

# INTERNATIONAL STANDARD

**ISO**  
**4190-2**

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## Lift (US: Elevator) installation —

### Part 2: Class IV lifts

*Installation d'ascenseurs —*

*Partie 2: Ascenseurs de classe IV*

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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.

Attention is drawn to the possibility that some of the elements of this part of ISO 4190 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4190-2 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators, passenger conveyors*.

This second edition cancels and replaces the first edition (ISO 4190-2:1982), which has been technically revised. It reflects the requirements of the global marketplace. A range of goods (freight) lifts typically used for rated speeds of 0,25 m/s to 2,5 m/s and loads of 630 kg to 5 000 kg has been incorporated.

The dimensions on the car are related to the loads which have been based on the R10 series of numbers but, due to the predominance of hydraulic drives, some have been based on other considerations.

The range of loads has been extended up to 5 000 kg and includes both the car and landing entrance configuration.

Two classes of loading related to car floor area have been addressed to reflect different safety code requirements.

Additional loads incurred whilst loading/unloading the car are not part of the rated load.

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 2: Class IV lifts

### 1 Scope

This part of ISO 4190 specifies the necessary dimensions to permit the installation of Class IV lifts, as defined in 3.2.4, generally used for the transport of goods (freight).

It deals with electric and hydraulic lifts. The horizontal dimensions of the wells (US: hoistways) are generally defined by the entrance and drive configurations. It covers lifts with either horizontal or vertical power-operated sliding doors [see Figures 1 a) and 1 b)].

For other characteristics, the manufacturers should be consulted.

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

Two types of loading (load per unit area) are addressed:

**Series A:** passenger and goods (freight) lifts with loading conforming to EN 81-1 or EN 81-2;

**Series B:** lifts for goods (freight) only, which have a different floor loading in countries which allow this by virtue of their safety codes.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 4190. 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 4190 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.

EN 81-1:1998, *Safety rules for the construction and installation of lifts — Part 1: Electric lifts.*

EN 81-2:1998, *Safety rules for the construction and installation of lifts — Part 2: Hydraulic lifts.*

### 3 Terms and definitions

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

#### 3.1 General

##### 3.1.1

##### **car**

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

**3.1.2**

**headroom**

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

**3.1.3**

**landing**

area providing access to the car at each level of use

**3.1.4**

**machine room**

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

**3.1.5**

**goods lift (US: freight elevator)**

permanent lifting appliance serving defined landing levels, comprising a car, mainly designed for transport of goods (freight) which are generally accompanied by persons

**3.1.6**

**pit**

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

**3.1.7**

**well (US: hoistway)**

space in which the car, the counterweight(s) and/or hydraulic jack(s) move

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

**3.2 Lift classes**

**3.2.1**

**Class I**

lifts designed for the transport of persons

**3.2.2**

**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.

**3.2.3**

**Class III**

Lifts designed for health-care purposes, including hospitals and nursing homes

**3.2.4**

**Class IV**

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

**3.2.5**

**Class V**

service lifts (US: dumbwaiters)

**3.2.6**

**Class VI**

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

**3.3 Dimensions**

See Figures 1 to 3.

**3.3.1****car width** $b_1$ 

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

**3.3.2****car depth** $d_1$ 

horizontal distance from the rear wall of the car to the front edge of the car, measured perpendicular to the front entrance side

NOTE These two dimensions (3.3.1 and 3.3.2) are measured, as indicated in Figure 1, at 1 m above the floor. Protective panels or bumper rails, if any, should be accommodated within these dimensions.

**3.3.3****car height** $h_4$ 

vertical inner distance between the entrance threshold and the constructional roof of the car

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

**3.3.4****entrance width into car** $b_2$ 

clear width of the entrance measured when the landing and car doors are fully open

**3.3.5****entrance height** $h_3$ 

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

**3.3.6****well (US: hoistway) width** $b_3$ 

horizontal distance between the inner surface of the well walls measured parallel to the car width

**3.3.7****well (US: hoistway) depth** $d_2$ 

horizontal dimension perpendicular to the well width

**3.3.8****pit depth** $d_3$ 

vertical distance between the finished floor of the lowest landing served and the bottom of the well

**3.3.9****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 the car)

**3.3.10****machine room width** $b_4$ 

horizontal dimension parallel to the car width

### 3.3.11

#### machine room depth

$d_4$

horizontal dimension perpendicular to the machine room width

### 3.3.12

#### machine room height

$h_2$

smallest vertical distance between the finished floor and the room ceiling, satisfying both the requirements of the local building regulations and the lift equipment

## 3.4 Other characteristics

### 3.4.1

#### rated speed

$v_n$

speed for which the lift has been built and at which it is designed to operate

### 3.4.2

#### rated load

load for which the lift has been built and at which it is designed to operate

NOTE 1 Equipment used for loading is not included unless this equipment is carried with the car.

NOTE 2 Additional loads incurred whilst loading/unloading the car are not part of the rated load.

## 4 Lift characteristics

### 4.1 Renard series

The dimensions of the car are related to the loads which have been based on the R10 series of preferred numbers. However, because of the predominance of hydraulic drives, some have been based on other considerations.

The dimensions of the pit, headroom and machine room have been determined in relation to the speeds which have been based, where practical, on the R5 series of preferred numbers.

### 4.2 Rated loads

#### 4.2.1 Series A

Rated loads shall be (in kilograms):

horizontal sliding doors: 630 - 1 000 - 1 600 - 2 000 - 2 500 - 3 500 - 5 000

vertical sliding doors: 1600 - 2 000 - 2 500 - 3 500 - 5 000

#### 4.2.2 Series B

Rated loads shall be (in kilograms):

horizontal or vertical sliding doors: 2 000 - 2 500 - 3 500 - 5 000

### 4.3 Rated speeds

#### 4.3.1 Series A

Rated speeds shall be (in metres per second):

0,25 - 0,40 - 0,50 - 0,63 - 1,00

#### 4.3.2 Series B

Rated speeds shall be (in metres per second):

0,25 - 0,40 - 0,50 - 0,63 - 1,00 - 1,60 - 1,75 - 2,50

### 4.4 Lift selection

Any type of building can be equipped with lifts of different classes. Class IV lifts are grouped in Tables 1 to 4.

## 5 Dimensions

### 5.1 Inner dimensions of cars

The width, depth and height of a goods lift is often a function of the nature of the goods carried and the way in which they are moved (e.g. pallets of a known size or in containers). Where possible, the designer should select one of the standardized sizes shown, since lifts manufactured to these sizes are likely to be more economical than customized designs.

Consideration should also be given to the possibility that items other than those for which the lift has been designed may also need to be carried. For example, the goods lift may be the only means of transporting items such as office furniture and partitions, etc. Standard access doors are not always wide enough for such items.

For safe loading, goods lifts should be located in a position which provides adequate free space in front of the entrance to allow easy access. If wheeled trolleys or fork-lift trucks are to be used, adequate space to manoeuvre shall be provided, with clear access to the loading area. Consideration shall also be given to the sills and car flooring.

If possible, determine the specific type of goods to be moved, the overall dimensions and the weight. This enables the designer to calculate the volume and total weight expected to be moved at one time. Additional space shall be allowed for any personnel who may be required to accompany the goods.

When loading is to be carried out by fork-lift trucks or other vehicles, the design of the lift shall take into account the additional load imposed by the weight of any vehicle which may enter the lift car. This does not necessarily require an increase in the size of the car, but consideration shall be given to whether trucking sills will be required to accommodate the localized high loads imposed by the vehicle wheels. It may also be necessary to consider re-inforcing the car, guide rail structures, etc.

### 5.2 Inner dimensions of well (US: hoistway)

**5.2.1** The lift well plan dimensions include clear plumb tolerances. A tolerance of  $\pm 25$  mm out of plumb in the lift well (elevator hoistway) shall be maintained.

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

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.

**5.2.2** For the incorporation of lifts in a 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 counterweight safety gear is required, the depths or the widths defined should be increased by up to 200 mm.

The dimensions of the well shall have the values shown in Figures 4 to 7.

### 5.3 Dimensions of landings

The landing depth specified in 5.1 shall be maintained at least over the whole width of the well.

### 5.4 Dimensions of machine room

The dimensions of the machine room shall be as indicated in Tables 1 to 4. Machine room heights shall satisfy existing national regulations.

### 5.5 Arrangement of machine room

**5.5.1** For electric lifts, this part of ISO 4190 is based on a configuration of a machine room above the well (see Figure 2). The lateral extension of the machine room with respect to the well can be taken on either the right or the left of the well.

**5.5.2** For hydraulic lifts, the machine room is preferably placed beside or behind the well in the lower part of the building (see Figure 3).

**5.5.3** The machine room should have adequate ventilation.

Table 1 — Class IV lifts — Functional dimensions — Series A: Horizontal sliding doors

Dimensions in millimetres

Parameter	Rated speed $v_n$	Rated load (mass)						
		630 kg	1 000 kg	1 600 kg	2 000 kg	2 500 kg	3 500 kg	5 000 kg
Height of car, $h_4$		2 100				2 500		
Height of car door and landing doors, $h_3$		2 100				2 500		
Pit depth <sup>a</sup> , $d_3$	0,25 m/s 0,40 m/s 0,50 m/s 0,63 m/s 1,00 m/s	1 400		1 600				
Headroom <sup>a</sup> , $h_1$	0,25 m/s 0,40 m/s 0,50 m/s 0,63 m/s 1,00 m/s	3 700		4 200		4 600		
Machine room for electric lifts <sup>b</sup> , $b_4 \times d_4$		2 500 × 3 700	3 200 × 4 900			3 000 × 5 000		
Machine room for hydraulic lifts <sup>b</sup> , $b_4 \times d_4$		Width or depth of the well × 2 000						
<sup>a</sup> Some countries/drives may require additional headroom and pit depth. <sup>b</sup> Site conditions and national regulations may require different machine room dimensions and equipment clearances. NOTE Other entrance configurations may be supplied to meet local market requirements. These variations can have some impact upon well dimensions.								

Table 2 — Class IV lifts — Functional dimensions — Series A: Vertical sliding doors

Dimensions in millimetres

Parameter	Rated speed $v_n$	Rated load (mass)				
		1 600 kg	2 000 kg	2 500 kg	3 500 kg	5 000 kg
Height of car, $h_4$		2 100		2 500		
Height of car door and landing doors, $h_3$		2 100		2 500		
Pit depth <sup>a</sup> , $d_3$	0,25 m/s 0,40 m/s 0,50 m/s 0,63 m/s 1,00 m/s	1 600				
Headroom <sup>a</sup> , $h_1$	0,25 m/s 0,40 m/s 0,50 m/s 0,63 m/s 1,00 m/s	4 200		4 600		
Machine room for electric lifts <sup>b</sup> , $b_4 \times d_4$		3 200 × 4 900		3 000 × 5 000		
Machine room for hydraulic lifts <sup>b</sup> , $b_4 \times d_4$		Width or depth of the well × 2 000		b		

<sup>a</sup> Some countries require additional headroom and pit depth.

<sup>b</sup> Site conditions and national regulations may require different machine room dimensions and equipment clearances.

NOTE 1 For minimum distance between floors using door types [Figure 1b)] consult the lift (elevator) supplier.

NOTE 2 Other entrance configurations may be supplied to meet local market requirements. These variations can have some impact upon well dimensions.

Table 3 — Class IV lifts — Functional dimensions — Series B: Horizontal sliding doors

Dimensions in millimetres

Parameter	Rated speed $v_n$	Rated load (mass)			
		2 000 kg	2 500 kg	3 500 kg	5 000 kg
Height of car, $h_4$		2 500 / 3 000			
Height of car door and landing doors, $h_3$		2 100 / 2 700			
Pit depth <sup>b</sup> , $d_3$	0,25 m/s	1 400			
	0,40 m/s				
	0,50 m/s				
	0,63 m/s				
	1,00 m/s	1 800			
	1,60 m/s <sup>a</sup>				
	1,75 m/s <sup>a</sup>				
2,50 m/s <sup>a</sup>	2 400				
Headroom <sup>b</sup> , $h_1$	0,25 m/s	4 500 <sup>c</sup> / 5 000 <sup>d</sup>			
	0,40 m/s				
	0,50 m/s				
	0,63 m/s				
	1,00 m/s	5 000 <sup>c</sup> / 5 500 <sup>d</sup>			
	1,60 m/s <sup>a</sup>	5 100 <sup>c</sup> / 5 600 <sup>d</sup>			
	1,75 m/s <sup>a</sup>	5 200 <sup>c</sup> / 5 700 <sup>d</sup>			
	2,50 m/s <sup>a</sup>	5 650 <sup>c</sup> / 6 150 <sup>d</sup>			
<p><sup>a</sup> For electric lifts only.</p> <p><sup>b</sup> Some countries or drives may require additional headroom and pit depth.</p> <p><sup>c</sup> Car height 2 500 mm.</p> <p><sup>d</sup> Car height 3 000 mm.</p> <p>NOTE 1 Site conditions and national regulations will determine machine room dimensions and equipment clearances.</p> <p>NOTE 2 Other entrance configurations may be supplied to meet local market requirements. These variations can have some impact upon well dimensions.</p>					

Table 4 — Class IV lifts — Functional dimensions — Series B: Vertical sliding doors

Dimensions in millimetres

Parameter	Rated speed $v_n$	Rated load (mass)			
		2 000 kg	2 500 kg	3 500 kg	5 000 kg
Height of car, $h_4$		2 500 / 3 000			
Height of car door and landing doors, $h_3$		2 500 / 3 000			
Pit depth <sup>b</sup> , $d_3$	0,25 m/s	1 400 <sup>c</sup> / 1 850 <sup>d</sup>			
	0,40 m/s				
	0,50 m/s				
	0,63 m/s				
Headroom <sup>b</sup> , $h_1$	1,00 m/s	2 400			
	1,60 m/s <sup>a</sup>				
	1,75 m/s <sup>a</sup>				
	2,50 m/s <sup>a</sup>				
Headroom <sup>b</sup> , $h_1$	0,25 m/s	4 500 <sup>c</sup> /5 250 <sup>d</sup>			
	0,40 m/s				
	0,50 m/s				
	0,63 m/s				
Headroom <sup>b</sup> , $h_1$	1,00 m/s	5 100 <sup>c</sup> /5 600 <sup>d</sup>			
	1,60 m/s <sup>a</sup>				
	1,75 m/s <sup>a</sup>				
	2,50 m/s <sup>a</sup>				
Headroom <sup>b</sup> , $h_1$	0,25 m/s	5 200 <sup>c</sup> /5 700 <sup>d</sup>			
	0,40 m/s				
	0,50 m/s				
	0,63 m/s				
Headroom <sup>b</sup> , $h_1$	1,00 m/s	5 650 <sup>c</sup> /6 150 <sup>d</sup>			
	1,60 m/s <sup>a</sup>				
	1,75 m/s <sup>a</sup>				
	2,50 m/s <sup>a</sup>				

<sup>a</sup> For electric lifts only.

<sup>b</sup> Some countries require additional headroom and pit depth.

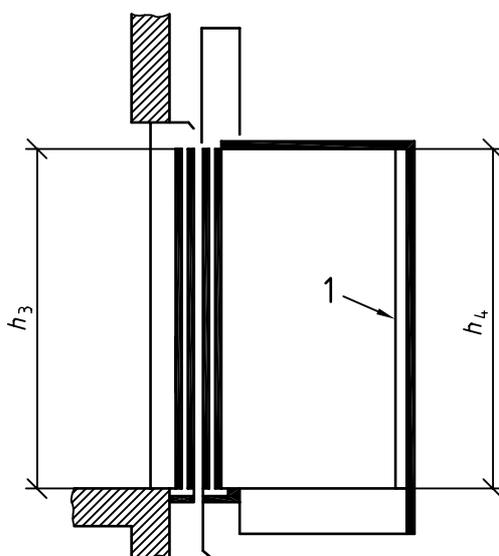
<sup>c</sup> Car height 2 500 mm.

<sup>d</sup> Car height 3 000 mm.

NOTE 1 For minimum distance between floors using door types [Figure 1b)] consult the lift (elevator) supplier.

NOTE 2 Site conditions and national regulations will determine machine room dimensions and equipment clearances.

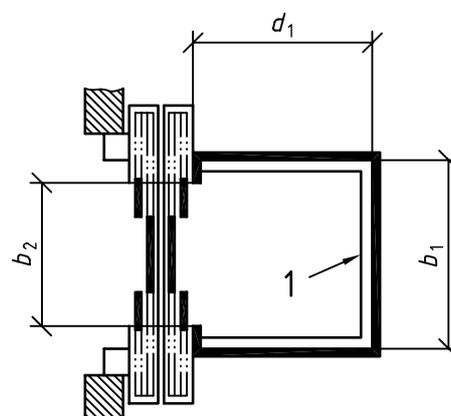
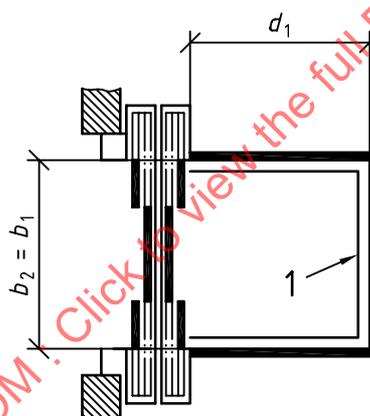
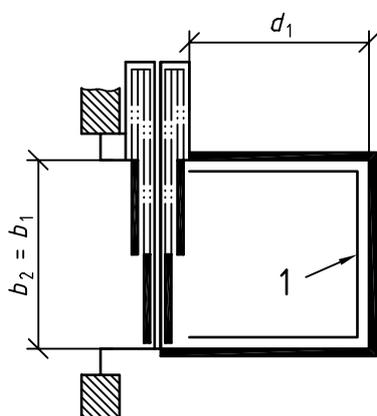
NOTE 3 Other entrance configurations may be supplied to meet local market requirements. These variations can have some impact upon well dimensions.



Entrance: Type 1

Type 2

Type 3



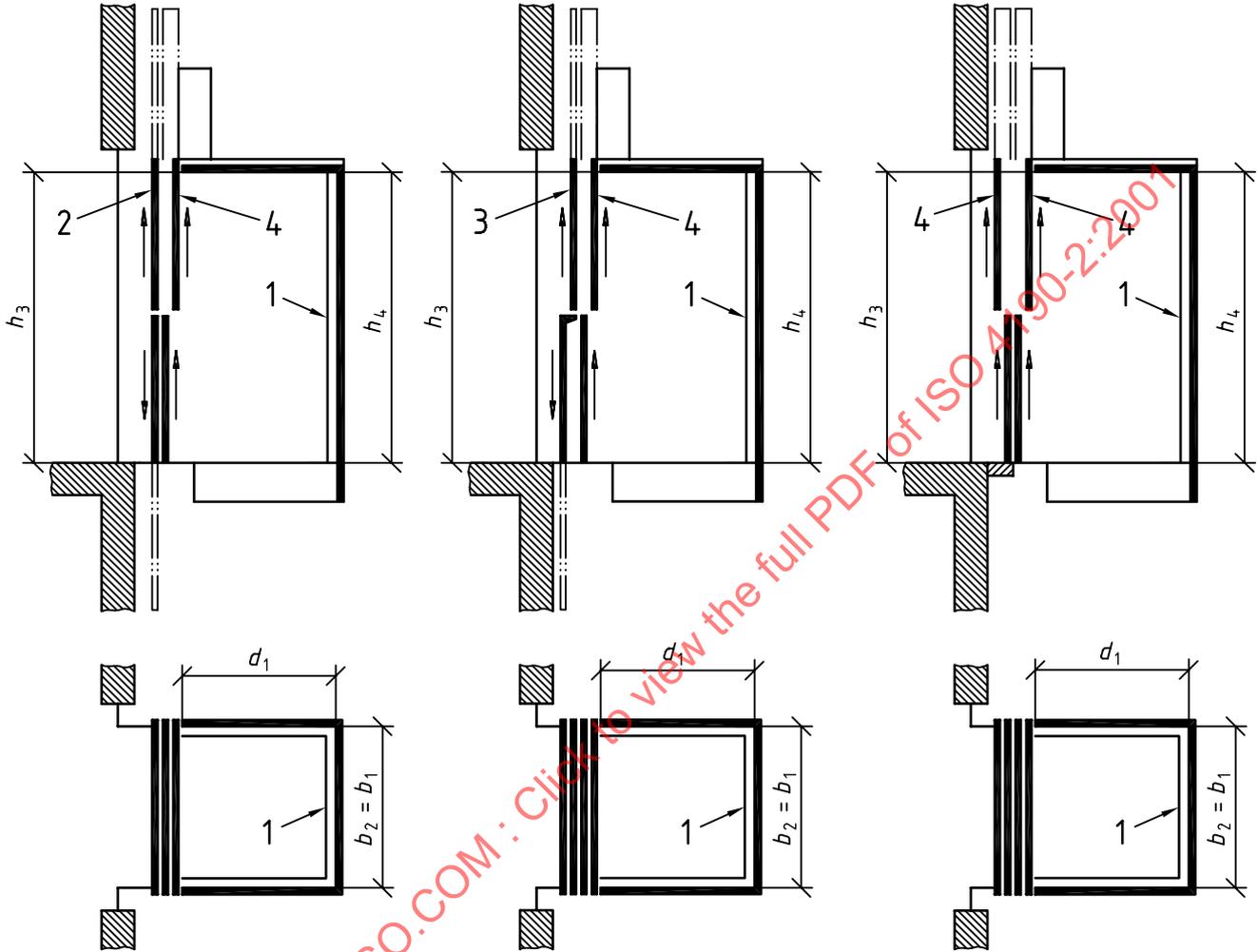
a) Horizontal sliding doors

**Key**

- 1 Protective elements
- $b_1$  Car width
- $b_2$  Entrance width
- $d_1$  Car depth
- $h_3$  Entrance height
- $h_4$  Car height

Figure 1 — Class IV: Goods lifts (freight elevators) — Dimensions

Entrance:	Type 4	Type 5	Type 6
Landing door:	Biparting (central opening)	Biparting, pass type (central opening, overlapping)	Telescopic upwards
Car door:	Telescopic upwards	Telescopic upwards	Telescopic upwards

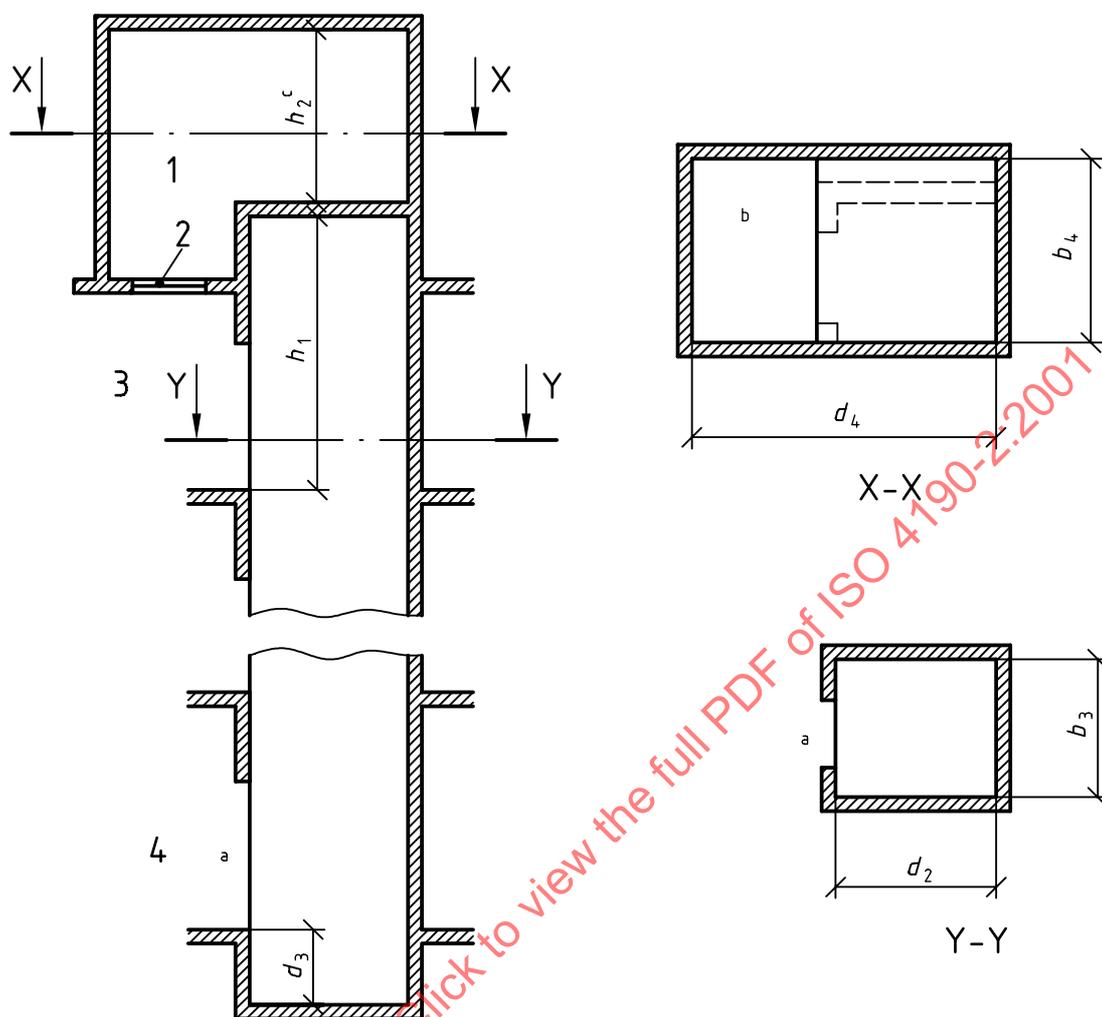


**b) Vertical sliding doors**

- Key**
- 1 Protective elements
  - 2 Biparting (central opening)
  - 3 Biparting, pass type (central opening, overlapping)
  - 4 Telescopic upwards
  - $b_1$  Car width
  - $b_2$  Entrance width
  - $d_1$  Car depth
  - $h_3$  Entrance height
  - $h_4$  Car height

NOTE See note 1 in Tables 2 and 4.

**Figure 1 — Class IV: Goods lifts (freight elevators) — Dimensions (continued)**

**Key**

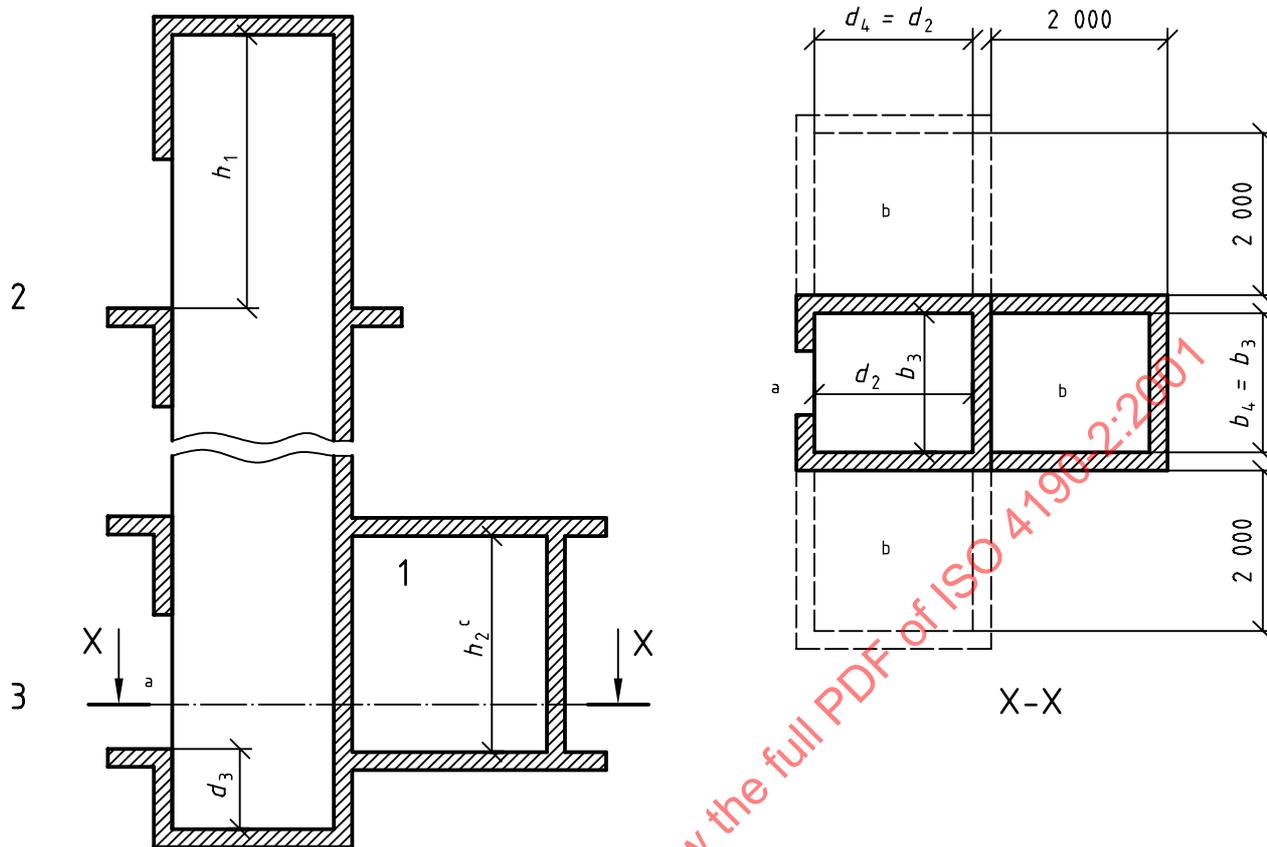
- 1 Machine room
- 2 Trap door
- 3 Highest level served
- 4 Lowest level served
- $b_3$  Well width
- $b_4$  Machine room width
- $d_2$  Well depth
- $d_3$  Pit depth
- $d_4$  Machine room depth
- $h_1$  Headroom height
- $h_2$  Machine room height

<sup>a</sup> For door details see Figures 1 a) and 1 b).

<sup>b</sup> It is necessary to have an access door to the machine room although this is not indicated on the sketch.

<sup>c</sup> See 3.3.12.

**Figure 2 — Electric lifts — Well and machine room**



**Key**

- 1 Machine room
- 2 Highest level served
- 3 Lowest level served
- $b_3$  Well width
- $b_4$  Machine room width
- $d_2$  Well depth
- $d_3$  Pit depth
- $d_4$  Machine room depth
- $h_1$  Headroom height
- $h_2$  Machine room height

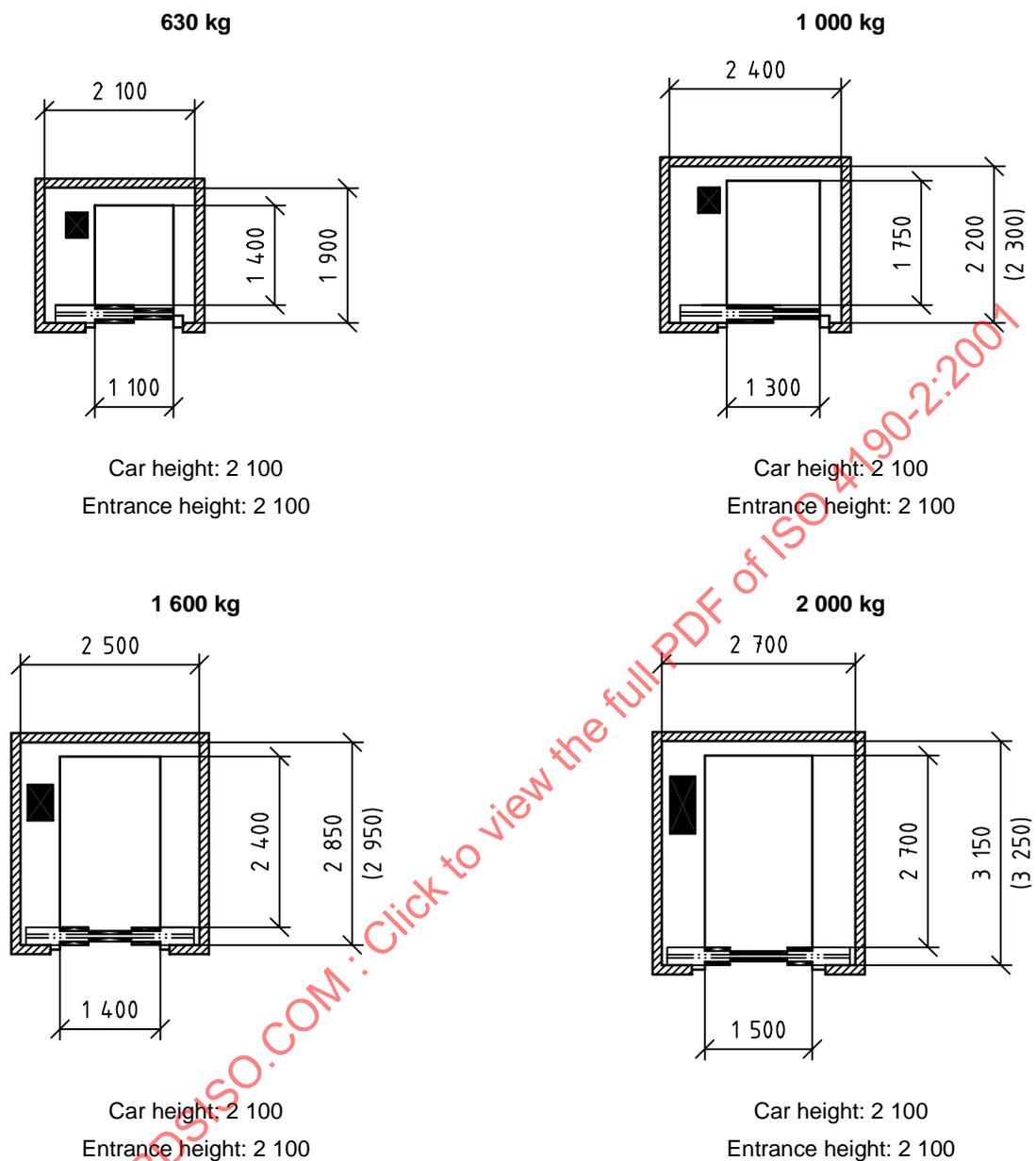
<sup>a</sup> For door details see Figures 1 a) and 1 b).

<sup>b</sup> It is necessary to have an access door to the machine room although this is not indicated on the sketch.

<sup>c</sup> See 3.3.12.

**Figure 3 — Hydraulic lifts — Well and machine room**

Dimensions in millimetres



**Figure 4 — Class IV: Goods lifts (freight elevators) — Series A: Horizontal sliding doors (one or two entrances, types 1 and 2)**