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Lift (US: Elevator) installation —

Part 1:
Class I, II, III and VI lifts

Installation d'ascenseurs —

Partie 1: Ascenseurs des classes I, II, III et VI

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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 Standard 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 4190-1 was prepared by Technical Committee ISO/TC 178 *Lifts, escalators and passenger conveyors.*

This third edition cancels and replaces the second edition (ISO 4190-1:1990) and all amendments. This edition reflects the requirements of the global marketplace and includes:

— the special needs, access and full manœuvrability of people with physical disabilities;

— appropriate use of stretchers, beds and ancillary medical equipment in hospitals and nursing homes;

— a range of intensive-use lifts typically used for high-rise buildings for rated speeds of 2,5 m/s to 6,0 m/s; the rated speeds have been based upon the Renard Series for speeds of up to 2,5 m/s;

— improved utilization of building space by reducing well (hoistway) sizes where practical.

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ISO 4190 consists of the following parts, under the general title *Lift (US: Elevator) installation*:

— *Part 1: Class I, II, III and VI lifts*

— *Part 2: Class IV lifts*

— *Part 3: Service lifts class V*

— *Part 5: Control devices, signals and additional fittings*

— *Part 6: Passenger lifts to be installed in residential buildings — Planning and selection*

Lift (US: Elevator) installation —

Part 1:
Class I, II, III and VI lifts

1 Scope

This part of ISO 4190 specifies the necessary dimensions to permit the installation of passenger lifts of classes I, II, III and VI as defined in 2.2.

The dimensions given reflect the requirements for the apparatus. Due note should be made of national regulations which may demand greater dimensions in some instances.

This part of ISO 4190 is applicable to all new lift installations, irrespective of drive systems, with a car with one entrance, to be installed in a new building. Where relevant, it may be used as a basis for an installation in an existing building.

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It does not cover lifts whose the speed is higher than 6,0 m/s: manufacturers should be consulted for such installations.

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2 Terms and definitions

For the purposes of this part of ISO 4190, the following terms and definitions apply.

2.1 General

2.1.1
car
that part of the lift which carries the passenger and/or other loads

2.1.2
head room
that part of the well situated above the highest landing served by the car

2.1.3
landing
area providing access to the car at each level of use

2.1.4
machine room
room in which the machine or machines and/or the associated equipment are placed

2.1.5
passenger lift (US: elevator)
permanent lifting appliance serving defined landing levels, comprising a car whose dimensions and means of construction clearly permit the access of passengers

2.1.6
pit
that part of the well situated below the lowest landing served by the car

2.1.7
well (US: hoistway)
space in which the car, the counterweight(s) and/or hydraulic jack(s) move

NOTE This space is usually bounded by the bottom of the pit, the walls and the ceiling of the well.

2.2 Lift classes

2.2.1
Class I
lifts designed for the transport of persons

2.2.2
Class II
lifts designed mainly for the transport of persons but in which goods may be carried

NOTE They differ from class I, III and VI lifts essentially by the inner fittings of the car.

2.2.3
Class III
lifts designed for health-care purposes, including hospitals and nursing homes

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2.2.4
Class IV
lifts designed mainly for the transport of goods (freight) which are generally accompanied by persons

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2.2.5
Class V
service lifts (US: dumbwaiters)

2.2.6
Class VI
lifts especially designed to suit buildings with intensive traffic, i.e. lifts with speeds 2,5 m/s and above

2.3 Dimensions

See Figures 1 to 3.

2.3.1
car width, b_1
horizontal distance between the inner surface of the car walls, measured parallel to the front entrance side

2.3.2
car depth, d_1
horizontal distance between the internal walls of the car, measured perpendicular to the front entrance side

NOTE These two dimensions (2.3.1 and 2.3.2) are measured, as indicated in Figure 1, at 1 m above the floor. Decorative or protective panels or handrails, if any, should be accommodated within these dimensions.

2.3.3
car height, h_4
vertical inner distance between the entrance threshold and the constructional roof of the car.

NOTE Light fittings and false ceilings should be accommodated within this dimension.

2.3.4
entrance width into car, b_2
clear width of the entrance, measured when the landing and car doors are fully open

2.3.5
entrance height, h_3
clear height of entrance, measured when the landing doors and car doors are fully open

2.3.6
well (US: hoistway) width, b_3
horizontal distance between the inner surface of the well walls measured parallel to the car width

2.3.7
well (hoistway) depth, d_2
horizontal dimension perpendicular to the width

2.3.8
pit depth, d_3
vertical distance between the finished floor of the lowest landing served and the bottom of the well

2.3.9
headroom height, h_1
vertical distance between the finished floor of the highest landing served and the ceiling of the well (not including any pulley over line of car)

2.3.10
machine room width, b_4
horizontal dimension measured parallel to the car width

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2.3.11
machine room depth, d_4
horizontal dimension perpendicular to the width

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2.3.12
machine room height, h_2
smallest vertical distance between the finished floor and the room ceiling, satisfying both the requirements of the national building regulations and lift equipment

2.4 Other characteristics

2.4.1
rated speed, v_n
speed for which the lift has been built and at which it is designed to operate

2.4.2
rated load
load for which the lift has been built and under which it is designed to operate

2.4.3
group collective lifts (US: elevators)
group of electrically interconnected lifts for which landing controls are common

3 Lift characteristics

3.1 Renard series

The dimensions of the car are related to the loads which have been selected to be close to the Renard R10 series of preferred numbers.

The dimensions of the pit, headroom and machine room have been determined in relation to the speeds which, up to 2,5 m/s, are based on the R5 series of preferred numbers.

The Renard Series is a series of preferred numbers adopted at international level in 1946 (Budapest International Congress).

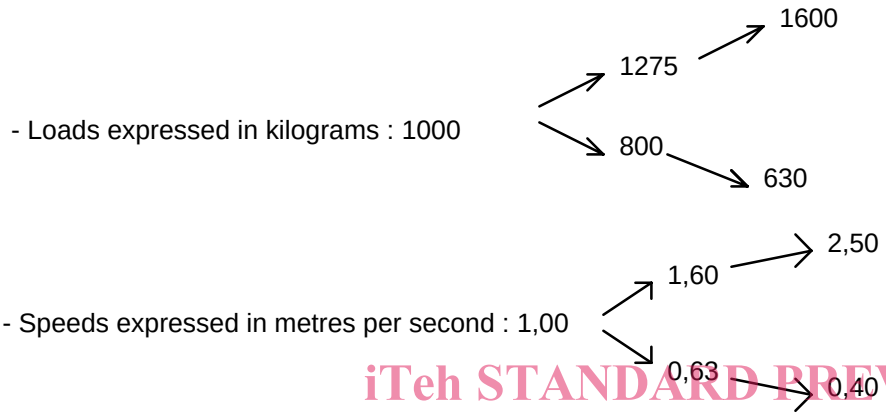
It is a geometrical progression and has a multiplier selected on exponents of 10.

For lifts, multipliers are:

— car load: R10 = $\sqrt[10]{10}$ = 1,258 9

— car speed: R5 = $\sqrt[5]{10}$ = 1,584 9

The results are approximate, which gives:



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3.2 Rated loads

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These shall be, in kilograms:

320 - (450) - 630 - 800 - 1000 - 1 275 - 1 600 - 1 800 - 2 000 - 2 500

3.3 Rated speeds

These shall be, in metres per second:

0,4 - 0,63 - 1,0 - 1,6 - 2,0 - 2,5 - 3,0 - 3,5 - 4,0 - 5,0 - 6,0

Speeds from 0,63 m/s to 6,0 m/s apply to electric lifts.

Speeds from 0,4 m/s to 1,0 m/s apply to hydraulic lifts.

3.4 Selection of class of lift

Any type of building may be equipped with lifts of different classes. The lifts are grouped in Tables 1 to 3.

4 Dimensions

4.1 Inner dimensions of cars

4.1.1 General

It is recommended that in multistorey buildings there is at least one lift accessible to transport persons in wheelchairs.

This lift shall meet all conditions required for this application, and shall be indicated by the sign:

 "Accessible for wheelchairs"

4.1.2 Class I lifts (see Figures 4 and 5 and Table 1)

4.1.2.1 In particular, lifts for residential buildings are shown in Table 1:

a) cars for 320 kg and 450 kg rated load lifts allow only the transport of persons;

b) cars for 630 kg rated load lifts allow, in addition, the transport of a person in a wheelchair (but do not allow full manœuvrability) and/or perambulator;

c) cars for 1 000 kg rated lifts allow, in addition to a) and b), the transport of stretchers with removable handles and of coffins and furniture.

4.1.2.2 General-purpose lifts are to be used mainly in low/medium rise buildings up to 15 floors where lift speeds of up to 2,5 m/s are suitable. The dimensions of these lifts are shown in Table 1.

4.1.3 Class II lifts (see Figures 4 to 7 and Tables 1 and 3)

The dimensions of class II lifts shall be selected from those for either class I or class VI lifts. It is particularly recommended that the dimensions for the 1 000 kg lift intended for residential buildings and/or class III lifts should be used for this purpose.

4.1.4 Class III lifts (see Figure 7 and Table 3)

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It should be noted that:

a) cars for 2 500 kg rated load lifts are particularly suitable for carrying persons in hospital beds of dimensions 1 000 mm × 2 300 mm, together with ancillary medical equipment and associated attendants;

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b) cars for 2 000 kg lifts are suitable for carrying beds of dimensions 1 000 mm x 2 300 mm (excluding ancillary medical equipment) but with associated attendants;

c) cars for 1 600 kg lifts are primarily suitable for moving hospital beds of dimensions 900 mm × 2 000 mm;

d) cars for 1 275 kg lifts are suitable for beds of dimensions 900 mm × 2 000 mm in nursing homes.

4.1.5 Class VI lifts (see Figure 6 and Table 1)

Lifts for intensive use are to be used mainly in high-rise buildings above 15 floors where lift speeds of at least 2,5 m/s are needed. The dimensions of these lifts are shown in Table 1.

NOTE The precise load, speed and numbers of lifts should be the subject of a detailed traffic calculation.

4.2 Inner dimensions of well

4.2.1 Plan dimensions

The lift well plan dimensions include clear plumb tolerances. A tolerance of ± 25 mm out of plumb in lift wells (elevator hoistways) shall be maintained for the first 20 storeys, with an additional 1,0 mm for each storey above that, with a maximum allowance of 50 mm total regardless of height.

The dimensions b_3 and d_2 in Figures 2 and 3 represent the minimum plumb requirement.

The architect, or any person assuming such functions, in agreement with the builder, shall ensure that these tolerances are adequate for the specified dimensions of the finished work. Otherwise additional tolerances shall be added to the lift well plan dimensions.

For the incorporation of lifts in the building, the well shall have a certain free volume enclosed by a rectangular parallelepiped inscribed in the well, with vertical edges and bases formed by the bottom of the pit and the ceiling of the well.

When a counterweight safety gear is required, the depths or the widths defined should be increased by up to 200 mm.

4.2.2 Individual lifts

The dimensions of the well shall have the values shown in Figures 4 to 8.

4.2.3 Multiple lifts situated side by side

In the case of a common well, the internal dimensions shall be determined in the following manner:

a) the total width of the common well shall be equal to the sum of the individual well widths plus the sum of the boundary widths between the wells, each boundary width being at least 200 mm;

b) the depths of the constituent parts of the common well shall be the same as those laid down for the individual lifts.

4.2.4 Distance between landings

The minimum distance between two successive landings to permit the accommodation of landing doors shall be:

— 2 450 mm for a landing door height of 2 000 mm;

— 2 550 mm for a landing door height of 2 100 mm.

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4.3 Dimensions of landings

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4.3.1 General

The landing depth specified in subsequent clauses shall at least be maintained over the whole width of the well (individual or common).

These dimensions do not take into account the possibility of through traffic of persons not using the lifts.

4.3.2 Class I lifts particularly intended for residential buildings

These may be individual lifts or multiple lifts situated side by side.

For this category of lifts, a maximum number of four group collective lifts should be placed side by side.

For hydraulic lifts, a maximum of two group collective lifts is generally recommended.

The minimum depth of the landing measured wall to wall and in the same direction as the depth(s) of the car(s) should be equal to the depth of the deepest car. However, the depth of landings served by lifts for persons with disabilities shall be at least 1 500 mm.

4.3.3 Class I (other than those particularly intended for residential buildings), II, III and VI lifts

4.3.3.1 Individual lifts or multiple lifts situated side by side

In the case of group collective lifts, the maximum number shall be four.

The minimum depth of the landing measured wall to wall and in the same direction as the depth(s) of the car(s) should be equal to $1{,}5 \times d_1$ (where d_1 is the depth of the deepest car). For group collective lifts with four lifts, other than class III, this depth shall be not less than 2 400 mm.

4.3.3.2 Lifts arranged face to face

In the case of group collective lifts, the maximum number shall be eight (2 x 4).

The distance between facing walls shall be at least equal to the sum of the depths of two facing cars. For group collective lifts, other than class III, this distance shall be not more than 4 500 mm.

4.4 Dimensions of machine room for electric lifts

4.4.1 Individual lifts

The dimensions of the machine room shall be as indicated in Tables 2 and 3. Machine room heights shall satisfy existing national regulations.

4.4.2 Multiple lifts

4.4.2.1 Class I lifts particularly intended for residential buildings

These shall fulfil the following conditions.

4.4.2.1.1 Floor area

a) Multiple lifts having the same rated load: the minimum floor area of the common machine room shall be equal to the sum of the minimum areas required for the individual lifts.

b) Two lifts having different rated load: the minimum floor area of the common machine room shall be equal to the sum of the minimum areas required for the individual lifts plus the difference between the well areas of the two lifts.

c) A group of more than two lifts having different rated loads: the minimum floor area of the common machine room shall be equal to the sum of the minimum areas required for the individual lifts, plus the sum of the differences between the well area of the largest lift and the well areas of each of the other lifts.

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4.4.2.1.2 Width

The actual dimensions shall provide a floor area at least equal to the one specified for the total area.

The minimum width of the common machine room shall be equal to the total of the common well plus a lateral extension corresponding to that appropriate to the lift with the greatest individual requirement.

4.4.2.1.3 Depth

The actual dimensions shall provide a floor area at least equal to the one specified for the total area.

The minimum depth of the common machine room shall be equal to the depth of the deepest individual well plus 2 100 mm.

4.4.2.1.4 Height

The minimum height of the common machine room shall be equal to the height of the machine room having the greatest height. Machine room heights to satisfy existing national regulations.

4.4.2.2 Class I (other than those particularly intended for residential buildings), II, III and VI lifts

4.4.2.2.1 Symbols

The following symbols are used for the determination of the dimensions: