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Safety rules for the construction and installation of lifts - Part 1: Electric lifts - A2: Machinery and pulley spaces

Règles de sécurité pour la construction et l'installation des ascenseurs - Partie 1: Ascenseurs électriques - A2: Emplacement de machinerie et de poulies

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen und Kleingüteraufzügen _ Teil 1: Elektrisch betriebene Personen- und Lastenaufzüge - A2: Aufstellungsorte von Triebwerk und Steuerung sowie Seilrollen

This draft amendment is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 10.

This draft amendment A2, if approved, will modify the European Standard EN 81-1:1998. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This Amendment EN 81-1:1998/prA2:2000 to the EN 81-1:1998 has been prepared by Technical Committee CEN/TC 10 "Passenger, goods and service lifts", the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This Amendment to the European Standard EN 81-1:1998 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

EN 81-1:1998 requires special machine and pulley rooms. Modern technology shows that machines and associated parts can be located in the well, on the car or in cabinets. To ensure the safety of normal operation, maintenance and inspection provisions are necessary which are not yet described in this Standard.

This draft amendment covers the necessary additional precautions by replacing the relevant existing text of EN 81-1:1998 or adding new clauses as indicated.

0 Introduction

0.3.15 The text of this clause is replaced by the following :

To ensure the correct functioning of the equipment in the machinery space(s), i.e. taking into account the heat dissipated by the equipment, the ambient temperature in the machinery space(s) is assumed to be maintained between + 5 °C and + 40 °C.

0.3.16 The following clause is added :

Working areas outside of the well and their means of access are adequately lit.

3 Definitions

The following definitions are added :

Machinery *(machinerie) (Triebwerk und Steuerung)*
equipment traditionally placed in the machine room : cabinet(s) for control and drive system, lift machine, main switch(es) and means for emergency operations

Machinery space *(emplacement de machinerie) (Aufstellungsort von Triebwerk und Steuerung)*
space(s) inside or outside of the well where the machinery as a whole or in parts is placed

Pulley *space (emplacement de poulies) (Aufstellungsort von Seilrollen)*
space(s) inside or outside of the well where pulleys are placed

5 Lift well

5.3.3 Strength of the ceiling

The text of this clause is replaced by the following :

Not withstanding the requirements of **6.3.2** and/or **6.7.1,** in the case of hanging guide rails the suspension points shall be able to take at least the loads and forces according to **G.5.1**.

6 Machine and pulley rooms

The whole of chapter 6 is replaced by the following :

6 Machinery and pulley spaces

6.1 General provisions

Lift machines, their associated equipment and pulleys, shall be located in special spaces. These spaces and the associated working areas shall be accessible. Provisions shall be made to allow access only to authorised persons (maintenance, inspection and rescue). The spaces shall be suitably protected against environmental influences to be taken into consideration and provide suitable areas for maintenance/inspection work and emergency operation. See **0.2.2**, **0.2.5** and **0.3.3**.

6.2 Access

6.2.1 Access to the interior of the machinery and pulley spaces shall be :

a) capable of being properly lit by a permanent electric light fixture(s) ;

b) easy to use in complete safety in all circumstances without necessitating entry into private premises.

6.2.2 A safe access for persons to machinery and pulley spaces shall be provided. For preference this should be effected entirely by way of stairs. If it is not possible to install stairs, ladders satisfying the following requirements shall be used :

a) the access to the machinery and pulley spaces shall not be situated more than 4 m above the level accessible by stairs ;

b) ladders shall be fastened to the access in such a way that they cannot be removed ;

c) ladders exceeding 1,50 m in height shall, when in position for access, form an angle between 65° and 75° to the horizontal and shall not be liable to slip or turnover ;

d) the clear width of the ladder shall be at least 0,35 m, the depth of the steps shall not be less than 25 mm and in the case of vertical ladders the distance between the steps and the wall behind the ladder shall not be less than 0,15 m. The steps shall be designed for a load of 1500 N ;

e) adjacent to the top end of the ladder there shall be at least one hand hold within easy reach ;

f) around a ladder, within a horizontal distance of 1,50 m, the risk of falling by more than the height of the ladder shall be prevented.

6.3 Machine rooms

6.3.1 General provisions

6.3.1.1 When lift machines and their associated equipment are located in a machine room, it shall comprise solid walls, ceiling, floor and door and / or trap.

Machine rooms shall not be used for purposes other than lifts. They shall not contain ducts, cables or devices other than for the lift.

These rooms may, however, contain :

a) machines for service lifts or escalators ;

b) equipment for air-conditioning or heating of these rooms, excluding steam heating and high pressure water heating ;

c) fire detectors or extinguishers, with a high operating temperature, appropriate for the electrical equipment, stable over a period of time, and suitably protected against accidental impact.

6.3.1.2 The traction sheave may be installed in the well, provided that:

a) the examinations and the tests and the maintenance operations may be carried out from the machine room ;

b) the openings between the machine room and the well are as small as possible.

6.3.2 Mechanical strength, floor surface

6.3.2.1 Machine rooms shall be so constructed to withstand the loads and forces to which they are intended to be subjected.

They shall be in durable material not favouring the creation of dust.

6.3.2.2 Room floors shall be of non-slip material, e.g. troweled concrete or chequer plate.

6.3.3 Dimensions

6.3.3.1 The dimensions of machine rooms shall be sufficient to permit easy and safe working on equipment, especially the electrical equipment.

In particular there shall be provided at least a clear height of 2 m at working areas, and :

a) a clear horizontal area in front of the control panels and cabinets. This area is defined as follows :

1) depth, measured from the external surface of the enclosures, at least 0,70 m ;

2) width, the greater of the following values : 0,50 m or the full width of the cabinet or panel ;

b) a clear horizontal area of at least 0,50 m x 0,60 m for maintenance and inspection of moving parts at points where this is necessary and, if need be, manual emergency operation (**12.5.1**).

6.3.3.2 The clear height for movement shall not be less than 1,80 m.

The access ways to the clear spaces mentioned in **6.3.3.1** shall have a width of at least 0,50 m. This value may be reduced to 0,40 m where there are no moving parts.

This clear height for movement is taken to the underside of the structural roof beams and measured from the floor of the access area.

6.3.3.3 There shall be a clear vertical distance of at least 0,30 m above the rotating parts of the machine.

6.3.3.4 When the machine room floor comprises a number of levels differing by more than 0,50 m, stairways or steps and guard rails shall be provided.

6.3.3.5 When the floor of the machine rooms has any recesses greater than 0,50 m deep and less than 0,50 m wide, or any ducts, they shall be covered.

6.3.4 Doors and trap doors

6.3.4.1 Access doors shall have a minimum width of 0,60 m and a minimum height of 1,80 m. They shall not open towards the inside of the room.

6.3.4.2 Access trap doors for persons shall give a clear passage of at least 0,80 m x 0,80 m, and shall be counterbalanced.

All trap doors, when they are closed, shall be able to support two persons, each counting for 1000 N on an area of 0,20 m x 0,20 m at any position, without permanent deformation.

Trap doors shall not open downwards, unless they are linked to retractable ladders. Hinges, if any, shall be of a type which cannot be unhooked.

When a trap door is in the open position, precautions shall be taken to prevent the fall of persons (e.g. a guard rail).

6.3.4.3 Doors or trap doors shall be provided with a key operated lock , capable of being opened without a key from inside the room.

Trap doors used only for access of material may be locked from the inside only.

6.3.5 Other openings

The dimension of holes in the slab and room floor shall be reduced to a minimum for their purpose.

With the aim of removing the danger of objects falling through openings situated above the well, including those for electric cables, ferrules shall be used, which project at least 50 mm above the slab or finished floor.

6.3.6 Ventilation

The machine rooms shall be suitably ventilated. Should the well be ventilated through the machine room, this has to be taken into account. Stale air from other parts of the building shall not be extracted directly into the machine room. It shall be such that the motors, and equipment, as well as electric cables, etc., are protected as far as it is reasonably practicable from dust, harmful fumes and humidity.

6.3.7 Lighting and socket outlets

The machine room shall be provided with permanently installed electric lighting with an intensity of at least 200 lux at floor level. The supply for this lighting shall be in conformity with **13.6.1**.

A switch placed inside close to the access point(s), at an appropriate height, shall control lighting of the room.

At least one socket outlet (**13.6.2**) shall be provided.

6.3.8 Handling of equipment

One or more metal supports or hooks with the indication of the safe working load (**15.4.5**), as appropriate, are provided in the machine room ceiling or on the beams, conveniently positioned to permit the hoisting of heavy equipment (see **0.2.5** and **0.3.14**).

6.4 Machinery inside the well

6.4.1 General provisions

6.4.1.1 Machinery supports and working areas inside the well shall be so constructed to withstand the loads and forces to which they are intended to be subjected.

6.4.1.2 In the case of wells partially enclosed at the exterior of buildings the machinery shall be suitably protected against environmental influences to be taken into consideration.

6.4.2 Dimensions of working areas inside the well

6.4.2.1 The dimensions of working areas inside the well shall be sufficient to permit easy and safe working on equipment, especially the electrical equipment.

In particular there shall be provided at least a clear height of 2 m at working areas, and :

a) a clear horizontal area in front of the control panels and cabinets. This area is defined as follows :

   1) depth, measured from the external surface of the enclosures, at least 0,70 m ;

   2) width, the greater of the following values : 0,50 m or the full width of the cabinet or panel ;

b) a clear horizontal area of at least 0,50 m x 0,60 m for maintenance and inspection of moving parts at points where this is necessary and, if need be, manual emergency operation (**12.5.1)**.

6.4.2.2 The clear height for movement shall not be less than 1,80 m.

6.4.2.3 There shall be a clear vertical distance of at least 0,30 m above rotating parts of the machine. This requirement does not apply if these parts are directly located below the well ceiling.

6.4.3 Working areas in the car or on the car roof

6.4.3.1 If maintenance/inspection work on the machinery is to be carried out from inside the car or from the car roof, the following applies :

a) any kind of uncontrolled and unexpected car movement resulting from maintenance/inspection that can be dangerous to persons carrying out maintenance/inspection work shall be prevented by a mechanical device ;

b) when this device is in the active position, monitoring by means of an electrical safety device in accordance with **14.1.2** is necessary ;

c) when the car is blocked against all movement it shall be possible to leave the working area easily and safely.

6.4.3.2 Any necessary devices for emergency operation and for dynamic tests (such as brake tests, traction tests, safety gear tests, buffer tests or tests of ascending car overspeed protection means) shall be arranged so that they can be operated from outside of the well in accordance with **6.6**.

6.4.3.3 Inspection traps and doors in the car shall be provided with a key-operated lock, capable of being reclosed and relocked without a key. An electrical safety device in conformity with **14.1.2** shall check the closed position of the traps and doors.

6.4.4 Working areas in the pit

6.4.4.1 Where machinery is to be maintained or inspected from the pit and if this work requires movement of the car, or is likely to result in uncontrolled and unexpected car movement, the following applies :

a) a device shall be provided to mechanically stop the car to create a free distance of at least 2 m between the floor of the working area and the lowest parts of the car ;

b) the mechanical device shall be able to stop the car travelling at rated speed with rated load. The deceleration shall not exceed that produced by the buffers (**10.4**) ;

c) the mechanical device can be operated manually or automatically ;

d) the opening of any door by the use of a key providing access to the pit shall neutralise all electrical controls (**14.2**) ;

e) unless the mechanical device is in its inactive position, all electrical controls (**14.2**) shall be neutralised ;

f) where it is necessary to move the car from the pit, an inspection control station according to **14.2.1.3** shall be available for use in the pit ;

g) when the mechanical device is in its active position, only movements of the car controlled by the inspection control station shall be possible ;

h) when the installation uses more than one inspection control station, an interlock system shall ensure that if more than one inspection control station is switched to “INSPECTION”, it shall not be possible to move the car from any of them ;

i) the return of the lift to normal service shall only be made by operation of an electrical reset device placed outside of the well and inaccessible to unauthorised persons, e. g. inside a locked cabinet.

6.4.4.2 When the car is in the position according to **6.4.4.1 a)**, it shall be possible to leave the working area easily and safely.

6.4.4.3 Any necessary devices for emergency operation and for dynamic tests (such as brake tests, traction tests, safety gear tests, buffer tests or tests of ascending car overspeed protection means) shall be arranged so that they can be operated from outside of the well in accordance with **6.6**.

6.4.5 Working areas on a platform

6.4.5.1 Where machinery is to be maintained or inspected from a platform, it shall be

a) permanently installed, and

b) retractable if it is in the travel path of the car, the counterweight or the balancing weight.

6.4.5.2 Where machinery is to be maintained or inspected from a platform located in the travel path of the car, the counterweight or the balancing weight :

a) the car shall be stationary, i.e. by using a mechanical device in conformity with **6.4.3.1 a)** and **b)** , or

b) the travel path of the car shall be limited by movable stops in such a way that the car is stopped, either above the platform leaving a clear height of at least 2 m or below the platform.

6.4.5.3 The platform shall be :

a) able to support at any position the mass of two persons, each counting for 1000 N over an area of 0,20 m $\times$ 0,20 m without permanent deformation. If the platform is intended to be used for handling heavy equipment the dimensions and the resistance of the platform shall be considered accordingly (see **6.4.10**) ;

b) provided with a balustrade in conformity with **8.13.3** ;

c) equipped with means ensuring that the vertical distance of the gap underneath the platform between the lower part of the platform and the level of access does not exceed 0,30 m.

6.4.5.4 In addition to **6.4.5.3** any retractable platform shall be :

a) provided with an electric safety device in conformity with **14.1.2,** checking the fully retracted position ;

b) provided with a manually or power operated device for putting into or removing from the working position. The operation of this device shall be possible from outside of the well or from the pit, near the access.

If the access to the plat form is not through a landing door, the opening of the access door shall be impossible when the platform is not in the working position, or alternatively, means shall be provided preventing falling into the well.

6.4.5.5 Movable stops shall be :

a) provided with buffers in conformity with **10.3** and **10.4** ;

b) provided with an electric safety device in conformity with **14.1.2**, which only allows car movement if the stops are in their fully retracted position ;

c) provided with an electrical safety device in conformity with **14.1.2**, which only allows car movement with a lowered platform if the stops are in their fully extended position ;

d) operable from outside of the well or from the platform.

6.4.5.6 When the movable stops are in the extended position, an additional final limit switch in conformity with **10.5** shall operate before the car, the counterweight or the balancing weight comes into contact with the movable stops.

6.4.5.7 Any necessary devices for emergency operation and dynamic tests (such as brake tests, traction tests, safety gear tests, buffer tests or tests of ascending car overspeed protection means) shall be arranged so that they can be operated from outside of the well in conformity with **6.6.**

6.4.6 Working areas outside of the well

6.4.6.1 When the machinery is in the well and is intended to be maintained/inspected from outside of the well, deviating from **6.1**, the working areas in accordance with **6.3.3.1** and **6.3.3.2** can be provided outside of the well. Access to this equipment shall only be possible by a door/trap in conformity with **6.4.7.2.**

6.4.6.2 When the door/trap is open, protection means shall be provided to prevent the access of unauthorised persons into dangerous areas.

6.4.6.3 Passage ways shall not be obstructed by the open door/trap and the protections means (see **0.2.5**).

6.4.7 Doors and traps

6.4.7.1 Doors providing access to working areas inside the well shall :

a) have a minimum width of 0,60 m and a minimum height of 1,80 m ;

b) not open towards the inside of the well ;

c) be provided with a key-operated lock, capable of being reclosed and relocked without a key ;

d) be capable of being opened from inside the well without a key, even when locked ;

e) be provided with an electrical safety device in conformity with **14.1.2**, checking the closed position ;

f) be imperforate, satisfy the same requirements for mechanical strength as the landing doors, and comply with the regulations relevant to the fire protection for the building concerned.

6.4.7.2 Doors and/or traps providing access to the machinery from outside of the well shall :

a) have sufficient dimensions to carry out the required work through the door/trap ;

b) be as small as possible to avoid falling into the well ;

c) not open towards the inside of the well ;

d) be provided with a key-operated lock, capable of being reclosed and relocked without a key ;

e) be provided with an electrical safety device in conformity with **14.1.2**, checking the closed position ;

f) be imperforate, satisfy the same requirements for mechanical strength as the landing doors, and comply with the regulations relevant to the fire protection for the building concerned.

6.4.8 Ventilation

The machinery spaces shall be suitably ventilated. The electric equipment of the machinery shall be protected as far as it is reasonably practicable from dust, harmful fumes and humidity.

6.4.9 Lighting and socket outlets

The working area and machinery spaces shall be provided with permanently installed electric lighting with an intensity of at least 200 lux at floor level. The supply for this lighting shall be in conformity with **13.6.1**.

A switch placed inside close to the access point(s) to working area(s), at an appropriate height, shall control lighting of the areas and spaces.

At least one socket outlet (**13.6.2**) shall be provided at an appropriate place for each working area.

6.4.10 Handling of equipment

One or more metal supports or hooks with the indication of the safe working load (**15.4.5**), as appropriate, are provided in the machinery spaces, conveniently positioned to permit the hoisting of heavy equipment of the machinery (see **0.2.5** and **0.3.14).**

6.5 Machinery outside of the well

6.5.1 General provisions

Machinery spaces outside of the well shall be so constructed to withstand the loads and forces to which they are intended to be subjected.

6.5.2 Machinery cabinet

6.5.2.1 The machinery shall be located inside a cabinet.

6.5.2.2 The machinery cabinet shall consist of imperforate walls, floor, roof and door(s).

The door(s) shall :

a) have sufficient dimensions to carry out the required work through the door ;

b) not open towards the inside of the cabinet ;

c) be provided with a key-operated lock, capable of being reclosed and relocked without a key.

6.5.3 Working area

The working area in front of a machinery cabinet shall comply with the requirements according to **6.4.2** and **6.4.6**.

6.5.4 Ventilation

The machinery cabinet shall be suitably ventilated. It shall be such that the machinery is protected as far as it is reasonably practicable from dust, harmful fumes and humidity.

6.5.5 Lighting and socket outlets

The inside of the machinery cabinet shall be provided with permanently installed electric lighting with an intensity of at least 200 lux at floor level. The supply for this lighting shall be in conformity with **13.6.1**.

A switch placed inside close to the door(s), at an appropriate height, shall control lighting of the cabinet.

At least one socket outlet (**13.6.2**) shall be provided.

6.6 Devices for emergency and tests operations

6.6.1 In the case of **6.4.3**, **6.4.4** and **6.4.5** the necessary devices for emergency and tests operations shall be provided on a panel(s) suitable for carrying out from outside of the well all emergency operations and any necessary dynamic tests of the lift. The panel(s) shall be inaccessible to unauthorised persons.

If the emergency and tests devices are not protected inside a machinery cabinet, they shall be enclosed with a suitable cover, which :

a) does not open towards the inside of the well ;

b) is provided with a key-operated lock, capable of being reclosed and relocked without a key.

6.6.2 The panel(s) shall :

a) include the emergency operation devices according to **12.5** and an intercom system in conformity with **14.2.3.4** ;

b) have equipment which enables dynamic tests to be carried out ;

c) be provided with a vision panel for a direct observation of the lift machine and where necessary with display devices, which inform about :

— the direction of movements ;

— the reaching of an unlocking zone, and

— the speed of the lift, except if it is automatically limited up to 0,63 m/s.

6.6.3 The devices on the panel(s) shall be lit by a permanently installed electric lighting with an intensity of at least 50 lux .

A switch placed on or close to the panel shall control lighting of the panel(s).

6.6.4 The panel(s) for emergency and tests operations shall be installed only where a working area in accordance with **6.3.3.1** is available.

6.7 Construction and equipment of pulley spaces

6.7.1 Pulley rooms

Pulleys outside of the well shall be located in a pulley room.

6.7.1.1 Mechanical strength, floor surface

6.7.1.1.1 The pulley rooms shall be so constructed to withstand the loads and forces to which they will normally be subjected.

They shall be in durable material, not favouring the creation of dust.

6.7.1.1.2 The floors of the pulleys rooms shall be of non-slip material, e.g. troweled concrete or chequer plate.

6.7.1.2 Dimensions

6.7.1.2.1 Pulley room dimensions shall be sufficient to provide easy and safe access for maintenance personnel to all the equipment.

The requirements of **6.3.3.1 b)** and **6.3.3.2, sentence two** and **three**, are applicable.

6.7.1.2.2 The height under the ceiling shall be at least 1,50 m.

6.7.1.2.3 There shall be a clear space of at least 0,30 m high above the pulleys.

6.7.1.2.4 If there are control panels and cabinets in the pulley room the provisions of **6.3.3.1** and **6.3.3.2** apply to this room.

6.7.1.3 Doors and trap doors

6.7.1.3.1 Access doors shall have a minimum width of 0,60 m and minimum height of 1,40 m. They shall not open towards the inside of the room.

6.7.1.3.2 Access trap doors for persons shall give a clear passage of at least 0,80 m x 0,80 m and shall be counterbalanced.

All trap doors, when they are closed, shall be able to support two persons, each counting for 1000 N on an area of 0,20 m x 0,20 m at any position, without permanent deformation.

Trap doors shall not open downwards, unless they are linked to retractable ladders. Hinges, if any, shall be of a type which cannot be unhooked.

When a trap door is in the open position, precautions shall be taken to prevent the fall of persons (e.g. a guard rail).

6.7.1.3.3 Doors or trap doors shall be provided with a key operated lock , capable of being opened without a key from inside the room.

6.7.1.4 Other openings

The dimensions of holes in the slab and pulley room floor shall be reduced to a minimum for their purpose.

With the aim of removing the danger of objects falling through openings situated over the well, including those for electric cables, ferrules shall be used which project at least 50 mm above the slab or finished floor.

6.7.1.5 Stopping device

A stopping device, in conformity with **14.2.2** and **15.4.4,** shall be installed in the pulley room, close to the point(s) of access.

6.7.1.6 Temperature

If there is a risk of frost or condensation in the pulley rooms, precautions shall be taken to protect the equipment.

If the pulley rooms also contain electrical equipment, the ambient temperature shall be similar to that of the machine room.

6.7.1.7 Lighting and socket outlets

The pulley room shall be provided with permanently installed electric lighting with an intensity of at least 100 lux at the pulley(s). The supply for this lighting shall be in conformity with **13.6.1**.

A switch, placed inside, close to the access point, at an appropriate height, shall control the lighting of the room.

At least one socket outlet in conformity with **13.6.2** shall be provided. See also **6.7.1.2.4**.

If there are control panels and cabinets in the pulley room, the provisions of **6.3.7** apply.

6.7.2 Pulleys in the well

Diverter pulleys may be installed in the headroom of the well provided that they are located outside the projection of the car roof and that examinations and tests and maintenance operations can be carried out in complete safety from the car roof or from outside of the well.

However, a diverter pulley, with single or double wrap, may be installed above the car roof for diverting towards the counterweight, provided that its shaft can be reached in complete safety from the car roof.

12.5 Emergency operation

12.5.1 The text of this clause is replaced by the following :

If the manual effort required to move the car in the upward direction with its rated load does not exceed 400 N the machine shall be provided with a manual means of emergency operation allowing the car to be moved to a landing. If the means for moving the car can be driven by the lift moving, then it shall be a smooth, spokeless wheel.

12.5.1.1 The text of this clause is replaced by the following :

If the means is removable, it shall be located in an easily accessible place in the machinery space. It shall be suitably marked if there is any risk of confusion as to the machine for which it is intended.

If the means is removable or can be disengaged from the machine, an electric safety device in conformity with **14.1.2** shall be actuated, at the latest when the means is about to be coupled with the machine.

12.5.1.2 The text of this clause is replaced by the following :

It shall be possible to check easily whether the car is in an unlocking zone. This check may be made, for example, by means of marks on the suspension or governor ropes. See also **6.6.2 c)**.

12.5.2 The text of this clause is replaced by the following :

If the effort defined in **12.5.1** is greater than 400 N, a means of emergency electrical operation shall be provided in accordance with **14.2.1.4.**

This means shall be located in the machine room (**6.3**), in the machinery cabinet (**6.5.2**) or in the emergency and tests panel(s) (**6.6**).

13 Electric installations and appliances

13.1 General provisions

13.1.2 The text of this clause is replaced by the following :

In the machinery and pulley spaces protection against direct contact shall be provided by means of casings providing a degree of protection of at least IP 2X.

13.4 Main switches

13.4.1 The text of this clause is replaced by the following :

For each lift, a main switch capable of breaking the supply to the lift on all the live conductors shall be provided. This switch shall be capable of interrupting the highest current involved in normal conditions of use of the lift.

13.4.1.1 This switch shall not cut the circuits feeding :

a) car lighting or ventilation, if any ;

b) socket outlet on the car roof ;

c) lighting of machinery and pulley spaces ;

d) socket outlet in the machinery and pulley spaces and in the pit ;

e) lighting of the lift well ;

f) alarm device.

13.4.1.2 This switch shall be located :

a) in the machine room where it exists ;

b) where no machine room exists, in the cabinet for control, except if this is mounted in the well, or

c) at the emergency and tests panel(s) (**6.6**) when the cabinet for control is mounted in the well. If the emergency panel is separate from the tests panel, the switch shall be at the emergency panel.

If the main switch is not easily accessible from the cabinet for control, then the cabinet shall be provided with an isolating switch.

13.6 Lighting and socket outlets

13.6.1 The text of this clause is replaced by the following :

The electric lighting supplies to the car, the well and the machinery and pulley spaces, shall be independent of the supply to the machine, either through another circuit or through connection to the machine supply circuit on the supply side of the main switch or the main switches laid down in **13.4**.

13.6.2 The text of this clause is replaced by the following :

The supply to socket outlets required on the car roof, in the machinery and pulley spaces and in the pit, shall be taken from the circuits referred to in **13.6.1**.

These socket outlets shall be :

a) either of type 2 P + PE, 250 V, supplied directly, or

b) supplied at a safety extra-low voltage (SELV) in accordance with CENELEC HD 384.4.41 S2, subclause 411.

The use of the above socket outlets does not imply that the supply cable has a cross-sectional area corresponding to the rated current of the socket outlet. The cross-sectional area of the conductors may be smaller, provided that the conductors are correctly protected against excess currents.

13.6.3.2 The text of this clause is replaced by the following :

In the machinery spaces a switch or a similar device shall be located near to its access(es) controlling the supply for lighting.

Well lighting switches (or equivalent) shall be located both in the pit and close to the main switch so that the well light can be operated from either location.

14.2.1.4 Control of emergency electrical operation

The text of this clause is replaced by the following :

If a means of emergency electrical operation is required in accordance with **12.5.2** an emergency electrical operation switch in conformity with **14.1.2** shall be installed. The machine shall be supplied from the normal mains supply or from the standby supply if there is one.

The following conditions shall be satisfied simultaneously :

a) operation of the emergency electrical operation switch shall permit the control of car movement by constant pressure on buttons protected against accidental operation. The direction of movement shall be clearly indicated ;

b) after operation of the emergency electrical operation switch, all movement of the car except that controlled by this switch shall be prevented.

The effects of the emergency electrical operation shall be overridden by switching on the inspection operation ;

c) the emergency electrical operation switch shall render inoperative by itself or through another electric switch in conformity with **14.1.2** the following electric devices :

   1) those mounted on the safety gear, according to **9.8.8** ;

   2) those of the overspeed governor, according to **9.9.11.1** and **9.9.11.2** ;

   3) those mounted on the ascending car overspeed protection means, according to **9.10.5** ;

   4) final limit switches, according to **10.5** ;

   5) those mounted on the buffers, according to **10.4.3.4** ;

d) the emergency electrical operation switch and its push-buttons shall be so placed that the machine can be observed directly or by display devices (**6.6.2 c)**) ;

e) the car speed shall not exceed 0,63 m/s.

14.2.2 Stopping devices

14.2.2.1 The text of this clause is replaced by the following :

A stopping device shall be provided for stopping, and maintaining the lift out of service, including the power operated doors :

a) in the lift pit (**5.7.3.4 a)**) ;

b) in the pulley room (**6.7.1.5**) ;

c) on the car roof (**8.15**), in an easily accessible position and no more than 1 m from the entry point for inspection or maintenance personnel. This device may be the one located next to the inspection operation control if this is not placed more than 1 m from the access point;

d) at the inspection control device (**14.2.1.3 c)**) ;

e) in the car of lifts with docking operation (**14.2.1.5 i)**) ;

f) The stopping device shall be placed within 1 m of the entrance with docking operation and be clearly identified (15.2.3.1).

g) at the lift machine, if there is no main switch nearby ;

h) at the emergency and tests panel(s) (**6.6**), if there is no main switch nearby.

14.2.3 Emergency alarm device

14.2.3.4 The text of this clause is replaced by the following :

An intercom system, or similar device, powered by the emergency supply referred to in **8.17.4** shall be installed between inside the car and the place from which the emergency operation is carried out if the lift travel exceeds 30 m or if a direct acoustic communication between the car and the place from which the emergency operation is carried out is not possible.

15.4 Machinery and pulley rooms

This headline is replaced by the following :

15.4 Machinery and pulley spaces

15.4.3 The text of this clause is replaced by the following :

In the machine room (**6.3**), the machinery cabinet (**6.5.2**)or at the emergency and tests panel(s) (**6.6**), there shall be detailed instructions to be followed in the event of lift breakdown, particularly concerning the use of the device for manual or electrical emergency movement, and the unlocking key for landing doors.

15.4.5 The text of this clause is replaced by the following :

The maximum permissible load shall be indicated on the lifting beam or hooks (see **6.3.8** and **6.4.10**).

The following clause is added :

15.4.6 The maximum permissible load shall be indicated on the platform (see **6.4.5.3**).

15.5 Well

15.5.1 The text of this clause is replaced by the following :

Outside of the well, near any inspection and access doors, there shall be a notice stating :

« Lift well – Danger of falling

Access forbidden to unauthorised persons »

16.3.1 Normal use

The text of this clause is replaced by the following :

The instruction manual shall give the necessary information about the normal use of the lift and rescue operation, especially relating to :

a) keeping the doors giving access to machinery spaces locked ;

b) safe loading and unloading ;

c) precaution to be taken in case of lifts with partially enclosed well (**5.2.1.2 d)**) ;

d) events needing the intervention of a competent person ;

e) keeping the documentation ;

f) the use of the emergency unlocking key ;

g) rescue operation.

Annex A
(normative)

List of the electric safety devices

Annex A is completed by the following additions and modifications :

Clause	Devices checked
6.4.3.1 b)	Check of the position of the blocking device
6.4.3.3	Check of the closed position of the inspection traps and doors in the car
6.4.5.4 a)	Check of the fully retracted position of the retractable platform
6.4.5.5 b)	Check of the fully retracted position of the movable stops
6.4.5.5 c)	Check the fully extended position of the movable stops
6.4.5.6	Additional final limit switch
6.4.7.1 e)	Check of the closed position of the access door
6.4.7.2 e)	Check of the closed position of the access door
6.7.1.5	Stopping device in the pulley room
12.5.1.1	Check on the positions of the removable means for manual emergency operation
14.2.2.1 f)	Stopping device at lift machine
14.2.2.1 g)	Stopping device at emergency and tests panel(s)

Annex C
(informative)

Technical dossier

C.2 General

The text of this clause is replaced by the following :

a) names and addresses of the installer, the owner and/or the user ;

b) address of the installation premises ;

c) type of equipment - rated load - rated speed - number of passengers ;

d) travel of the lift, number of landings served ;

e) mass of the car and of the counterweight or balancing weight ;

f) means of access to machinery and pulley spaces.

C.3 Technical details and plans

The text of this clause is replaced by the following :

Necessary plans and sections in order to understand the lift installation, including spaces for machines, pulleys and apparatus.

These plans do not have to give details of construction, but they should contain the necessary particulars to check conformity to this standard, and particularly the following :

a) clearances at the top of the well and in the pit (**5.7.1, 5.7.2, 5.7.3.3**) ;

b) any accessible spaces which exist below the well (**5.5**) ;

c) access to the pit (**5.7.3.2**) ;

d) guards between lifts if there are more than one in the same well (**5.6**) ;

e) provision for holes for fixings ;

f) position and principal dimensions of machinery spaces with the layout of the machine and principal devices. Dimensions of the traction sheave or the drum. Ventilation holes. Reaction loads on the building and at the bottom of the pit ;

g) access to machinery spaces (**6.2**) ;

h) position and principal dimensions of the pulley spaces, if any. Position and dimensions of pulleys ;

i) position of other devices in the pulley spaces ;

j) access to the pulley spaces (**6.4.3**) ;

k) arrangement and principal dimensions of landing doors (**7.3**). It is not necessary to show all the doors if they are identical and if the distances between the landing door sills are indicated ;

l) arrangement and dimensions of inspection doors and inspection traps and emergency doors (**5.2.2**) ;

m) dimensions of the car and of its entrances (**8.1**, **8.2**) ;

n) distances from the sill and from the car door to the inner surface of the well wall (**11.2.1** and **11.2.2**) ;

o) horizontal distance between the closed car and landing doors measured as indicated in **11.2.3** ;

p) principal characteristics of the suspension – safety factor- ropes (number, diameter, composition, breaking load) - chains (type, composition, pitch, breaking load) - compensation ropes (where provided) ;

q) calculation of the safety factor (**annex N**) ;

r) principal characteristics of the overspeed governor rope and/or safety rope : diameter, composition, breaking load, safety factor ;

s) dimensions and proof of the guide rails, condition and dimensions of the rubbing surfaces (drawn, milled, ground) ;

t) dimensions and proof of energy accumulation type buffers with linear characteristics.

Annex D
(normative)

Examinations and tests before putting into service

D.2 Tests and verifications

f) electric wiring :

The text of this clause is replaced by the following :

1) measurement of the insulation resistance of the different circuits (**13.1.3**). For this measurement all the electronic components are to be disconnected ;

2) verification of the electrical continuity of the connection between the main earth terminal of the machinery spaces and the different parts of the lift liable to be made live accidentally ;

The following clause is added :

o) functional tests of the following devices if available :

- mechanical device for preventing movement of the car (**6.4.3.1**) ;

- mechanical device for stopping the car (**6.4.4.1**) ;

- platform (**6.4.5**) ;

- mechanical device for blocking the car or movable stops (**6.4.5.2**) ;

- devices for emergency and tests operations (**6.6**).

Annex E
(informative)

Periodical examinations and tests, examinations and tests after an important modification or after an accident

E.2 Examinations and tests after an important modification or after an accident

The text of this clause is replaced by the following :

The important modifications and accidents shall be recorded in the technical part of the register or file covered in **16.2**.

In particular, the following are considered as important modifications :

a) change of :

1) the rated speed ;

2) the rated load ;

3) the mass of the car ;

4) the travel ;

b) change or replacement of :

1) the type of locking devices (the replacement of a locking device by a device of the same type is not considered as an important modification) ;

2) the control system ;

3) guide rails or the type of guide rails ;

4) the type of door (or the addition of one or more landing or car doors) ;

5) the machine or the traction sheave ;

6) the overspeed governor ;

7) the ascending car overspeed protection means ;

8) the buffers ;

9) the safety gear ;

10) the mechanical device for preventing movement of the car (**6.4.3.1**) ;

11) the mechanical device for stopping the car (**6.4.4.1**) ;

12) the platform (**6.4.5**) ;

13) the mechanical device for blocking the car or movable stops (**6.4.5.2**) ;

14) the devices for emergency and tests operations (**6.6**).

For the tests after an important modification or after an accident the documents and the necessary information shall be submitted to the responsible person or organization.

Such person or organization will decide on the advisability of carrying out tests on the modified or replaced components.

These tests will, at the most, be those required for the original components before the lift was put into service.

Annex ZA
(informative)

Clauses of this standard addressing essential requirements or other provisions of EU Directives

The Note 1 is replaced by the following :

NOTE 1 Regarding **6.2**, **6.3** and **6.7**, see clause **0.2.2** of this Standard.