INTERNATIONAL STANDARD

ISO 4190-1

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Lift installation —

Part 1:
Lifts of classes I, II and III

Installation d'ascenseurs —

Partie 1: Ascenseurs des classes I, II et III

Reference number
ISO 4190-1:1990(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 4190-1 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators, passenger conveyors*.

This second edition cancels and replaces the first edition (ISO 4190-1:1980), it incorporates Addendum 2, adds a 320 kg lift, modifies lift-shaft and car sizes, and maintains a 400 kg lift.

ISO 4190 consists of the following parts, under the general title *Lift installation*:

— *Part 1: Lifts of classes I, II and III*

— *Part 2: Lifts of class IV*

— *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*

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Lift installation —

Part 1:
Lifts of classes I, II and III

1 Scope

This part of ISO 4190 lays down the necessary dimensions to permit the installation of passenger lifts of classes I, II and III as defined in 2.1.

It applies to new lift installations 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.

It lays down the dimensions of the lift car appropriate for the following buildings:

— residential buildings, offices, hotels, nursing homes and hospitals.

It deals with electric traction and hydraulic lifts for residential buildings. For other than residential buildings, this part of ISO 4190 deals with electric traction lifts only.

It does not cover lifts the speed of which is higher than 2,5 m/s: manufacturers should be consulted for such installations.

2 Definitions

For the purposes of ISO 4190, the following definitions apply.

2.1 General

2.1.1 passenger lift: Permanent lifting appliance serving defined landing levels, comprising a car, whose dimensions and means of construction clearly permit the access of passengers, running at least partially between rigid guides which are vertical or whose inclination to the vertical is less than 15°.

The following classes can be identified:

Class I: Lifts designed for the transport of persons.

Class II: Lifts designed mainly for the transport of persons but in which goods may be carried. They differ from class I and III lifts essentially by the inner fittings of the car.

Class III: Lifts designed for the transport of beds.

Class IV: Lifts designed mainly for the transport of goods which are generally accompanied by persons.

2.1.2 service lift: Permanent lifting appliance serving defined landing levels, comprising a car, the interior of which is inaccessible to persons on account of its dimensions and means of construction, running at least partially between rigid guides which are vertical or whose inclination to the vertical is less than 15°.

To satisfy the condition of inaccessibility, the car dimensions do not exceed

a) floor area = 1 m^2

b) depth = 1 m

c) height = 1,2 m

A height greater than 1,2 m is permissible however, if the car comprises several permanent compartments, each of which satisfies the above requirements.

Class V: Service lifts alone constitute class V.

2.1.3 car: That part of the lift which carries the passengers and/or other loads.

2.1.4 well: Space in which the car, the counterweight(s) and/or hydraulic jack(s) move. This space is bounded by the bottom of the pit, the walls and the top of the well.

2.1.5 landing: Flat space for access to the car at each level of use.

2.1.6 pit: That part of the well situated below the lowest landing level served by the car.

2.1.7 head room: That part of the well situated above the last level served by the car.

2.1.8 machine room: Room in which the machine, or machines, and/or the associated equipment are placed.

2.2 Dimensions

2.2.1 Inner dimensions of car (see figure 1)

2.2.1.1 car width, b_1: Horizontal distance between the inner surface of the car walls measured parallel to the front entrance side.

2.2.1.2 car depth, d_1: Horizontal distance between internal walls of the car measured perpendicular to the width.

These two dimensions 2.2.1.1 and 2.2.1.2 shall be measured, as indicated in figure 1, 1 m above the floor. Decorative or protective panels or handrails, if any, shall be accommodated within these dimensions.

2.2.1.3 car height: Vertical inner distance between the entrance threshold and the constructional roof of the car. Light fitting and false ceilings shall be accommodated within this dimension.

2.2.1.4 clear entrance into car: Width, b_2, and height of the entrance measured when the landing and car doors are fully open.

2.2.2 Inner dimensions of well [see figure 2a) and figure 2b)]

2.2.2.1 well width, b_3: Horizontal distance between the inner surface of the well walls measured parallel to the car width.

2.2.2.2 well depth, d_2: Horizontal dimension perpendicular to the width.

2.2.2.3 pit depth, d_3: Vertical distance between the finished floor of the lowest level served and the bottom of the well.

2.2.2.4 height above highest level served, h_1: Vertical distance between the finished floor of the highest level served and the top of the well.

2.2.3 Inner dimensions of machine room [see figure 2a) and figure 2b)]

2.2.3.1 machine room width, b_4: Horizontal dimension measured parallel to the car width.

2.2.3.2 machine room depth, d_4: Horizontal dimension perpendicular to the width.

2.2.3.3 machine room height, h_2: Smallest vertical distance between the finished floor and the room ceiling.

2.3 Other characteristics

2.3.1 rated speed, v_n: Speed for which the lift has been built and is designed to operate.

2.3.2 rated load: Load for which the lift has been built and is designed to operate.

2.3.3 group collective lifts: Group of electrically interconnected lifts for which landing controls are common and having the same rated load, the same rated speed, the same car dimensions, serving the same levels and for which the means of access at those levels are in sight of and close to each other.

For class I lifts in residential buildings, it is admissible for the rated load and car dimensions of lifts in a group to be different.

3 Lift characteristics

3.1 Loads have been selected from the R5 and R10 series of preferred numbers.

The dimensions of the pit, height above the highest level served and machine room have been determined in relation to the speeds, which have been chosen from the R5 series of preferred numbers.

3.2 The dimensions specified in this part of ISO 4190 have been determined on the basis of the following rated loads and rated speeds:

3.2.1 Rated loads, in kilograms: 320 — 400 — 630 — 800 — 1 000 — 1 250 — 1 600 — 2 000 — 2 500.

3.2.2 Rated speeds, in metres per second: 0,4 — 0,63 — 1 — 1,6 — 2,5 (0,4 only applies to hydraulic lifts; 1,6 and 2,5 only apply to electric lifts).

4 Dimensions

4.1 Lift choice

Any type of building can be equipped with lifts of different classes. Nevertheless, the lifts particularly intended for residential buildings are grouped and specially annotated in table 1.

4.2 Inner dimensions of cars

4.2.1 General

It is recommended that in all buildings at least one lift accessible to handicapped persons in wheelchairs should be provided.

This lift shall meet all conditions required for this application (dimensions, location of controls, etc.). It is shown by the symbol ♿ .

4.2.2 Class I lifts (see table 1 and figure 3)

It should be noted that for lifts particularly intended for residential buildings

a) the small-size cars for 320 kg and 400 kg rated load lift allow only the transport of persons;

b) the medium-size car for 630 kg rated load lift allows, in addition, the transport of normal wheelchairs for handicapped persons and of perambulators;

c) the large-size car for 1 000 kg rated load lift allows, in addition to the medium size car capability, the transport of stretchers with removable handles, and of coffins and furniture.

4.2.3 Class II lifts

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

4.2.4 Class III lifts (see table 2 and figure 3)

It should be noted that

a) cars for 1 600 kg and 2 000 kg rated load lifts meet the requirements of most nursing homes and hospitals;

b) the car for 2 500 kg rated load lift is particularly suited to carry persons in hospital beds together with medical aid equipment.

1) Or any person assuming his functions.

4.3 Inner dimensions of well

4.3.1 Plan dimensions

The lift well plan dimensions include the clear-plumb tolerances of ± 20 mm. The architect[1], in agreement with the builder, shall ensure that these tolerances are adequate with the specified dimensions for the finished work. Otherwise additional tolerances shall be added to the lift well plan dimensions.

In certain exceptional cases, the depths or the widths defined here might have to be increased when counterweight safety gear is provided.

NOTE 1 For the incorporation of lifts in the building, the well should 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 top of the well.

4.3.2 Individual lifts

The dimensions of the well shall have the values shown in tables 1 and 2.

4.3.3 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.

c) The pit depth shall be determined by reference to the fastest lift in the group.

d) The minimum height above the highest level served shall be determined by reference to the fastest lift in the group.

4.3.4 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.

4.4 Dimensions of landings

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.

4.4.1 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 shall be placed side by side. Lifts at right angles are inadvisable.

For hydraulic lifts a maximum of two group collective lifts is 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 handicapped persons shall be at least 1,5 m.

4.4.2 Classes I (other than those particularly intended for residential buildings), II and III lifts

4.4.2.1 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.

4.4.2.2 Lifts arranged face to face

In the case of group collective lifts, the maximum number shall be 8 (2 × 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.

4.5 Dimensions of machine room for electric lifts

4.5.1 Individual lifts

The dimensions of the machine room shall be as indicated in tables 1 and 2. Greater machine room heights may be required in certain countries to satisfy existing national regulations.

4.5.2 Multiple lifts

The dimensions of the machine room shall comply with the conditions 4.5.2.1 and 4.5.2.2.

4.5.2.1 Class I lifts particularly intended for residential buildings

4.5.2.1.1 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.

4.5.2.1.2 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 width of the common well plus a lateral extension corresponding to that appropriate to the lift with the greatest individual requirement.

4.5.2.1.3 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.

4.5.2.1.4 Height

The minimum height of the common machine room shall be equal to the height of the machine room having the greatest height. Greater heights may be required in certain countries to satisfy existing national regulations.

4.5.2.2 Classes I (other than those particularly intended for residential buildings), II and III lifts

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

b_4 minimum width
d_4 minimum depth
A floor area
} of the machine room for one single lift

b_3 well width for one single lift

d_2 well depth for one single lift

n total number of lifts

The dimensions of the machine room are determined as indicated in 4.5.2.2.1 to 4.5.2.2.3.

4.5.2.2.1 Lifts situated side by side

Total area: $A + 0{,}9\ A\ (n - 1)$

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

Minimum width: $b_4 + (n - 1)\ (b_3 + 200)$

Minimum depth: d_4

4.5.2.2.2 Lifts arranged face to face

Total area: $A + 0{,}9\ A\ (n - 1)$

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

Minimum width: $b_4 + \frac{(n-1)}{2}\ (b_3 + 200)$

Minimum depth: $2\ d_2$ + distance between the wells

In the case of an odd number of lifts, n is rounded up to the next even number.

4.5.2.2.3 Height

The minimum height of the common machine room shall be equal to the height of the machine room having the greatest height. Greater heights may be required in certain countries to satisfy existing national regulations.

4.6 Dimensions of machine room for hydraulic lifts

4.6.1 Individual lifts

The dimensions of the machine room shall be as indicated in table 1. Greater machine room heights may be required in certain countries to satisfy existing national regulations.

4.6.2 Duplex group lifts

For both group lifts a common machine room is recommended.

Floor area shall be as follows.

a) Duplex group 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 machine rooms placed behind the well of individual lifts.

b) Duplex group 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 machine rooms placed behind the well of individual lifts plus the difference between the well areas of the two lifts.

4.7 Arrangement of machine room

4.7.1 Individual or common arrangement

4.7.1.1 For electric traction lifts, the machine room shall be above the well (see figure 2). The lateral extension of the machine room with respect to the well (or common well) can be taken on either the right or the left of the well.

4.7.1.2 For hydraulic lifts the machine room is preferably placed beside or behind the well in the lower part of the building [see figure 2b)].

4.7.1.3 The machine room should have adequate ventilation.

4.7.2 Arrangement for individual lifts and multi-lifts side by side with common machine room

4.7.2.1 For electric traction lifts, the rear wall of the machine room shall be in line with the corresponding well wall (or of the deepest well) and one of the lateral walls shall be in line with the corresponding well wall (or of the common well).

The depth extension of the machine room with respect to the well shall be taken on the landing side.

4.7.2.2 For duplex group hydraulic lifts the common machine room is preferably placed behind the well in the lower part of the building.

4.7.3 Arrangement for lifts face to face with a common machine room (for electric traction lifts only)

It is recommended that any depth extension should not be greater than 0,5 m from the rear walls of the wells and should be at the same level as the slab supporting the machinery.

Table 1 — Lifts of class 1 — Functional dimensions

General purpose				Residential buildings				Non-residential buildings (offices, banks, hotels, etc.)				
Rated load (mass)			(kg)	1) 320	1) 400	630	1 000	630	800	1 000	1 250	1 600
Car		Width b_1	(mm)	900	1 100			1 100	1 350	1 600	1 950	
		Depth d_1	(mm)	1 000		1 400	2 100	1 400				1 750
		Height	(mm)	2 200				2 200		2 300		
Car door and landing doors		Width b_2	(mm)	700	800			800		1 100		
		Height h_3	(mm)	2 000				2 000		2 100		
		Type		Lateral opening				Central opening				
				2)	Central opening							
Well		Width b_3 Lateral-opening doors	(mm)	1 400	1 600			2)				
		Central-opening doors		2)	1 800			1 800	1 900	2 400	2 600	
		Depth d_2	(mm)	1 600		1 900	2 600	2 100	2 300			2 600
Pit depth			d_3 (mm)									
	v_n = 0,40 m/s[3]			1 400				2)				
	v_n = 0,63 m/s			1 400				1 400			1 600	
	v_n = 1,00 m/s											
	v_n = 1,60 m/s[4]			2)	1 600			1 600				
	v_n = 2,50 m/s[4]			2)		2 200		2)	2 200			
Height above the last level			h_1 (mm)									
	v_n = 0,40 m/s[3]			3 600				2)				
	v_n = 0,63 m/s			3 600								
	v_n = 1,00 m/s			3 700				3 800		4 200	4 400	
	v_n = 1,60 m/s[4]			3 800				4 000		4 200	4 400	
	v_n = 2,50 m/s[4]			2)		5 000		2)	5 000	5 200	5 400	
Machine room for hydraulic lifts[5]				Width or depth of the well × 2 000 mm				2)				
		Height h_1	(mm)	2 000								
Machine room for electric lifts[5]	v_n = 0,63 m/s	Surface A	(m^2)	6	7,5	10	12	15		20	22	25
		Width[6] b_4	(mm)	1 600	2 200		2 400	2 500		3 200		
		Depth[6] d_4	(mm)	3 000	3 200	3 700	4 200	3 700		4 900		5 500
		Height h_2	(mm)	2 000				2 200		2 400		2 800
	v_n = 1,00 m/s	Surface A	(m^2)	6	7,5	10	12	15		20	22	25
		Width[6] b_4	(mm)	1 600	2 200		2 400	2 500		3 200		
		Depth[6] d_4	(mm)	3 000	3 200	3 700	4 200	3 700		4 900		5 500
		Height h_2	(mm)	2 000				2 200		2 400		2 800
	v_n = 1,60 m/s	Surface A	(m^2)	2)	10	12	14	15		20	22	25
		Width[6] b_4	(mm)	2)	2 200		2 400	2 500		3 200		
		Depth[6] d_4	(mm)	2)	3 200	3 700	4 200	3 700		4 900		5 500
		Height h_2	(mm)	2)	2 200			2 200		2 400		2 800
	v_n = 2,50 m/s	Surface A	(m^2)	2)		14	16	2)	18	20	22	25
		Width[6] b_4	(mm)	2)		2 800		2)	2 800	3 200		
		Depth[6] d_4	(mm)	2)		3 700	4 200	2)	4 900			5 500
		Height h_2	(mm)	2)		2 600		2)	2 800			

1) These car dimensions do not allow access of handicapped people in wheelchairs.
2) Non-standard configuration.
3) For hydraulic lifts only.
4) For electric lifts only.
5) Site conditions and national regulations may require different machine room dimensions.
6) b_4 and d_4 are minimum values. The actual dimensions shall provide a floor area at least equal to A.