

# INTERNATIONAL STANDARD

# ISO 12480-1

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## Cranes — Safe use —

### Part 1: General

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*Appareils de levage à charge suspendue — Sécurité d'emploi —*  
*Partie 1: Généralités*



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## Foreword

ISO (the International Organization for Standardization) is a world-wide 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 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 12480-1 was prepared by Technical Committee ISO/TC 96, *Cranes*.

ISO 12480 consists of the following parts, under the general title *Cranes - Safe use*:

<i>Part 1</i>	<i>General</i>	<a href="https://standards.iteh.ai/catalog/standards/sist/d1ce5ce3-c6c0-4d57-96fb-d63b7064e564/iso-12480-1-1997">https://standards.iteh.ai/catalog/standards/sist/d1ce5ce3-c6c0-4d57-96fb-d63b7064e564/iso-12480-1-1997</a>
<i>Part 2</i>	<i>Mobile cranes</i>	
<i>Part 3</i>	<i>Tower cranes</i>	
<i>Part 4</i>	<i>Jib cranes</i>	
<i>Part 5</i>	<i>Overhead travelling cranes and portal bridge cranes</i>	

Annex C forms an integral part of this part of ISO 12478. Annexes A, B and D are for information only.

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# Cranes — Safe use —

## Part 1: General

### 1 SCOPE

This part of ISO 12480 establishes required practices for the safe use of cranes, including safe systems of work, management, planning, selection, erection and dismantling, operation and maintenance of cranes and the selection of drivers, slingers and signallers.

It does not cover manually operated (non-powered) cranes, cranes in which at least one of its motions is manually operated and cranes mounted on water-borne vessels, except in those circumstances where a land-based crane is temporarily affixed to a vessel.

### 2. NORMATIVE REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 12480. 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 12480 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 4306-1: 1990	<i>Cranes - Vocabulary - Part 1: General</i>
ISO 4306-2: 1994	<i>Cranes - Vocabulary - Part 2: Mobile cranes</i>
ISO 4306-3: 1991	<i>Cranes - Vocabulary - Part 3: Tower cranes</i>
ISO 4309: 1990	<i>Cranes - Wire ropes - Code of practice for examination and discard</i>
ISO 4310: 1981	<i>Cranes - Test code procedures</i>
ISO 7363: 1986	<i>Cranes and lifting appliances - Technical characteristics and acceptance documents</i>
ISO 9926-1: 1990	<i>Cranes - Training of drivers</i>
ISO 9927-1: 1994	<i>Cranes - Inspections - Part 1: General</i>
ISO 9928-1: 1990	<i>Cranes - Crane driving manual - Part 1: General</i>
ISO 9942-1:1994	<i>Cranes - Information labels - Part 1: General</i>
ISO 12478-1: — <sup>1</sup>	<i>Cranes - Maintenance manual - Part 1: General</i>
ISO 12482-1: 1995	<i>Cranes - Condition monitoring - Part 1: General</i>
ISO 10973: 1995	<i>Cranes - Spare parts manual</i>

### 3 DEFINITIONS

For the purposes of this part of ISO 12480, the definitions given in ISO 4306-1, ISO 4306-2 and ISO 4306-3 and the following definitions, apply.

**3.1 competent person:** Person who has the necessary practical and theoretical knowledge and the necessary experience of the crane and equipment used in the lifting operation to carry out the function satisfactorily.

**3.2 crane driver (operator):** Person who is operating the crane for the purpose of positioning loads or operating for erection of the crane.

NOTE — For mobile cranes, the term "operator" is often used instead, and the term "driver" is then used to refer to that person who operates only those controls which moves the crane from place to place.

<sup>1</sup> To be published.

**3.3 employing organization; employer:** Person or organization requiring the lifting operation to take place.

NOTE — The employing organization is not necessarily the user.

**3.4 rated capacity:** Maximum permitted load that can be lifted by the crane under conditions specified by the manufacturer.

### 3.5 Service conditions

**3.5.1 in-service:** Condition in which the crane is handling loads up to the rated capacity in permissible wind speeds and in other conditions as specified by standards and/or the manufacturer.

**3.5.2 out-of-service:** Condition in which the crane is out of use, without load on the load-lifting attachment and in conditions as specified by standards and/or the manufacturer.

**3.6 centre of gravity:** Point at which the total mass of a body may be regarded as being concentrated, or about which the parts of a body exactly balance each other.

**3.7 use:** Any operation with or on the crane, e.g. transportation, erection, dismantling, maintenance, movements of the load.

**3.8 user organization; user:** Competent person or organization which has direct control over the lifting operation.

**3.9 appointed person:** One competent person who has overall control of the crane operation and acts on behalf of the management of the organization requiring the load to be moved (the employing organization).

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## 4 MANAGEMENT OF THE CRANE OPERATION

### 4.1 Safe system of work

A safe system of work shall be established and this shall be followed for every crane operation whether it be an individual lift or a group of repetitive operations. The same principles shall be applied when crane operations are carried out at a site or when the crane is a permanent fixture, e.g. in a factory or at a dock.

The safe system or work shall include the following:

(a) planning of the operation;

All crane operations shall be planned to ensure that they are carried out safely and that all foreseeable risks have been taken into account. Planning shall be carried out by personnel who have the appropriate expertise and have been appointed for this purpose. In cases of repetitive or routine operations, this planning may only be necessary in the first instance, with periodic reviews to ensure that no factors have changed;

(b) selection, provision and use of suitable crane(s) and equipment;

(c) maintenance, checks, inspections etc. of crane(s) and equipment;

(d) the provision of properly trained and competent personnel who have been made aware of their relevant responsibilities and those of the other persons involved in the crane operation;

(e) adequate supervision by properly trained and competent personnel having the necessary authority;

- (f) ensuring that all necessary certificates and other documents are available;
- (g) prohibiting unauthorised movement or use of the crane at all times;
- (h) the safety of persons not involved in the crane operation;
- (i) coordination with other applicable parties for appropriate approval compliance or cooperation in avoiding hazards or guarding against hazards;
- (j) establishing a system of communication which is understood by the persons involved in the actual lifting operation (for an example see Annex D).

NOTE — It is essential for the safety of the operation to ensure that all personnel can communicate clearly in the same language.

The crane operation shall be taken to include any necessary preparation of a site, erection, dismantling and maintenance of the crane(s).

The safe system of work shall be effectively communicated to all parties concerned.

## 4.2 Control of the crane operation

To ensure the implementation of the safe system of work, one person shall be appointed to have overall control of the crane operation to act on behalf of the management of the organization requiring the load to be moved (the "Employing Organization"). The appointed person shall have adequate training and experience to enable these duties to be carried out competently.

## 4.3 Contractual considerations

### 4.3.1 Contract crane operations

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The Employing Organization may enter into a contract with a "User Organization" who will undertake the work on their behalf.

The contract shall state the following:

- (a) that all work shall be carried out in accordance with this part of ISO 12480;
- (b) that the User shall appoint a person, in accordance with 4.2, to the satisfaction of the Employing Organization;
- (c) that all information or services provided by the Employing Organization to facilitate compliance with this part of ISO 12480 shall be notified to the User in writing.

All other requirements given in this part of ISO 12480 shall be followed by the User. The User shall be given full authority to fulfil his obligations relating to this part of ISO 12480 including, where appropriate, authority to control and instruct the Employing Organization's personnel.

Before entering into a contract, Employing Organizations have a duty to satisfy themselves that the User has the necessary competence to carry out the work in accordance with this part of ISO 12480.

### 4.3.2 Owner's duties when hiring out cranes

When a crane is hired out together with a driver to the organization requiring the load to be moved (the "User Organization"), the crane owner has a duty to provide a competent driver and a crane that is properly maintained, checked, inspected etc.

### 4.3.3 User's duties when using hired cranes

The User Organization retains the responsibility for appointing the competent person in accordance with 4.2, for those matters for which the appointed person is expressly made responsible and for following the requirements given in this part of ISO 12480. Notwithstanding any advice the crane owner may have offered concerning the selection of a particular crane or any other relevant matter, the responsibility for ensuring that the crane is of a suitable type, size and capacity for the task being undertaken and for planning the operation remains with the User Organization.

## 5 SELECTION, RESPONSIBILITIES AND MINIMUM REQUIREMENTS OF PERSONNEL

### 5.1 General

Safe operating of cranes depends on the selection of competent personnel.

Records of training and experience of persons such as the crane driver will assist the selection of competent personnel. Those responsible for the selection shall ensure that the personnel involved in the operation are efficiently organized in order to ensure good teamwork in the working situation. No person shall be a member of the team if their efficiency is impaired by alcohol, drugs or other influences. All personnel in the team shall be aware of their duties (see 5.2 to 5.7). Where personnel are under training they shall be adequately supervised.

NOTE — In some circumstances it may be appropriate for one person to undertake more than one of the duties described in 5.2 to 5.7.

### 5.2 Duties of the person appointed to control the crane operation (the appointed person)

The appointed person's duties shall include the following:

- (a) assessment of the crane operation to provide such planning, selection of crane(s), lifting gear and equipment, instruction and supervision as is necessary for the task to be undertaken safely. This shall include consultation with other responsible bodies if necessary and ensuring that where different organizations are involved they collaborate as necessary;
- (b) ensuring that adequate checks, inspections etc. and maintenance of the equipment have been carried out;
- (c) ensuring that there is an effective procedure for reporting defects and incidents and taking any necessary corrective action;
- (d) responsibility for the organization and control of the crane operation. Ensuring that competent personnel are assigned as driver and other lift crew personnel;

The appointed person shall be given the necessary authority for the performance of all these duties and, in particular, authority to stop the operation whenever that person considers that danger is likely to arise if the operation were to continue.

Duties, but not responsibilities, may be delegated to another person where considered appropriate.

As the crane driver is required to be at the controls of the crane when it is handling loads, it would not be appropriate to appoint the driver to be in control of the crane operation.

See also 6.3, 8.2, 8.3.3, 9.2, 10.3 and Annex A, regarding duties of the appointed person.



### 5.3 Crane driver

#### 5.3.1 Duties

The crane driver shall be responsible for the correct operation of the crane in accordance with the manufacturer's instruction and within the safe system of work (see 4.1). The crane driver shall at any one time respond only to the signals from one slinger/signaller who shall be clearly identified (see 6.2). Exception when a stop signal is received.

#### 5.3.2 Minimum requirements

The crane driver shall be:

- (a) competent;
- (b) not less than 18 years of age unless under the direct supervision of a person competent for the purpose of training;
- (c) fit, with particular regard to eyesight, hearing and reflexes;
- (d) physically able to operate the crane safely;
- (e) able to judge distances, heights and clearances;
- (f) adequately trained for the type of crane being operated and have sufficient knowledge of the crane and its operational control and safety devices;
- (g) fully competent in slinging and signalling;
- (h) familiar with any fire appliances on the crane and trained in their use;
- (i) familiar with any means provided for escape in case of emergency;
- (j) authorized to operate the crane.

NOTE — Evidence that the driver is medically fit to drive a crane should be obtained at not more than five-year intervals.

#### 5.3.3 Training of crane drivers

ISO 9926-1 specifies the minimum training to be given to trainee drivers of cranes, to develop basic operational skills and to impart the requisite knowledge for the proper use of those skills.

### 5.4 Slinger

#### 5.4.1 Duties

The slinger shall be responsible for attaching and detaching the load to and from the crane load-lifting attachment and for the use of the correct lifting gear and equipment in accordance with the planning of the operation for proper positioning of loads.

The slinger is responsible for initiating the planned movement of the crane and load (see 5.4.2.j). If there is more than one slinger, only one of them shall have this responsibility at any one time, depending on their positions relative to the crane.

To ensure continuity of signalling where this slinger is not visible to the crane driver, a signaller is necessary to relay the signals to the crane driver. Alternatively, other audio or visual methods may be used. (See Annex D)

If, during the crane operation, responsibility for directing the crane and load is to be transferred to

another nominated person, the slinger shall clearly indicate to the crane driver that this responsibility is being transferred and to whom. Furthermore, the driver and the new nominated person shall clearly indicate that they accept the transfer of responsibility.

#### 5.4.2 Minimum requirements

The slinger shall be:

- (a) competent;
- (b) not less than 18 years of age unless under the direct supervision of a person competent for the purpose of training
- (c) fit, with particular regard to eyesight, hearing, reflexes and agility;
- (d) physically able to handle lifting gear and equipment
- (e) able to assess masses, balance loads and judge distances, heights and clearances;
- (f) trained in the techniques of slinging;
- (g) capable of selecting lifting gear and equipment in suitable condition for the load to be lifted;
- (h) trained in the techniques of signalling and understand the signal code;
- (i) capable of giving precise and clear verbal instructions where audio equipment (e.g. radio) is used and capable of operating the equipment;
- (j) capable of initiating and directing the safe movement of the crane and load;
- (k) authorized to carry out slinging duties.

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### 5.5 Signaller

#### 5.5.1 Duties

The signaller shall be responsible for relaying the signal from the slinger to the crane driver. The signaller may be given the responsibility for directing movements of the crane and load instead of the slinger, provided that only one person has the responsibility at any one time.

If, during the crane operation, responsibility for directing the crane and load is to be transferred to another nominated person, the signaller shall clearly indicate to the crane driver that this responsibility is being transferred and to whom. Furthermore, the driver and the new nominated person shall clearly indicate that they accept the transfer of responsibility.

#### 5.5.2 Minimum requirements

The signaller shall be:

- (a) competent;
- (b) not less than 18 years of age unless under the direct supervision of a person competent for the purpose of training;
- (c) fit, with particular regard to eyesight, hearing, reflexes and agility;
- (d) able to judge distances, heights and clearances;
- (e) trained in the techniques of signalling and understand the signal code

(f) capable of giving precise and clear verbal instructions where audio equipment (e.g. radio) is employed and capable of operating the equipment;

(g) capable of directing the safe movement of the crane and load;

(h) authorized to carry out signalling duties.

## 5.6 Crane erector

### 5.6.1 Duties

The crane erector is responsible for the erection of the crane in accordance with the manufacturer's instructions (see clause 9). Where two or more crane erectors are required, one shall be appointed as 'erector in charge' to control this operation at any one time.

### 5.6.2 Minimum requirements

The crane erector shall be:

(a) competent;

(b) not less than 18 years of age unless under the direct supervision of a person competent for the purpose of training;

(c) fit, with particular regard to eyesight, hearing, reflexes and agility;

(d) physically able to handle safely the loads involved in crane erection;

(e) able to work confidently and safely at heights;

(f) able to establish masses, balance loads and judge distances, heights and clearances;

(g) trained in the techniques of slinging and signalling;

(h) capable of selecting lifting gear and equipment that is suitable for the load to be lifted;

(i) adequately trained in the erection, dismantling and working of the type of crane being erected;

(j) adequately trained in the setting and testing of the safety devices fitted to the crane being erected.

## 5.7 Maintenance personnel

### 5.7.1 Duties

The maintenance personnel shall be responsible for maintaining the crane and for its safe and satisfactory operation. They shall carry out all necessary maintenance in accordance with the manufacturer's maintenance manual and within the safe system of work (see 4.1).

### 5.7.2 Minimum requirements

The maintenance personnel shall be:

(a) competent;

(b) fully conversant with the machinery they are required to maintain and its hazards;

(c) properly instructed and trained. This shall include attending appropriate courses where special equipment is used;

(d) familiar with the procedures and precautions recommended in clause 10.

## 6 SAFETY

### 6.1 General

The person or organization having overall control of the place of work and the employers of personnel involved in the crane operation have responsibility for safety. In order that this responsibility may be effectively discharged, the appointed person (see 5.2) shall be given the necessary authority to ensure that adequate systems to achieve safety are in operation. Safety matters relating to crane operations will include the use, maintenance, repair and renewal of safety equipment and the instruction of, and allocation of responsibilities to, the various personnel in relation to the equipment.

### 6.2 Identification of person directing crane movements

The person directing crane movements (slinger or signaller) shall be easily identifiable to the crane driver, e.g. by wearing high-visibility clothing or by using radio call signs.

NOTE — When choosing high-visibility clothing, the background, type of illumination and other relevant factors shall be considered.

### 6.3 Personal safety equipment

The appointed person shall ensure:

(a) that personal safety equipment appropriate for the conditions of the location is available, such as helmets, safety spectacles, safety harness, safety boots and hearing protection;

(b) that equipment is inspected before and after use and maintained in good working order or replaced where appropriate;

(c) that a record of inspection and repairs is maintained where appropriate.

Certain safety equipment (e.g. helmets and safety harnesses) may deteriorate with age and shall therefore be considered for renewal periodically. Safety equipment damaged by impact shall be replaced immediately.

### 6.4 Use of personal safety equipment

All personnel working on, visiting or in the vicinity of the crane shall be made aware of the requirements relating to their personal safety and to the use of the personal safety equipment provided.

Personnel shall be instructed in the correct use of the appropriate personal safety equipment provided and shall be required to use it.

### 6.5 Access and emergency escape

#### 6.5.1 General

Safe access and means of emergency escape shall be maintained in good condition for the driving position(s) of the crane and for check, inspection, examination, maintenance, repair, erection and dismantling of the crane.

### 6.5.2 Boarding and leaving the crane

No person(s) shall be permitted to board or leave the crane or enter its physically designated area without first obtaining the driver's permission. The driver shall be aware of the precautions that are necessary while the person(s) is boarding or leaving and shall take them.

If the boarding or leaving point is out of sight of the driver, it shall be checked that means are provided to ensure that the driver is aware of the other person(s) whereabouts, and that a notice advising of the boarding procedure is posted at the boarding point.

### 6.5.3 Instruction of personnel

Personnel shall be instructed to use (and shall use) only the proper access and means of emergency escape.

## 6.6 Fire extinguishers

Regarding mounting of any fire extinguisher, see the product-specific standards.

## 6.7 Documentation

### 6.7.1 Rated capacity charts

For rated capacity charts applicable to the various specified operating configurations of the crane, see ISO 9942 and the product-specific standards.

### 6.7.2 Instruction manuals

Regarding manuals to be supplied by the manufacturer, see ISO 9928-1, ISO 10973 and ISO 12478-1.

### 6.7.3 Test and examination certificates and reports

All required reports or certificates of inspections, examinations and tests shall be kept readily available.

## 7 SELECTION OF CRANES

Cranes are available in a number of forms and the characteristics of the various types of cranes should be considered in relation to the job requirements. Having decided upon the type of crane and knowing the overall requirements involved, a crane that will safely meet all the requirements of a planned lift shall be selected.

Points to be considered in making the selection include the following:

- (a) masses, dimensions and characteristics of loads;
- (b) operational speeds, radii, heights of lifts and areas of movement;
- (c) number, frequency and types of lifting operations;
- (d) length of time for which the crane will be required or anticipated life expectancy for a permanently installed crane;
- (e) site, ground and environmental conditions or restrictions arising from the use of existing buildings;