International Standard 4190/1

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

In future, lifts
Passenger and service lifts —

Passenger lift installation — Part 1 : Lifts of classes I, II and III

Installation d'ascenseurs — Partie 1 : Ascenseurs des classes I, II et III

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4190/1 was developed by Technical Committee ISO/TC 59, *Building construction*, and was circulated to the member bodies in July 1978. Subsequently, responsibility for this document has been transferred to ISO/TC 178, *Lifts, escalators and moving walkways*, which was set up in 1979.

It has been approved by the member bodies of the following countries :

Austria	Hungary	Romania
Belgium	India	South Africa, Rep. of
Brazil	Israel	Spain
Chile	Italy	Switzerland
Denmark	Japan	USSR
Ethiopia	Korea, Rep. of	Yugoslavia
France	Mexico	
Germany, F. R.	Netherlands	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Finland
Norway
Sweden
United Kingdom

This International Standard cancels and replaces International Standard ISO 3571/1-1977 of which it constitutes a technical revision.

Passenger lift installation — Part 1 : Lifts of classes I, II and III

1 Scope and field of application

This International Standard fixes the necessary dimensions to permit the installation of accommodation passenger lifts of classes I, II and III as defined in 2.1.[1]

It fixes for these lifts the dimensions of the car appropriate for the following buildings :

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

It deals more specifically with electric traction lifts. However, the horizontal dimensions of the well adopted for these lifts allow the installation of hydraulic lifts with the same load and the same car and door dimensions. For the other characteristics, manufacturers should be consulted.

It does not concern lifts whose speed is higher than 2,50 m/s, for which manufacturers should be consulted.

This International Standard 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.

2 Definitions

2.1 General

2.1.1 passenger lift : A 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 : A 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 = 1,00 m^2

b) depth = 1,00 m

c) height = 1,20 m

A height greater than 1,20 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 : The part of the lift which carries the passengers and(or) other loads.

2.1.4 well : The space in which the car and the counterweight (if any) move. This space is bounded by the bottom of the pit, the walls and the top of the well.

2.1.5 landing : A 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 machine room : A room in which the machine, or machines, and/or the associated equipment are placed.

[1] Lifts of classes IV and V will be the subject of a separate part of this International Standard.

2.2 Dimensions

2.2.1 Inner dimensions of the car (see figure 1)

2.2.1.1 car width (A) : The horizontal distance between the inner surfaces of the car walls measured parallel to the front entrance side.

2.2.1.2 car depth (B) : The horizontal dimension perpendicular to the width.

These two dimensions shall be measured as indicated in figure 1, at 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 : The vertical inner distance between the entrance threshold and the constructional roof of the car. Light fitting and false ceilings shall be accomodated within this dimension.

2.2.1.4 clear entrance into the car : The width and height of the entrance measured when the landing and car doors are fully open.

2.2.2 Inner dimensions of the well (see figure 2)

2.2.2.1 well width (C) : The horizontal distance between the inner surfaces of the well walls measured parallel to the car width.

2.2.2.2 well depth(D) : The horizontal dimension perpendicular to the width.

NOTE — For the incorporation of lifts in the building, the well must 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.

2.2.2.3 pit depth (P) : The vertical distance between the finished floor of the lowest level served and the bottom of the well.

2.2.2.4 height above the highest level served (Q) : The vertical distance between the finished floor of the highest level served and the top of the well.

2.2.3 Inner dimensions of the machine room (see figure 2)

2.2.3.1 machine room width (R) : The horizontal dimension measured parallel to the car width.

2.2.3.2 machine room depth (T) : The horizontal dimension perpendicular to the width.

2.2.3.3 machine room height (H) : The vertical distance between the part of the finished floor above the well and the room ceiling.

2.3 Other characteristics

2.3.1 rated speed (V) : The speed for which the lift has been built and is designed to operate.

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

2.4 group collective lifts : A 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.

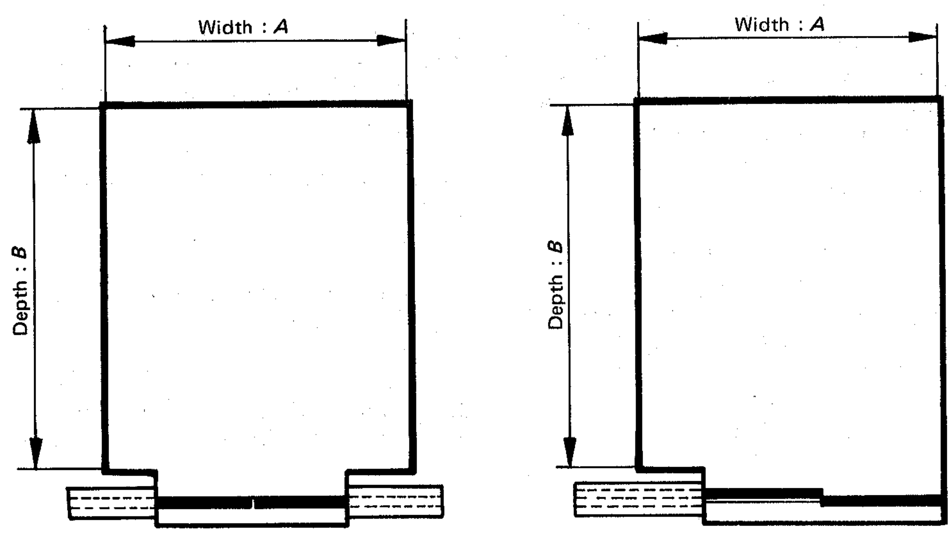

Figure 1

3 Lift characteristics

3.1 Loads have been selected from the R 5 and R 10 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 R 5 series of preferred numbers.

3.2 The dimensions specified in this International Standard have been determined on the basis of the following rated loads and rated speeds :

3.2.1 Rated loads (kg) : 400 — 630 — 800 — 1 000 — 1 250 — 1 600 — 2 000 — 2 500.

3.2.2 Rated speeds (m/s) : 0,63 — 1,00 — 1,60 — 2,50 (the specified dimensions are also valid for lower speeds).

4 Dimensions

4.1 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

4.2.1.1 It is good practice to provide in all buildings at least one lift accessible to handicapped persons in wheelchairs.

This lift shall meet all conditions required for this application (dimensions, location of controls, etc.) It is shown by the symbol ♿ [1)]

4.2.1.2 Pending the establishment of an internationally agreed ratio of load to surface area of the lift car in national safety regulations, values of rated load somewhat different from those given above, and in the tables of this International Standard, may be used in the meantime in countries where the load/surface area ratio is given in national standards.

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

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

— the small size car for 400 kg rated load lift allows only the transport of persons;

— the medium size car for 630 kg rated load lift allows, in addition, the transport of normal wheel-chairs for handicapped persons and of perambulators;

— 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.

1) The use of this symbol is subject to the agreement of the national representative of "Rehabilitation International" (New York).

Table 1 — Standard electric lifts — Class I — Functional dimensions

General purpose				Residential buildings			Non-residential buildings (offices, banks, hotels, etc.)				
Rated-load (mass)			(kg)	400[1]	630	1 000	630	800	1 000	1 250	1 600
Car	Width	*A*	(mm)	1 100			1 100	1 350	1 600	1 950	
	Depth	*B*	(mm)	950	1 400	2 100	1 400				1 750
	Height		(mm)	2 200			2 200		2 300		
Car door and landing doors	Width	*E*	(mm)	800			800		1 100		
	Height	*F*	(mm)	2 000			2 000		2 100		
	Type			Central opening			Central opening				
Well	Width	*C*	(mm)	1 800			1 800	1 900	2 400	2 600	
	Depth	*D*	(mm)	1 600	2 100	2 600	2 100	2 300			2 600
Pit depth		*P*	(mm)								
$V_n \leqslant 0{,}63$ m/s				1 400							
$V_n \leqslant 1{,}00$ m/s				1 500			1 500		1 700	1 900	
$V_n \leqslant 1{,}60$ m/s				1 700			1 700			1 900	
$V_n \leqslant 2{,}50$ m/s				2)	2 800		2)	2 800			
Height above the last level		*Q*	(mm)								
$V_n \leqslant 0{,}63$ m/s				3 700							
$V_n \leqslant 1{,}00$ m/s				3 800			3 800		4 200	4 400	
$V_n \leqslant 1{,}60$ m/s				4 000			4 000		4 200	4 400	
$V_n \leqslant 2{,}50$ m/s				2)	5 000		2)	5 000	5 200	5 400	
Machine room	$V_n \leqslant 0{,}63$ m/s Surface	*S*	(m^2)	7,5	10	12	15		20	22	25
	3) Width	*R*	(mm)	2 200		2 400	2 500		3 200		
	3) Depth	*T*	(mm)	3 200	3 700	4 200	3 700		4 900		5 500
	Height	*H*	(mm)	2 000			2 200		2 400		2 800
	$V_n \leqslant 1{,}00$ m/s Surface	*S*	(m^2)	7,5	10	12	15		20	22	25
	3) Width	*R*	(mm)	2 200		2 400	2 500		3 200		
	3) Depth	*T*	(mm)	3 200	3 700	4 200	3 700		4 900		5 500
	Height	*H*	(mm)	2 000			2 200		2 400		2 800
	$V_n \leqslant 1{,}60$ m/s Surface	*S*	(m^2)	10	12	14	15		20	22	25
	3) Width	*R*	(mm)	2 200		2 400	2 500		3 200		
	3) Depth	*T*	(mm)	3 200	3 700	4 200	3 700		4 900		5 500
	Height	*H*	(mm)	2 200			2 200		2 400		2 800
	$V_n \leqslant 2{,}50$ m/s Surface	*S*	(m^2)	2)	14	16	2)	18	20	22	25
	3) Width	*R*	(mm)	2)	2 800		2)	2 800	3 200		
	3) Depth	*T*	(mm)	2)	3 700	4 200	2)	4 900			5 500
	Height	*H*	(mm)	2)	2 600		2)	2 800			

1) These car dimensions do not allow access of handicapped people in wheel-chairs.

2) Non-standard lift.

3) *R* and *T* are minimum values. The actual dimensions shall provide a floor area at least equal to *S*.

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 :

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

Table 2 — Standard electric lifts — Class III (Bed lifts) — Functional dimensions

Rated load (mass)				(kg)	1 600	2 000	2 500
Car	Width	A	(mm)		1 400	1 500	1 800
	Depth	B	(mm)		2 400	2 700	
	Height		(mm)		2 300		
Car door and landing doors	Width	E	(mm)		1 300		1 300[1]
	Height	F	(mm)		2 100		
	Type				Lateral opening		Lateral opening[1]
Well	Width	C	(mm)		2 400		2 700
	Depth	D	(mm)		3 000	3 300	
Pit depth		P	(mm)				
$V_n \leqslant 0{,}63$ m/s					1 600		1 800
$V_n \leqslant 1{,}00$ m/s					1 700		1 900
$V_n \leqslant 1{,}60$ m/s					1 900		2 100
$V_n \leqslant 2{,}50$ m/s					2 800		3 000
Height above the last level		Q	(mm)				
$V_n \leqslant 0{,}63$ m/s					4 400		4 600
$V_n \leqslant 1{,}00$ m/s					4 400		4 600
$V_n \leqslant 1{,}60$ m/s					4 400		4 600
$V_n \leqslant 2{,}50$ m/s					5 400		5 600
Machine room	$V_n \leqslant 0{,}63$ m/s Surface	S	(m^2)		25	27	29
	[2] Width	R	(mm)		3 200		3 500
	[2] Depth	T	(mm)		5 500	5 800	
	Height	H	(mm)		2 800		
	$V_n \leqslant 1{,}00$ m/s Surface	S	(m^2)		25	27	29
	[2] Width	R	(mm)		3 200		3 500
	[2] Depth	T	(mm)		5 500	5 800	
	Height	H	(mm)		2 800		
	$V_n \leqslant 1{,}60$ m/s Surface	S	(m^2)		25	27	29
	[2] Width	R	(mm)		3 200		3 500
	[2] Depth	T	(mm)		5 500	5 800	
	Height	H	(mm)		2 800		
	$V_n \leqslant 2{,}50$ m/s Surface	S	(m^2)		25	27	29
	[2] Width	R	(mm)		3 200		3 500
	[2] Depth	T	(mm)		5 500	5 800	
	Height	H	(mm)		2 800		

1) Possible alternative : clear entrance 1 400 mm — Central opening door.

2) R and T are minimum values. The actual dimensions shall provide a floor area at least equal to S.

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

4.3 Inner dimensions of the well

4.3.1 The lift well plan dimensions specified are the minimum clear plumb sizes. The architect[1] in agreement with the builder, must ensure that adequate tolerances are added to the specified dimensions in the building design, so that these minimum plumb dimensions are met in the finished work. These dimensions apply to lift installations with guiding of the counterweight by rigid metal guides only.

For lifts particularly intended for residential buildings and which have to meet the particular requirements of certain countries using sliding doors, the following variations are permissible in such cases for a limited period :

— to use a well width of 2 000 mm;

— for 630 kg lifts, to reduce the depth of the well to 1 900 mm. The counterweight will then be situated at the side of the well.

In certain exceptional cases the depths or the widths defined here may be increased when counterweight safety gear is provided.

Higher minimum values may be required in certain countries to satisfy existing national regulations.

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

The inner dimensions of the common well shall be determined as follows :

— 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.

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

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

— 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 accomodation 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 all over the 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

4.4.1.1 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.

The minimum depth 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.[2]

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 measured wall to wall and in the same direction as the depth(s) of the car(s) should be equal to 1,5 B (B being 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.

1) Or any person assuming his functions.

2) The depth of landings served by lifts for handicapped persons shall be at least 1,50 m.

4.5 Dimensions of the machine room

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 following conditions :

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[1]

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[1]

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 :

R : minimum width
T : minimum depth
S : floor area
} of the machine room for one single lift

C : well width for one single lift

D : well depth for one single lift

N : total number of lifts

The dimensions of the machine room are determined as follows :

4.5.2.2.1 Lifts situated side by side

Total area : $S + 0,9\,S\,(N - 1)$

Minimum width[1] : $R + (N - 1)\,(C + 200)$

Minimum depth[1] : T

4.5.2.2.2 Lifts arranged face to face

Total area : $S + 0,9\,S\,(N - 1)$

Minimum width[1] : $R + \frac{(N - 1)}{2}(C + 200)$

Minimum depth[1] : $2\,D$ + 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 Arrangement of machine room

4.6.1 Common arrangement

The machine room shall be above the well.

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.

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