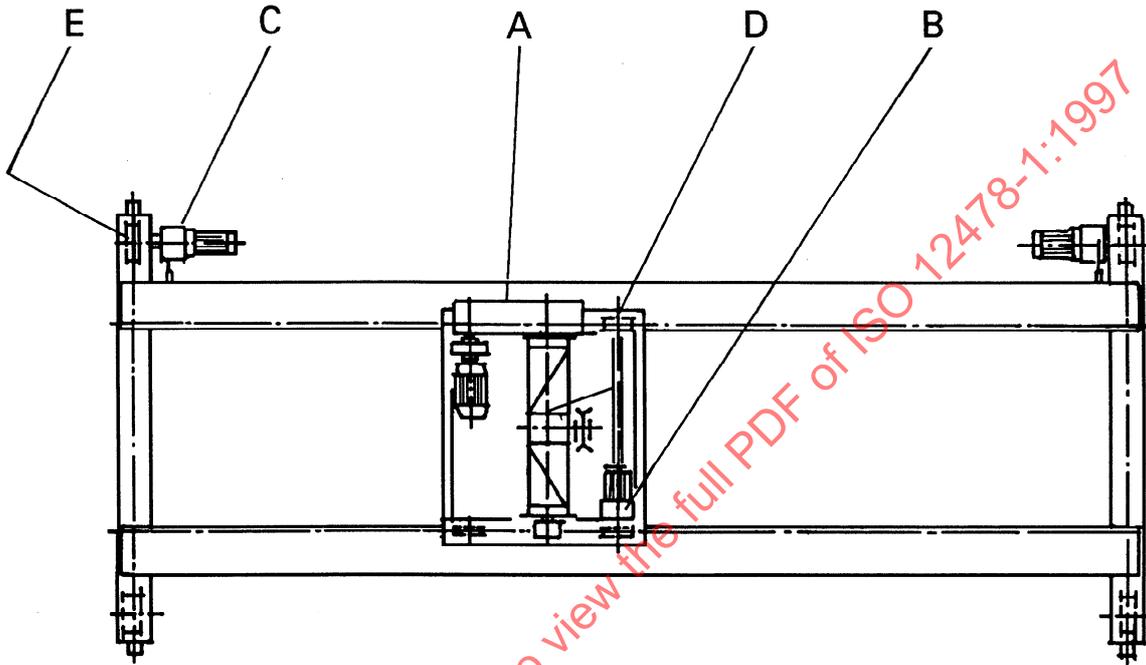
6 Safety during maintenance operations

The following are typical examples of items which should be included for observation of safety precautions by the maintenance, inspection and lubrication personnel:

- a) Regarding the site (provision of a safe work place):
 - removal of the crane to a maintenance position area;
 - fencing off the maintenance area;
 - anticollision measures when several cranes are operating on the same tracks or site.
- b) Regarding the crane (prevention of energizing/movement):
 - use of a clearly defined permit-to-work system (see ISO 12480);
 - use of warning signs (examples are shown in annex B);
 - disconnection and locking of power supply switch to prevent unauthorized reconnection;
 - discharge, release or vent of stored energy (hydraulic, pneumatic or electric) prior to maintenance;
 - checking of functions after disconnect to confirm all energy is removed;
 - request assistance from the manufacturer for situations or conditions not included in the manual.
- c) Regarding the operation being performed:
 - use of safety ropes;
 - use of working platforms where appropriate;
 - observation of appropriate precautions when welding in area close to bearings and electronic circuits.
- d) Regarding the personnel:
 - wear safety equipment (safety belt, helmet, eye protection, etc.);
 - use support bracing or blocking where appropriate;
 - specify authorized and qualified workers as required for applicable tasks;
 - appropriate handling and disposal of hazardous materials.

Annex A
(informative)

Example of lubrication schedule

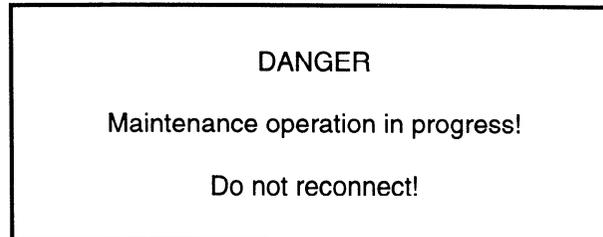


Item	Part	Interval	Type of lubricant
A	Hoisting machinery	.....	Oil
B	Trolley (crab) travelling mechanism	.....	Oil
C	Travelling mechanism	.....	Oil
D	Trolley wheel	.....	Grease
E	Travelling wheel	.....	Grease

Annex B (informative)

Examples of warning/safety signs

B.1 Example of safety sign with text



B.2 Example of safety sign without text

For example, to indicate "Shut off engine and remove key before performing maintenance or repair work".



NOTE — For further information regarding safety signs, see ISO 13200.

Annex C
(informative)

Bibliography

- [1] ISO 12480-1:—¹⁾, *Cranes — Safe use — Part 1: General*.
- [2] ISO 13200:1995, *Cranes — Safety signs and hazard pictorials — General principles*.

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1) To be published.