INTERNATIONAL STANDARD

**ISO 9927-1**

Second edition
2009-01-15

# Cranes — Inspections —

## Part 1: General

*Appareils de levage à charge suspendue — Vérifications —*

*Partie 1: Généralités*



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# Foreword

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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 9927-1 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 5, *Use, operation and maintenance*.



This second edition cancels and replaces the first edition (ISO 9927-1:1994), which has been technically revised.



ISO 9927 consists of the following parts, under the general title *Cranes — Inspections*:



— *Part 1: General*

— *Part 3: Tower cranes*

# Cranes — Inspections —

# Part 1: General

## 1 Scope

This part of ISO 9927 specifies the inspections to be carried out on cranes as defined in ISO 4306-1. It does not cover the inspections carried out prior to the first use of the crane.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies.



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

ISO 12480-1:1997, *Cranes — Safe use — Part 1: General*



ISO 12482-1, *Cranes — Condition monitoring — Part 1: General*

ISO 23814, *Cranes — Competency requirements for crane inspectors*

## 3 General

In order to ensure that cranes are operated safely, their proper working and operational conditions shall be maintained. Therefore, all cranes shall undergo inspections in order to ensure that deviations from safe conditions are detected and can be rectified. The inspections shall be arranged by the crane users or owners.

## 4 Inspections

### 4.1 Daily inspections

Daily inspections shall be carried out prior to the start of daily lifting operations.

### 4.2 Frequent inspections

Frequent inspections shall be carried out periodically at intervals of not more than six months.

### 4.3 Periodic inspections

Periodic inspections shall be carried out periodically at intervals of not more than 12 months or at re-erection.

### 4.4 Thorough inspections

Thorough inspections — detailed checks that can require non-destructive tests and/or dismantling if considered justified — shall be carried out periodically at intervals of two or more years.

### 4.5 Exceptional inspections

Exceptional inspections shall be carried out whenever a crane encounters any of the following exceptional circumstances:

— extreme weather conditions (storm);

— an earthquake of medium or greater seismic intensity;

— collision with other structures;

— an unexpected overload while in operation;

— activation of safety devices (e.g. limiting devices, indicating devices).

### 4.6 Alteration inspections

Alteration inspections shall be carried out whenever a crane has been subjected to alteration of any of the following:



— load rating;

— load-bearing structure or components;



— hoisting mechanism;

— mechanical components;

— control station (e.g. control system, control layout);

— prime mover;

— wire ropes or hoisting chains;

— fixed load-lifting attachments such as hooks, grab buckets, etc.;

— carrier or foundation.

### 4.7 Condition inspections for special assessment

When the crane approaches its design constraints, in order to determine the safe working period (the period of time between two successive general overhauls), condition inspections shall be carried out for the special assessment in accordance with ISO 12482-1.

# 5 Methods of inspection

## 5.1 General

Inspection methods shall include a visual examination, non-destructive testing, functional testing and operating tests. At the inspection, maintenance records, operating records and/or previous inspection records shall be examined.

## 5.2 Visual examination

A visual examination shall be carried out on every part of the crane in order to detect any abnormalities or deviations from the normal conditions by means of visual checks, e.g. hammering test and measurements.

Generally, the visual examination is to be carried out without dismantling. However, dismantling shall be performed if it is necessitated by the crane conditions.

## 5.3 Non-destructive testing

Depending on the results of the visual examination, non-destructive tests, such as penetrant testing, ultrasonic testing, magnetic particle testing and radiographic testing, shall be carried out.

## 5.4 Functional testing

### 5.4.1 General



The functions of controls, switches and indicators shall be checked. Measurement of the electrical and/or hydraulic system shall be carried out if necessary.



### 5.4.2 Limiting and indicating devices

Function tests shall be carried out for the following limiting and indicating devices to check that they are functioning correctly for safe operation:

— rated capacity limiter and indicator;

— motion limiter and indicator;

— performance limiter and indicator.

## 5.5 Operating tests

### 5.5.1 No-load test

No-load tests shall be carried out for all crane motions, including hoisting, travelling, traversing, slewing and luffing, at the rated speeds and without lifting loads, checking for any abnormalities and/or defects.

### 5.5.2 Load test

Load tests shall be carried out on basic crane motions, such as hoisting, travelling, traversing and slewing, while suspending a load corresponding to the rated capacity, checking for any abnormalities and/or defects.

# 6 Inspection personnel

Personnel engaged in the inspection shall be competent to inspect the pertinent crane. Annex A specifies the competent persons for carrying out particular types of inspection.

## 7 Precautions for inspection

Precautions for the safety of the personnel involved in crane inspection shall be taken in accordance with Annex B and with ISO 12480-1:1997, Clauses 6 and 10.

## 8 Result of inspection

The inspection results shall be recorded, including the parts inspected, defects or abnormalities detected, actions to be performed before reuse (e.g. the repair, adjustment and alteration of component parts) and limitations of use.

The inspection records shall be submitted to a responsible person: the crane owner or user.

The responsible person shall carry out the necessary measures according to the inspection records.

The inspection records shall be kept available.

# Annex A
(normative)

# Competent persons for types of inspection

Competent persons for carrying out particular types of inspection shall be as specified in Table A.1.

**Table A.1 — Competent persons according to type(s) of inspection**

| Daily inspections | Frequent inspections | Periodic inspections | Thorough inspections | Exceptional inspections | Alteration inspections | Condition inspections |
|---|---|---|---|---|---|---|
| Operator | | | | | | |
| Maintenance man | | | | | | |
| Experienced technician | | | | | | |
| Crane inspector | | | | | | |
| Expert engineer | | | | | | |

A *maintenance man* is as specified in ISO 12480-1.

An *experienced technician* is a person who, due to his or her vocational background and experience, has sufficient knowledge in the field of cranes and is sufficiently familiar with the relevant regulations to determine deviations from the proper conditions (i.e. specially trained personnel).

A *crane inspector* is as defined and specified in ISO 23814.

An *expert engineer* is an engineer with experience in the design, construction or maintenance of cranes, sufficient knowledge of the relevant regulations and standards and the equipment necessary for carrying out the inspection. Furthermore, an expert engineer is an engineer who is in a position to judge the safe condition of the crane and to decide which measures shall be taken in order to ensure continued safe operation.