
**Cranes — Access, guards and restraints —
Part 1:
General**

*Appareils de levage à charge suspendue — Moyens d'accès, dispositifs de
protection et de retenue —*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 11660-1 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 7, *Tower cranes*.

ISO 11660 consists of the following parts, under the general title *Cranes — Access, guards and restraints*:

— *Part 1: General*

— *Part 2: Mobile cranes*

— *Part 3: Tower cranes*

— *Part 4: Jib cranes*

— *Part 5: Overhead travelling cranes and portal bridge cranes*

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Cranes — Access, guards and restraints —

Part 1: General

1 Scope

This part of ISO 11660 establishes the general requirements for access to control stations and other areas of cranes, as defined in ISO 4306-1, during normal operation, maintenance, inspection, erection and dismantling. Guards and restraints are also dealt with in general, regarding the protection of persons on or near the crane as related to moving parts, falling objects or live parts.

The particular requirements relating to access, guards and restraints for the various types of cranes and lifting appliances are given in the other parts of ISO 11660.

In some cases, the particular requirements may not comply with the general requirements. Different dimensions are allowed provided an equivalent degree of protection is achieved.

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2 Normative references

[ISO 11660-1:1999](https://standards.iteh.ai/catalog/standards/sist/b29efc91-c233-417f-aeba-31660-1-1999)

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The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 11660. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 11660 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

IEC 60204-32, *Electrical equipment of industrial machines — Part 32: Requirements for hoisting machines*.

3 Terms and definitions

For the purposes of this part of ISO 11660, the terms and definitions given in ISO 4306-1 and the following apply.

3.1 ladder

access system or part of an access system, inclined from the horizontal at an angle greater than 50° but not more than 90°, consisting of a series of equally spaced steps that can accommodate one or both feet

3.1.1 rung ladder

ladder consisting of side rails and rungs which can accommodate both feet, used where the angle of inclination from the horizontal exceeds 75°

3.1.2**stepped ladder**

ladder consisting of side rails and steps which can accommodate both feet, used where the angle of inclination from the horizontal exceeds 65°

3.2**stair**

means of access used where the angle of inclination from the horizontal does not exceed 65°

3.3**ramp**

plane inclined at an angle of 20° or less from the horizontal, without steps

3.4**walkway**

part of an access system, with essentially horizontal flooring, that permits walking or crawling between locations on a crane

3.5**landing**

section of an essentially horizontal floor situated above and below a flight of stairs or access ladder

3.6**platform**

horizontal surface for the support of persons engaged in operation, maintenance, inspection or repair work

3.7**rung**

part of a ladder of any section but without sharp edges and which can be inscribed by a circle and on which one or both feet can be placed

See Figure 2.

3.8**step**

part of a ladder or stair with a flat horizontal surface on which both feet can be placed

See Figure 1.

3.9**going**

horizontal distance between the nose (outer edge) of a step and the vertical projection of the nose (outer edge) of the next step

See Figure 1.

3.10**handrail [handhold]**

device that may be grasped by the hand as an aid to body support and balance

3.10.1**handrail**

device which permits hand movement to a different location without removing the hand from the device

3.10.2**handhold**

device for single hand placement

3.11 toeboard

vertical plate which is placed around the perimeter of a platform to retain loose objects

4 Access

4.1 General

Access to control stations, machinery spaces and portions of the crane for which periodic inspection or maintenance is required shall be provided by means such as steps, stairs, ladders, gangways, landings and platforms complete with such handrails, handholds and other accessories as are necessary.

For cranes that are regularly erected and dismantled, means of access shall be provided as required for those operations. Their design shall permit performance of the work required.

For high cranes, it may be advantageous to have a powered means of access to the cabin.

4.2 Stairs

4.2.1 Stairs shall be provided with a handrail on both sides at a vertical height of 1 m to 1,1 m above the edge of each step, together with an intermediate rail located at half the handrail height.

If the stairs are near a continuous surface, it is acceptable to have only one handrail, on the open side.

4.2.2 The steps of the stairs shall be of the nonskid type and the outer edge (nose) shall be free from sharp edges.

4.2.3 Step construction shall minimize accumulation of debris and aid in the cleaning of mud and debris from the shoe sole where appropriate.

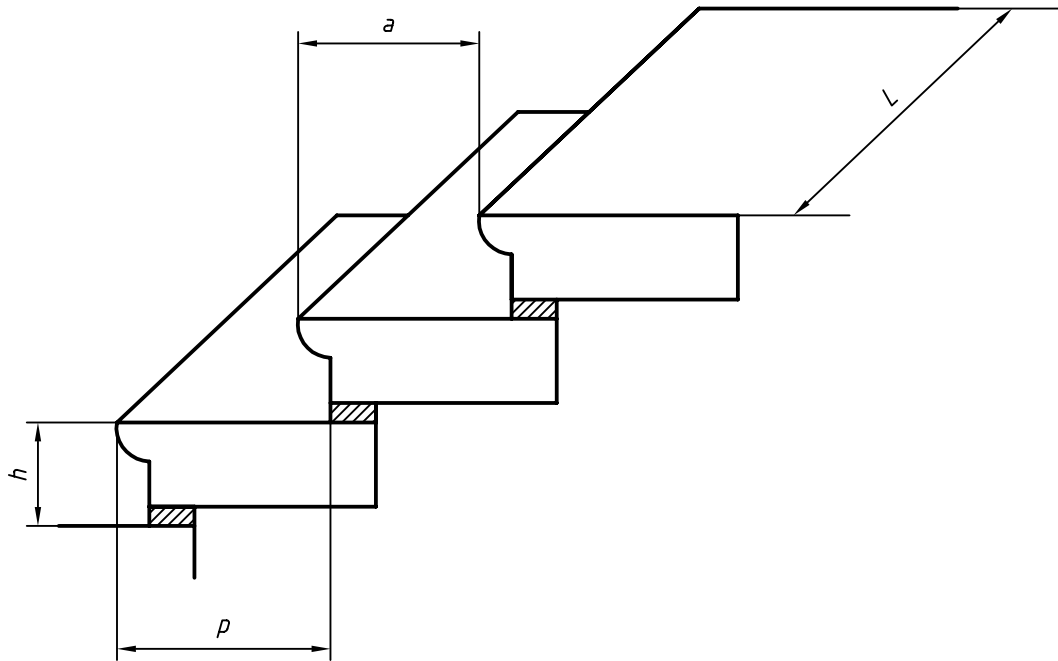
4.2.4 Steps shall be regularly spaced. Step construction shall provide natural foot placement while descending or the step shall be clearly visible while descending.

4.2.5 Steps shall conform with the dimensions given in Table 1. See Figure 1.

Table 1 — Dimensions of steps

Dimensions in millimetres

	cf. Figure 1	Minimum	Maximum
Riser	h	180	—
Tread width	p	240	400
Going	a	—	270
Clear width	L	320	—

**Key**

- h Riser
- p Tread width
- a Going
- L Clear width

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Figure 1 — Dimensions of steps

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Furthermore the following formula shall be observed:

$$2h + a = 630 \text{ mm}$$

All steps on the same stair flight shall have the same values of a , h and p .

4.2.6 The steps shall withstand without permanent deformation:

- a) a force of 2000 N applied through a 125 mm diameter disc at any location on the surface, and
- b) a uniformly distributed force of $4500 \text{ N} \cdot \text{m}^{-2}$.

4.3 Rung ladders

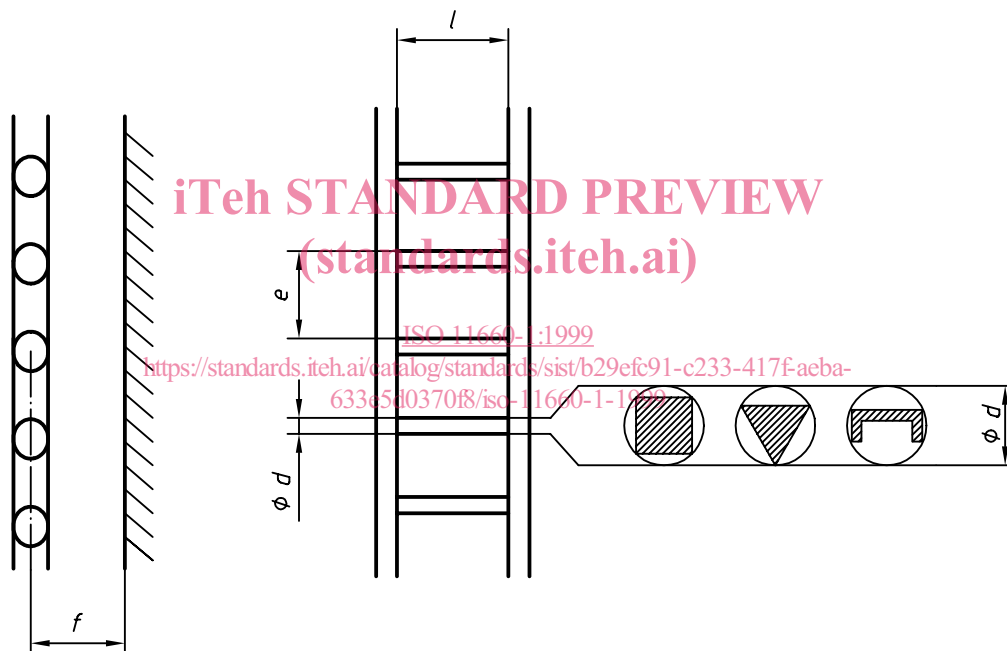
4.3.1 The uprights shall permit a firm grasp and shall be free from sharp edges.

4.3.2 Ladders shall conform with the dimensions given in Table 2. See Figure 2.

Table 2 — Dimensions of rung ladders

Dimensions in millimetres

	cf. Figure 2	Minimum	Maximum
Width between side rails	l	300	500
Rung spacing pitch (measured from the top of a rung to the top of the next rung)	e	230	300
Free space behind rungs (toe clearance, measured from the centreline of the rung)	f	150	—
Diameter surrounding the shape of the rungs	d	16	40

**Key**

- l Width between side rails
- e Rung spacing pitch (measured from the top of a rung to the top of the next rung)
- f Free space behind rungs (toe clearance, measured from the centreline of the rung)
- d Diameter surrounding the shape of the rungs

Figure 2 — Dimensions of rung ladders

4.3.3 The rungs shall support at their centre a force of 1200 N distributed over 0,1 m without permanent deformation.

4.3.4 Normally side rails are continuous but where side rails are required to be discontinuous, the maximum gap between them shall not be more than 40 mm.