

ICS

English version

Safety rules for the construction and installation of lifts - Existing lifts - Part 80: Rules for the improvement of safety of existing passenger and goods passenger lifts

Règles de sécurité pour la construction et l'installation des ascenseurs - Ascenseurs existants - Partie 80: Règles pour l'amélioration de la sécurité des ascenseurs et des ascenseurs de charge existants

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Bestehende Aufzüge - Teil 80: Regeln für die Erhöhung der Sicherheit bestehender Personen- und Lastenaufzüge

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

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Foreword

This European Standard 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.](#)

Regulations concerning the safety upgrading of existing lifts vary from member state to member state and have not, to date, been harmonised at either international or European level.

CEN/CENELEC have embarked on a programme of work to produce a series of related machinery and lift safety standards as part of the process of European harmonisation. This standard both makes use of and refers to EN 292 parts 1 and 2 and most of the EN 81 series of standards (see clause 2).

This standard is intended to identify and assess hazards and to provide corrective actions to progressively and selectively improve, step by step, the safety of all existing passenger and goods passenger lifts to today's state of the art. This standard is a safety standard and not a modernisation standard.

In addition the application of the proposed corrective actions given in this standard should be based on the reasonable and practical considerations and may vary in the extent of applicability from member state to member state. To determine what is relevant, a filtering process (see Annex A (informative)) should be used. Other designs to previous national regulations or standards, providing they have an equivalent safety level, may be acceptable.

Lifts form part of multi-storey building services as work equipment :

- a) for people to use lifts to gain access to their place of work ;
- b) to use lifts as a means of carrying goods ;
- c) for authorised lift persons to work on lifts.

Introduction

This document is a C type standard as stated in EN 1070.

The lift installation concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

This standard has been categorised in various hazards and hazardous situations, each of which has been analysed by a risk assessment.

This standard enables each lift to be audited and safety measures to be identified and implemented in a step by step and selective fashion according to the frequency and severity of any single risk. This safety standard lists the high, medium and low risks which can be complied with in separate steps. Existing lifts, providing they are properly maintained, are considered safe to an acceptable level for people who are familiar with the installation. However, with the free movement of people within the EU for both users and authorised persons, familiarisation with the different installations is becoming more and more difficult. Existing lifts were installed to the safety level appropriate at that time. This level is less than today's state of the art.

This has led to the situation today of different levels of safety across Europe. However, users expect one level of safety and therefore different levels of safety have led to accidents.

New technologies have led to a major breakthrough in the improvements in safety e.g. 2-way communication, new drive systems etc.

3 Million lifts are in use today in EU and EFTA and almost 50 % were installed more than 20 years ago.

There is a growing trend for people to live longer and therefore it is especially important to transport safely disabled and elderly persons up and down buildings.

Many environmental aspects were ignored or not apparent in the past and therefore should be considered when improving the safety of existing lifts.

Furthermore the life cycle of a lift is longer than any other transportation system and building equipment, which therefore means that lift design, performance and safety can fall behind modern technologies. If existing lifts are not upgraded to today's state of the art of safety the number of injuries will probably increase (especially in public buildings).

The following technical and social factors will accelerate the trend towards an increase in accidents :

- a) The ageing of the installed lift base increases the risks :
 - the ageing of asbestos parts increases the risk of dispersion in the air ;
 - the ageing of the well walls increases the risks posed by lifts without car doors.
- b) The increasing number of older users and the decline in their physical condition make them more vulnerable to some of the risks :
 - poor levelling accuracy ;
 - door closing impacts.
- c) The integration of disabled people into mainstream life is made more difficult.
- d) The reluctance of elderly people to be relocated to a nursing home from their own home is increasing.

The costs of injuries born by the different national social security systems will rise.

Lift attendants and in many cases building caretakers have disappeared, so it is important that relevant safety features should be integrated into the lifts themselves, to provide the required common safety level for all users.

Considering the above it is the responsibility of the owner to ensure that :

- a) the lift is safe for users and authorised lift persons ;
- b) the lift is properly maintained ;
- c) significant hazards (see clause 4) identified by this European Standard are addressed when the lift is used as intended by the owner ;
- d) an assessment of the risks to health and safety will be undertaken on the lift installation and according to the results any relevant protection measures will be taken.

In making an audit of an existing lift installation using annex B (informative), the hazards and protective measures in this standard could be used as a basis. However, if there is a deviation from this standard a separate risk assessment has to be made.

This risk assessment should be based on EN 1050 and ISO TS 14798 (see bibliography) and includes :

- a) an identification of significant hazards and hazardous situations ;
- b) an assessment of both the severity and the frequency of each significant hazard and hazardous situation ;

- c) identification and evaluation of possible protective and corrective measures . These should be to eliminate the hazard and hazardous situations. Where this is not possible the risk should be reduced to an acceptable level. Where a residual risk cannot be avoided, signs, instructions and training should be given where necessary.

From the risk assessment the measures required should be documented.

1 Scope

1.1 This European Standard gives rules for improving existing lifts with the aim of reaching today's state of the art of general safety.

NOTE Due to situations such as the building design etc. it may not be possible in all cases to reach today's state of the art.

1.2 This standard has taken into consideration safety requirements of the directives listed in the Bibliography and of EN 81 series of the safety standards for lifts.

NOTE The EN 81-series of standards for particular applications can be used as a basis for improving safety of existing lifts, providing they have been officially accepted. However, not all clauses may apply or be "reasonably practicable" (see note to 1.3).

1.3 It is the responsibility of each national authority to apply this standard and to determine its own programme of implementation in a step by step process (see Annex A (normative)) in a reasonable and practicable way based on :

- the level of risk (e.g. extreme, high, medium, low) ;
- social and economic considerations.

NOTE "Reasonably practicable" is defined as follows : "In deciding what is reasonably practicable the seriousness of risk to injury should be weighted against the difficulty and cost of removing or reducing that risk. In considering the cost no allowance should be made for the size, nature or profitability of the business concerned. Where the difficulty and costs are high, and a careful assessment of the risk shows it to be comparatively unimportant, action may not need to be taken. On the other hand where the risk is high, action should be taken at whatever cost".

1.4 This standard includes the improvement of safety for :

- a) users of passenger and goods passenger lifts ;
- b) lift maintenance and inspection personnel ;
- c) persons outside the well, machine room and the pulley room (if any) ;
- d) any authorised persons.

1.5 Excluded from this standard are the following :

- a) rack and pinions lifts, screw and chain lifts etc. ;
- b) lifting appliances such as paternosters, mine lifts, theatrical lifts, appliances with automatic caging, skips lifts and hoists for building and public works sites, ships' hoists, platforms for exploration or drilling at sea, construction and maintenance appliances ;
- c) installations where the inclination of the guide rails to the vertical exceeds 15 degrees ;
- d) safety during transport, installation, repairs and dismantling of lifts ;
- e) goods only lifts.

However, this standard may usefully be taken as a basis.

Noise and vibrations are not dealt with in this standard because these are not relevant to the safe use of the lift.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

CEN/CENELEC Standards

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

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

prEN 81-21:1998, *Safety rules for the construction and installation of lifts - Part 21 : New lifts in existing buildings.*

prEN 81-28:2000, *Safety rules for the construction and installation of lifts - Part 28 : Remote alarms on passenger and goods passenger lifts.*

prEN 81-70:1999, *Safety rules for the construction and installations of lifts - Part 70 : Particular applications for passenger and goods passenger lifts - Accessibility to lifts for persons including persons with disability.*

prEN 81-71, *Safety rules for the construction and installations of lifts - Part 71 : Particular applications for passenger and goods passenger lifts - Vandal resistant lifts.*

prEN 81-73, *Safety rules for the construction and installations of lifts - Part 73 : Particular applications for passenger and goods passenger lifts - Behaviour of lifts in case of fire.*

EN 294:1992, *Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs.*

EN 953:1997, *Safety of machinery – Guard – General requirements for the design and construction of fixed and movable guards.*

EN 1070:1998, *Safety of Machinery – Terminology.*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code).*

3 Terms and definitions

For the purposes of this document, the definitions given in EN 1070 and the EN 81 series of standards apply.

Additional definitions specifically needed for this European Standard are added below :

3.1

authorised person

a person who got a permission from the owner of the installation to perform defined activities about instructions which were received

3.2

competent person

a person with adequate training in theory and practice together with experience of the equipment being maintained, to enable a true assessment of its condition for continued safe operation, supported within his organisation

3.3

existing lift

a lift put into service after being placed on the market

3.4

owner of the installation

the natural or legal person who has the power of disposal of the installation and takes the responsibility for its operation and use

4 List of significant hazards

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessments as significant for this type of machinery and which require action to eliminate or reduce the risk.

The significant hazards dealt with are shown in table 1.

4.1 Significant hazards not dealt with by this standard

- Fire in well ;
- earthquake ;
- slipping on car roof ;
- shearing due to sharp edges ;
- out of date electrical installation.

4.2 Significant hazards dealt with by this standard (normative)

Table 1 — List of significant hazards

Nr.	Hazard/ Hazardous situation	Relevant clauses in this standard	Other standards or relevant clauses
1	Presence of asbestos in brake linings, well, etc.	5 General	0.3.1 (EN 81-1/2)
2	No or limited accessibility for disabled persons	5.1	prEN 81-70
3	No or inadequate vandal resistance	5.2	prEN 81-71
4	No or inadequate control functions in case of fire	5.3	prEN 81-73
5	Drive system with bad stopping/ levelling accuracy	5.4	prEN 81-70
6	Counterweight/balancing weight without safety gear in case of accessible spaces below well	5.5.1	5.5 (EN 81-1/2)
7	No or inadequate partition in the pit for several lifts in the same well	5.5.2.1	5.6.2.1 (EN 81-1/2)
8	No or inadequate partition for several lifts in the same well	5.5.2.2	5.6.2.2 (EN 81-1/2)
9	Well enclosures with perforate walls	5.5.3.1	5.2 (EN 81-1/2), 4.5.2 (EN 294)
10	Partially enclosed well with too low enclosure	5.5.3.2	5.2.1.2 (EN 81-1/2)
11	Unsafe pit access	5.5.4	5.7.3.2 (EN 81-1) 5.7.2.2 (EN 81-2)
12	No or inadequate stopping devices in the pit or in the pulley room	5.5.5	5.7.3.4 (EN 81-1) 5.7.2.5 (EN 81-2) 6.4.5 (EN 81-1/2)
13	No or inadequate locking device on inspection and emergency doors to well and access to the pit	5.5.6	5.2.2 (EN 81-1/2)
14	Insufficient clearances in headroom and/or pit	5.5.7	5.7.1, 5.7.2, 5.7.3.3 (EN 81-1) or 5.7.1, 5.7.2 (EN 81-2), prEN 81-21
15	No or inadequate partition of counterweight/ balancing weight travel path	5.5.8	5.6.1 (EN 81-1/2)
16	No or inadequate lighting of the well	5.5.9	5.9 (EN 81-1/2)
17	No alarm system in pit and on car roof	5.5.10	5.10 (EN 81-1/2)
18	No or unsafe means of access to machine and pulley room	5.6.1	6.2 (EN 81-1/2)
19	No or inadequate protection on different levels in machine/ pulley room	5.6.2	6.3.2.4 and 6.3.2.5 (EN 81-1/2)
20	No or inadequate lighting or socket outlets in machine or pulley room	5.6.3	6.3.6, 6.4.7 (EN 81-1/2)
21	Insufficient clearances in machine room	5.6.4	6.3.2 (EN 81-1/2), EN 953
22	Slippery floor in machine or pulley room	5.6.5	6.3.1.2, 6.4.1.2 (EN 81-1/2)
23	No or inadequate means of handling equipment in machine room or well	5.6.6	6.3.7 (EN 81-1/2)

"to be continued"

Table 2 — List of significant hazards (*continued*)

Nr.	Hazard/ Hazardous situation	Relevant clauses in this standard	Other standards or relevant clauses
24	Unsafe locking device of landing door	5.7.1	7.7 (EN 81-1/2)
25	Emergency unlocking of landing door	5.7.2.1	7.7.3.2 (EN 81-1/2), prEN 81-71
26	Well enclosure with perforate walls near door locks	5.7.2.2	7.7.3 (EN 81-1/2)
27	Inadequate glass in landing doors	5.7.3	7.2.3, 7.6.2, annex J (EN 81-1/2)
28	No automatic closing device on horizontal sliding landing doors driven by the car door	5.7.4	7.7.3.2 (EN 81-1/2)
29	Inadequate fire resistance of landing doors	5.7.5	not addressed
30	No or inadequate lighting on landings	5.7.6	7.6.1 (EN 81-1/2)
31	No or inadequate landing door sill (apron)	5.7.7	5.4.3 (EN 81-1/2)
32	No or inadequate protection against trapping of fingers on sliding car or landing doors with glass	5.7.8	7.2.3.6, 8.6.7.5 (EN 81-1/2)
33	Car door moving with open landing door	5.7.9	not covered
34	Inadequate design of landing door fixings	5.7.10	7.2.3.1, 7.4.2.1 (EN 81-1/2)
35	No or inadequate load control on car	5.8.1	14.2.5 (EN 81-1/2)
36	Car without doors	5.8.2	8.6, 8.7, 8.8, 8.9 8.10 (EN 81-1/2)
37	No or inadequate protective devices on power operated car and landing doors	5.8.3	7.5.2.1.1, 8.7.2.1.1 (EN 81-1/2)
38	Large gap between car and wall facing the car entrance	5.8.4.1	8.9.3, 11.2 (EN 81-1/2)
39	Absence or inadequate length of car apron	5.8.4.2	8.4 (EN 81-1/2), prEN 81-21
40	No or inadequate emergency lighting in car	5.8.5	8.17.4 (EN 81-1/2)
41	Too large gap between the car and well walls	5.8.6	8.13.3 (EN 81-1/2), prEN 81-21
42	Insufficient strength of car roof and emergency trap door	5.8.7	8.13.1 (EN 81-1/2)
43	No or insufficient ventilation in car	5.8.8	8.16 (EN 81-1/2)
44	No or inadequate lighting in car	5.8.9	8.17 (EN 81-1/2)
45	Unsafe locking of emergency trap door on the car	5.8.10	8.12.4.2 (EN 81-1/2)
46	No or inadequate safety gear on car	5.9.1	9 (EN 81-1/2)
47	No protection means against over speed in up direction	5.9.2	9.10 (EN 81-1/2)
48	No or inadequate protection means on sheaves and pulleys against injury	5.9.3	9.7 (EN 81-1), 9.4 (EN 81-2)
49	No or inadequate protection means on sheave and pulleys against damage	5.9.3	9.7 (EN 81-1), 9.4 (EN 81-2)
50	No or inadequate protection against free fall, over speed and creeping on hydraulic lifts	5.9.4	Table 3 ,14.2.1.5 (EN 81-2)

"to be continued"

Table 3 — List of significant hazards (*continued*)

Nr.	Hazard/ Hazardous situation	Relevant clauses in this standard	Other standards or relevant clauses
51	No or inadequate slack rope switch for governor rope	5.9.5	9.9.11.3 (EN 81-1), 9.10.2.10.3 (EN 81-2)
52	No or inadequate speed governor on electric lifts (e.g. lifts with slack rope operated safety gear)	5.9.6	9.9 (EN 81-1)
53	No or inadequate buffers	5.10.1	10.3 (EN 81-1/2)
54	Counterweight or balancing weight guided by 2 wire ropes	5.10.2	10.2.1 (EN 81-1)
55	No or inadequate final limit switches	5.10.3	10.5 (EN 81-1/2)
56	Excessive distance between car door and landing door	5.11	11.2.3/4 (EN 81-1/2)
57	No or inadequate emergency operation system	5.12.1	12.5 (EN 81-1), 12.9 (EN 81-2), 16.3.1 (EN 81-1/2)
58	Inadequate electro-mechanical brake	5.12.2	12.4.2 (EN 81-1)
59	No or inadequate low pressure device	5.12.3	12.9.1.5 (EN 81-2)
60	No shut-off valve	5.12.4	12.5.1 (EN 81-2)
61	No or inadequate slack rope device	5.12.5	9.5.3, 12.9 (EN 81-1) 12.13 (EN 81-2)
62	No run-time limiter	5.12.6	12.10 (EN 81-1), 12.12 (EN 81-2)
63	No independent starting contactors	5.12.7	12.7 (EN 81-1), 12.4 (EN 81-2)
64	Insufficient protection against electric shock and/or marking of electrical equipment ; missing notices	5.13.1 a), c), d)	13.1.2, 13.4.2, 13.5.3.3 (EN 81-1/2)
65	No lockable main switch	5.13.1 b)	13.4.2 (EN 81-1/2)
66	No or inadequate over-temperature protection of electrical equipment	5.13.2	13.3.3, 13.3.6 (EN 81-1/2)
67	No protection against phase reversal	5.13.3	14.1.1.1 j) (EN 81-1/2)
68	No or inadequate emergency alarm device	5.14.1	14.2.3 (EN 81-1/2), prEN 81-28
69	No or inadequate inspection control station and/or stopping device on car roof	5.14.2	14.2.1.3, 14.2.2.1 c) or d), 14.2.2.2 (EN 81-1/2)

"to be continued"

Table 4 — List of significant hazards (*concluded*)

Nr.	Hazard/ Hazardous situation	Relevant clauses in this standard	Other standards or relevant clauses
70	No or inadequate communication system between machine room and car	5.14.3	14.2.3.4 (EN 81-1/2)
71	Missing notices, markings and operating instructions	5.15	15.2.1, 15.3, 15.4, 15.5.1, 15.5.3, 15.7, 15.11, 15.15 (EN 81-1) and 15.2.1, 15.2.5, 15.3, 15.4, 15.5.1, 15.5.3, 15.7, 15.11, 15.15, 15.17, 15.18 (EN 81-2)

5 Safety requirements and/or protective measures

Where the requirements of this standard cannot be met and a residual risk remains, or cannot be avoided, then appropriate signs, instructions and training shall be given.

General requirements

- a) A risk assessment shall be made on a case by case basis for safety items not covered in this standard.
- b) Components containing asbestos including brake linings, contactor shields, well, landing doors, machine room, etc. shall be replaced (see also EN 81-1/2, 0.3.1).

NOTE These have to be considered in relation to national requirements.

5.1 Accessibility requirements

Where existing lifts are intended to be used also by persons with disabilities the requirements of prEN 81-70 shall be considered. The items considered are subject to a risk assessment on a case by case basis.

NOTE If this prEN 81-70 is not published before the formal voting of prEN 81-80, 5.1 will be deleted and dealt with in an amendment.

5.2 Requirements against vandalism

Where the lift is installed in an environment where it is subjected to vandalism, the requirements of prEN 81-71 shall be considered, e.g. protection of unlocking devices and partially enclosed wells. The items to be considered are subject to a risk assessment on a case by case basis.

NOTE If prEN 81-71 is not published before the formal voting of prEN 81-80, 5.2 will be deleted and dealt with in an amendment.

5.3 Behaviour of lifts in the event of fire

The requirements of prEN 81-73 shall be considered. The items to be considered are subject to a risk assessment on a case by case basis.

NOTE If prEN 81-73 is not published before the formal voting of prEN 81-80, 5.3 will be deleted and dealt with in an amendment.

5.4 Stopping/levelling accuracy

The stopping/levelling accuracy applies to lifts also used also by persons with disabilities and shall be as defined in prEN 81-70.

NOTE For the remainder of lifts and considering the Lift Directive and current revision of EN 81-1/2 it is recommended to apply the following :

- the stopping accuracy of the lift shall be ± 10 mm ;
- the levelling accuracy of ± 20 mm shall be maintained.

5.5 Well

5.5.1 Protection of accessible spaces located below the car, the counterweight or the balancing weight

If accessible spaces do exist below the car, the counterweight or the balancing weight, there shall either be :

- a) a solid pier extending down to solid ground, or
- b) a counterweight or a balancing weight equipped with a safety gear.

5.5.2 Screens

5.5.2.1 Where there are adjacent lifts in a common well, the installation shall have a partition in the pit in accordance with EN 81-1/2, 5.6.2.1.

5.5.2.2 Where the well contains several lifts, it shall be checked that the horizontal distance between the edge of the car roof and a moving part (car, counterweight or balancing weight) of an adjacent lift is greater than 0,5 m.

Where this is found not to be the case then a partition for the full height of the well shall be fitted in accordance with EN 81-1/2, 5.6.2.2.

5.5.3 Well enclosures

5.5.3.1 Existing well enclosures which deviate from EN 81-1/2, 5.2 may be perforate provided EN 294, 4.5.2 is fulfilled.

5.5.3.2 The dimensions of the partial enclosure shall be in accordance with EN 81-1/2, 5.2.1.2.

5.5.4 Pit access

The pit shall have a suitable access, egress and a protection against falling according to EN 81-1, 5.7.3.2 or EN 81-2, 5.7.2.2.

5.5.5 Pit and pulley room stopping device

Where the pit and/or pulley room are found not to have an appropriate stopping device, a device in accordance with EN 81-1, 5.7.3.4 and 6.4.5 or EN 81-2, 5.7.2.5 and 6.4.5 shall be installed.

5.5.6 Inspection and emergency doors to well and access to the pit

Any such doors shall confirm with EN 81-1/2, 5.2.2.

5.5.7 Top and pit clearances

Where top and/or pit clearances are found not to be in accordance with :

- a) EN 81-1, 5.7.1, 5.7.2 and 5.7.3.3 (for electric lifts), or
- b) EN 81-2, 5.7.1 and 5.7.2 (for hydraulic lifts),

the relevant requirements of prEN 81-21 shall be applied.

prEN 81-80:2001 (E)

NOTE If prEN 81-21 is not published before the formal voting of prEN 81-80, CEN/TC 10/WG10 will review this item at the comments' phase of prEN 81-80.

5.5.8 Counterweight or balancing weight screen

The counterweight or balancing weight shall be protected by a rigid pit screen in accordance with EN 81-1/2, 5.6.1.

5.5.9 Lighting of the well

The lift shall be checked to see that the lighting of the well is adequate. Where not it shall be fitted as defined in EN 81-1/2, 5.9.

5.5.10 Emergency release of persons working in well

If there is a risk for persons working in the well being trapped and no means are provided to escape, alarm devices shall be installed in accordance with EN 81-1/2, 5.10.

5.6 Machine and pulley rooms

5.6.1 Machine and pulley room access

A site evaluation of the hazardous situations shall be carried out to bring the access to the machine and pulley room to a safety level reflected by EN 81-1/2, 6.2.

5.6.2 Machine room floor levels and recesses

A site evaluation of the hazardous situations shall be carried out to ensure the levels and recesses in the machine room are to a safety level as reflected by EN 81-1/2, 6.3.2.4 and 6.3.2.5.

5.6.3 Lighting and socket outlets in machine and pulley room

The lighting and socket outlets in the machine and pulley room shall be in accordance with EN 81-1/2, 6.3.6 and 6.4.7.

5.6.4 Protection from the machinery

The machinery shall be checked that the clearances are in accordance with EN 81-1/2, 6.3.2.

Where this is found not to be the case the equipment shall be protected by suitable covers in accordance with EN 953.

5.6.5 Floors of machine and pulley rooms

The floors of machine rooms and pulley rooms shall be checked that they are in accordance with EN 81-1/2, 6.3.1.2 and 6.4.1.2.

5.6.6 Handling of equipment

The means of handling equipment in the machine room or well shall be checked that they are safe for use, suitably positioned and adopted to the working load required. The safe working loads shall be suitably indicated (see also EN 81-1/2, 6.3.7).

5.7 Landing doors

5.7.1 Landing door locks

All locks shall be according to the requirements defined in EN 81-1/2, except type examination. Where not they shall be replaced with a lock in accordance with EN 81-1/2, 7.7.

5.7.2 Emergency unlocking

5.7.2.1 Any emergency unlocking operation shall only be possible by authorised persons with the use of a special device (e.g. triangular key according to EN 81-1/2, 7.7.3.2) accompanied by written instructions detailing the essential precautions to be taken in order to avoid accidents which could result from an unlocking which was not followed by effective re-locking.

NOTE If there are buildings which may be subject to vandalism or where lift surfing may take place alternative measures shall be applied according to prEN 81-71.

5.7.2.2 Landing door locks shall not be accessible from the outside of the well (mesh wells) to reduce the risk of unauthorised utilisation in accordance with EN 81-1/2, 7.7.3.

5.7.3 Use of glass in landing doors

Landing doors which contain glass shall be checked to see that the glass fitted is in accordance with EN 81-1/2, 7.2.3 and annex J or national regulation of equivalent level of safety.

If not then :

- a) change glass to that defined in EN 81-1/2, annex J or
- b) the size of the glass panel shall be reduced to that of a vision panel in conformity with EN 81-1/2, 7.6.2 or
- c) the glass shall be removed and replaced by a solid panel, with the addition of a 'car here indicator' on each landing so that users may readily know if the lift is present.

5.7.4 Automatic closing of horizontal sliding landing doors

Horizontal sliding landing doors which can be driven by the car doors shall have an automatic closing device in accordance with EN 81-1/2, 7.7.3.2.

5.7.5 Fire rated landing doors

The landing doors shall conform with the fire rating of the building as required by national or local regulations.

5.7.6 Lighting of the landing

The lighting of the landings in the vicinity of the landing doors shall be in accordance with EN 81-1/2, 7.6.1.

5.7.7 Landing door sill (apron)

All landings shall have an landing door sill (apron) according to EN 81-1/2, 5.4.3.

5.7.8 Horizontally sliding car and landing doors with glass

Horizontally sliding car and landing doors made of class shall be in accordance with EN 81-1/2, 7.2.3.6 and 8.6.7.5 to protect against the trapping of children hands.

5.7.9 Swing landing doors in combination with power operated horizontally sliding car doors

The car doors shall only function when the landing door has been closed.

5.7.10 Landing door fixings

Each landing door fixing (e.g. fixing screws, bottom door guides, top door rollers, etc.) shall resist the forces and derailment as defined in EN 81-1/2, 7.2.3.1 and 7.4.2.1, to avoid the door panel falling into the well.

5.8 Car, counterweight and balancing weight

5.8.1 Load control

To avoid the risk of the car starting if overloaded, a load control shall be fitted in accordance with EN 81-1/2, 14.2.5.

5.8.2 Cars without doors

Where a car has no door the following additions shall be carried out. Either :

- a) a power operated car door shall be fitted in accordance with EN 81-1/2, 8.6, 8.7, 8.8, 8.9 and 8.10, or
- b) a manual car door shall be fitted in accordance with EN 81-1/2, 8.6, 8.7.1, 8.9 and 8.10.

5.8.3 Protection against impact from power operated horizontally sliding car and landing doors

All lifts shall be provided with door protective devices in accordance with EN 81-1/2, 7.5.2.1.1 and 8.7.2.1.1.

5.8.4 Avoidance of the risk of people falling into the well

5.8.4.1 The horizontal distance between the inner surface of the well and the sill, door frame of the car or closing edge of car sliding doors shall be in accordance with EN 81-1/2, 11.2. If not, a car door lock or means to reduce the distance shall be fitted according to EN 81-1/2, 8.9.3 or 11.2.1 respectively.

5.8.4.2 The car shall have an apron in accordance with EN 81-1/2, 8.4. Where this is not possible it shall be in accordance with prEN 81-21 (e.g. telescopic apron).

5.8.5 Emergency lighting in the car

The car shall have an emergency lighting in accordance with EN 81-1/2, 8.17.4.

5.8.6 Protection on the car roof

The car roof shall be checked to ensure that the free distance in the horizontal plane beyond and perpendicular to its outer edge does not exceed 0,30 m. Where a balustrade has not been fitted then one of the following provisions shall be taken :

- a) the car roof shall be extended so that the free distance is less than 0,30 m ;
- b) a balustrade shall be fitted on the car roof in accordance with EN 81-1/2, 8.13.3 or prEN 81-21 (e.g. telescopic balustrade) ;
- c) a full height partition shall be installed so that the free distance is less than 0,30 m.

5.8.7 Strength of car roof and emergency trap door

The car roof and any emergency trap doors shall be in accordance with EN 81-1/2, 8.13.1.

5.8.8 Ventilation of the car

The car ventilation shall be sufficient according to national regulations.

Where no national regulations exist then EN 81-1/2 ,8.16 shall apply.

5.8.9 Lighting in the car

The car shall have a permanently installed electrical lighting. Where not fitted or inadequate it shall be in accordance with EN 81-1/2, 8.17.

5.8.10 Locking of emergency trap doors on the car

If an emergency trap door on the car is fitted its locking device shall be in accordance with EN 81-1/2, 8.12.4.2.

5.9 Suspension, compensation and over speed protection

5.9.1 Safety gear

All installations using ropes or chains as a means of suspension shall have a safety gear fitted. The total system including safety gear and its over speed governor shall be checked for compatibility and a test be carried out to ensure that the system functions correctly.

When adding or replacing a safety gear it shall be in accordance with EN 81-1/2, clause 9.

5.9.2 Ascending car over speed protection

Provision of ascending car over speed protection in accordance with EN 81-1, 9.10 shall be considered for all electric lifts with a counterweight.

The evaluation of this requirement shall be carried out on a case by case basis taking into account specific factors, e.g. 3-bearing machines, nominal travel speed, maximum out of balance load, travel height, existing top clearance, height of car, gear ratio, design of worm and worm wheel teeth.

In particular :

- a) machines should be fitted with a double acting brake as defined in 5.12.2 of this standard ;
- b) 3-bearing machines should be the subject of EN 81-1, 9.10 or periodic inspection including ultrasonic testing.

NOTE CEN/TC 10/WG 10 has asked CEN/TC 10/WG 1 to reconsider the requirements of EN 81-1, 9.10.

5.9.3 Protection for traction sheaves and pulleys

Pulleys and sheaves shall be protected in accordance with EN 81-1, 9.7 or EN 81-2, 9.4.

5.9.4 Uncontrolled downward movement of hydraulic lifts

5.9.4.1 The installation shall be checked to ensure it is protected against free fall, over speed and creeping in down direction. Where not, the lift shall be provided with a combination of safety devices according to EN 81-2, 9.5 and table 3.

5.9.4.2 Where only an electrical anti-creep system is used it shall include automatic return to the lowest landing according to EN 81-2, 14.2.1.5.

5.9.5 Governor rope tensioning device

The governor rope tensioning device shall be fitted with a safety contact in accordance with EN 81-1, 9.9.11.3 or EN 81-2, 9.10.2.10.3.

5.9.6 Over speed protection

All electric lifts shall be equipped with an over speed governor compatible with the existing safety gear. Where not they shall be fitted with an over speed governor in accordance with EN 81-1, 9.9.

5.10 Guide rails, buffers and final limit switches

5.10.1 Buffers

All lifts shall be provided with buffers. Where not they shall be provided with buffers in accordance with EN 81-1/2, 10.3.

When existing buffers are not in accordance with EN 81-1/2, 10.3 a risk assessment shall be carried out to determine that the deceleration rates of the buffers are acceptable to all persons in the car.

5.10.2 Counterweights/ balancing weights guided by wire ropes

Where counterweights/ balancing weights are guided by only 2 wire ropes it shall be considered either :

- a) to replace them by rigid steel guides in accordance with EN 81-1, 10.2.1, or
- b) to protect the car by a mesh partition through the full height of the well.

NOTE No corrective action is foreseen for counterweights/ balancing weights guided by 4 ropes.

5.10.3 Final limit switches

All lifts shall be provided with final limit switches according to EN 81-1/2, 10.5.

5.11 Distance between car door and landing door

Where the distance between car door and landing door exceeds 120 mm for flat panel doors or 150 mm between a hinged landing door and a folding car door, the distances shall be reduced to be in accordance with EN 81-1/2, 11.2.3 and 11.2.4.

5.12 Lift machine

5.12.1 Emergency operation

The lift shall be provided with an emergency operation system in accordance with EN 81-1, 12.5 for electric lifts or EN 81-2, 12.9 for hydraulic lifts.

All such emergency operation systems shall be supplemented with rescue instructions which are clearly displayed as defined in EN 81-1/2, 16.3.1.

5.12.2 Electro-mechanical brake (electric lifts)

Where practical the electro-mechanical brake shall comply with EN 81-1, 12.4.2.

5.12.3 Low cylinder pressure (hydraulic lifts)

All indirect acting hydraulic lifts and direct acting hydraulic lifts where the jack is not rigidly fastened to the car shall be provided with a low pressure device for manual lowering in accordance with EN 81-2, 12.9.1.5.

5.12.4 Shut-off valve (hydraulic lifts)

Hydraulic systems shall include a shut-off valve between the jack and the power unit as defined in EN 81-2, 12.5.1. This valve shall be located in the machine room.

5.12.5 Slack rope/ chain device

A slack rope/ chain device shall be fitted to the suspension in accordance with EN 81-1, 9.5.3 and 12.9 or EN 81-2, 12.13.

5.12.6 Run-time limiter

All lifts shall incorporate a run-time limiter in accordance with EN 81-1, 12.10 or EN 81-2, 12.12.

5.12.7 Independent starting contactors

There shall be at least two independent starting contactors as defined in EN 81-1, 12.7 and EN 81-2, 12.4.

5.13 Electric installations and appliances

5.13.1 Protection against electric shock

The following shall be checked :

- a) the electric equipment of the installation shall be fitted with casings in accordance with EN 81-1/2, 13.1.2 providing a degree of protection of at least IP 2X ;
- b) lockable main switches as defined in EN 81-1/2, 13.4.2 shall be fitted ;
- c) markings as defined in EN 81-1/2, 13.5.3.3 shall be fitted on connection terminals if the voltage exceeds 50 V ;
- d) group relay controllers shall be checked to ensure there is a notice warning maintenance personnel that there may still be a voltage present when the main supply of the individual controller is switched off.

5.13.2 Over-temperature protection of electrical equipment

The electrical equipment shall be checked for a over-temperature protection. Where it is found not to be fitted, then a temperature monitoring device shall be fitted in accordance with EN 81-1/2, 13.3.3 and 13.3.6.

5.13.3 Phase reversal protection

The installation shall be checked to ensure that the phase reversal as mentioned in EN 81-1/2, 14.1.1.1 j) shall not be on its own the cause of a dangerous malfunction of the lift.

5.14 Protection against electric faults, controls, priorities

5.14.1 Emergency alarm device

An emergency alarm device allowing a two-way voice communication shall be fitted in accordance with EN 81-1/2, 14.2.3. The requirements of prEN 81-28 (remote alarm for lifts) shall be considered.

NOTE If prEN 81-28 is not published before the formal voting of prEN 81-80, reference to prEN 81-28 will be deleted and dealt with in an amendment.

5.14.2 Inspection control station and stopping device

Each car roof shall be provided with :

- a) an inspection control station in accordance with EN 81-1/2, 14.2.1.3, and
- b) a stopping device according to EN 81-1/2, 14.2.2.1 c) or d) and 14.2.2.2.

5.14.3 Communication between car and machine room

Where there is no direct means of audible communication between the car and the machine room an intercom system, or similar device, shall be fitted in accordance with EN 81-1/2, 14.2.3.4.

5.15 Notices, markings and operating instructions

The installation shall be provided with notices, markings and operating instructions as defined in :

- a) EN 81-1, 15.2.1, 15.3, 15.4, 15.5.1, 15.5.3, 15.7, 15.11 and 15.15 or
- b) EN 81-2, 15.2.1, 15.2.5, 15.3, 15.4, 15.5.1, 15.5.3, 15.7, 15.11, 15.15, 15.17 and 15.18.

6 Verification of safety measures and/ or protective devices

Before putting a lift back into service it shall be subject of examinations and tests in accordance with the relevant clauses/ standards referred to.

NOTE This means that if a modification is made using a specific clause of this standard, e.g. 5.8.4, then only the relevant clause of EN 81-1/2, annex D needs to be addressed.

7 Information for use

The existing instruction manual shall be updated for those components which are changed according to clause 5 of this standard.

Annex A (informative)

Method for national implementation of EN 81-80

All technical solutions for upgrading of existing lifts to the state-of-the-art are listed in clause 5 of this standard. Although immediate upgrading of all existing lifts to the state-of-the-art would be sensible from the safety point of view this cannot be realised in a short period of time mainly for economic reasons.

This European Standard cannot lay down binding requirements which measures are to be carried out on which lift and within which period of time. Such obligations for existing lifts are subject to national legislation. The procedures described in this annex are intended to assist in setting up national regulations for increasing the safety of existing lifts by showing how to identify and evaluate the existing hazardous situations and how to classify priority levels which apply to the necessary safety-increasing measures.

A.1 Identification of hazardous situations

Annex B (informative) contains a checklist which can be used for identification of the hazardous situations of a lift. This list contains all hazardous situations indicated in 4.2 of this standard. The hazardous situations mentioned in this sub-clause have been listed on the basis of experience gathered from registered accidents as well as specific risk assessments. The state-of-the-art of the European lift industry in the last decades served as base. There may be additional hazardous situations for very old lifts or lifts with special technology which are not covered by this standard. In this case additional risk assessments are necessary for the lifts in question.

The identification of the hazardous situation can be carried out in the course of any periodical survey or special examination, but only technically competent and sufficiently trained persons will be allowed to carry out these examinations. This can be subject to national regulations.

A.2 Evaluation of hazardous situations

The hazardous situations as listed in 4.2 were subjected to risk assessment in preparation for this standard.

The evaluations imply that an existing lift either has none or insufficient equipment for preventing the hazardous situations.

Table A.1 shows the original risk profile which can be present in existing lift installations which have not been brought up to today's state of the art safety levels in accordance with EN 81-1/2.

Table A.1 — Original risk profile

A				
B			37	
C		9 37 57	33 40 55	
C-D	69	5 11 16 18 19 20 21 27 31 36 46 53 68	30 44	
D	1 5 7 8 10 12 13 14 16 24 25 26 27 28 34 36 38 39 41 46 50 52 56 57 58 63 64 68	17 23 43 45 47 48 59 61 66	32 42 49 60 62	
D-E	29 47 51 65 70 71	22 35 54 67		
E	6 15 23 35 54 66			
F				
	I	II	III	IV
Frequency (hazard cause level) :			Severity (hazard effect category) :	
A Frequent, B Probable, C Occasional, D Remote, E Improbable, F Impossible			I Catastrophic, II Critical, III Marginal, IV Negligible	

However table A.1 does not strictly apply to every lift. The earlier local requirements valid in the individual member states may already include requirements which cover many hazardous situations of 4.2. Some of these requirements can be regarded as almost equivalent to the current requirements of EN 81 standards or identical.

Some of these requirements only partly covered the hazardous situations, which means that the remaining residual risk may be still too high compared with the safety level which is achieved for a lift in accordance with EN 81 series of standards.

This is why re-evaluating the risks and comparing with previous national standards will lead to filtering the risk profile. On the one hand hazardous situations covered by almost equivalent requirements can be eliminated from the risk profile. On the other hand the residual risk can be re-evaluated and re-ranked in the risk profile.

The risk caused by insufficient well lighting shall serve as an example here. Considering the worst case the risk assessment implies that no well lighting exists. The respective risk is evaluated at severity category I and frequency category D. Consequently the risk level in the risk profile is high, which means that risk-reducing measures are necessary in any case.

Former valid standards, such as EN 81-1:1985 or EN 81-2:1987, for example, already required permanently installed well lighting. These well lighting had to be mounted on determined positions in the well, but, in contrast to EN 81-1/2:1998, definite intensity of illumination was not required.

Therefore the well lighting used earlier cannot be considered to be equivalent to the well lighting used today. However, lifts equipped with well lighting in accordance with former standards have certainly a lower residual risk than lifts without well lighting. Consequently the remaining residual risk can be shifted to a lower risk level of the risk profile, i.e. to I D-E or II D, for example.

NOTE For reasons of practical application, the frequency category D was subdivided into C-D, D and D-E.

Eliminating of non-existing risks and re-evaluation of some risks dependent on earlier valid standards is a filtering process which can be carried out on national level. This filtering process facilitates use of this standard by considerably reducing the number of relevant hazardous situations for existing lifts (e.g. of certain years of manufacture) which must be subjected to check list examination and by integrating already existing equivalent solutions in the risk assessment.

A.3 Classification of priority levels

As mentioned before upgrading all hazards of all existing lifts to the state-of-the-art at the same time is hardly possible for economic reasons. This is why a procedure is recommended here which allows to subdivide the hazardous situations in priority levels which then can be removed in several timed steps by respective measures.

However, use of the safety levels of the risk profile according to ISO TS 14798 is one easy method of classifying the priority levels. The risk profile can be subdivided into 5 priority levels (see Tables A.2 and A.3).

These priority levels are defined in accordance with safety considerations only. However, implementation is also a question of economic considerations, as the costs of the measures to be carried out may differ significantly. This is why it is quite possible that costly measures move down and low cost measures move up in the priority ranking (however, high risks shall be addressed, see also 1.3).

The priority levels can be assigned to a schedule for the realisation of the measures. Table A.2 also contains a possible schedule. The schedule cannot only consider the costs for realising the measures but also the capacity of the industry to carry out the measures.

Table A.2 — Priorities and schedule

Fields in risk profile		Priority	Schedule
S	F		
I II	A, B, C A	Extreme	Immediate, lift has to be stopped
I II III	C-D, D B, C, C-D A, B	High	Short term, e.g. within 5 years
I II III	D-E D C, C-D	Medium	Medium term, e.g. within 10 years or together with a major modernisation
I II III IV	E D-E, E D A, B	Low	Long term or together with a modernisation of the related component
I II III IV	F F D-E, E, F C, C-D, D, D-E, E, F	-	-
Frequency (hazard cause level) :		Severity (hazard effect category)	
A Frequent, B Probable, C Occasional, D Remote, E Improbable, F Impossible		I Catastrophic, II Critical, III Marginal, IV Negligible	

Table A.3 — Modified risk profile with priority levels

A > 1.000.000	Extreme	Extreme	High	Low
B 1.000.000 - 100.000	Extreme	High	High	Low
C 100.000 - 20 000	Extreme	High	Medium	
C-D 20 000 - 200	High	High	Medium	
D 200 - 1	High	Medium	Low	
D-E 1 – 0,02	Medium	Low		
E < 0,02	Low	Low		
F 0				
Number of incidents per 10 ⁶ lifts and year	I	II	III	IV
Frequency (hazard cause level) :		Severity (hazard effect category) :		
A Frequent, B Probable, C Occasional, D Remote, E Improbable, F Impossible		I Catastrophic, II Critical, III Marginal, IV Negligible		

Annex B (informative)

Safety check list for existing lifts

The safety check list proposed in this annex (Table B.2) is intended to be a tool to identify the significant hazards on an existing lift and to determine which type of corrective action(s) proposed by this standard is applicable (see Table B.1 for its use).

All the significant hazards are regrouped by their localisation on the lift (well, machine room, door, car etc.) and the priority is given in accordance with the risk assessment done when establishing this standard.

This list identifies at once risks for users, authorised persons, maintenance and inspection personnel.

NOTE If a risk is re-evaluated, this re-evaluation must be done following the risk analysis methodology (EN 1050 and ISO TS 14798) used to establish this standard.

Table B.1 — The principle to use the check list




Nr.	Requirements to be checked	Clause	Requirements fulfilled?	Level of risk	Corrective action (s) (Risk reduction measure)	Applicability	Remarks
1	Requirement	5.x.y 	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (next)	High Mid Low	1. Action1 2. Action 2 3. Action 3	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Requirement	6.x.y 	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	High Mid Low	Action1 Action 2	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  (next)	

Table B.2 — Safety check-list for existing lifts

Nr.	Requirements to be checked	Clause	Requirement fulfilled ?	Level of risk	Corrective action (Risk reduction measure)	Applicability	Remarks
General requirements							
	Installation without asbestos fibres	5 General	<input type="radio"/> Yes <input type="radio"/> No	Mid	1. Remove asbestos which is subject to disintegration 2. Replace brake lining material 3. Do not carry out work on asbestos => put warning label	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
1 Requirements for disabled persons (Include if prEN81-70 is published)							
		5.1					
2 Requirements against vandalism (include if prEN81-71 is published)							
		5.2					
3 Behaviour of lifts in the event of fire (Include if prEN81-73 is published)							
		5.3					
4 Stopping/ levelling accuracy							
	Step between car and landing floors is within ± 10 mm and levelling accuracy of ± 20 mm	5.4	<input type="radio"/> Yes <input type="radio"/> No	High	1. Change to regulated drive 2. Fit re-levelling device 3. Regulate valve	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
5 Lift well							
	Protection of accessible spaces below car, counterweight/ balancing weight	5.5.1	<input type="radio"/> Yes <input type="radio"/> No	Low	1. Ensure solid pier extending down to solid ground 2. Fit counterweight/ balancing weight with safety gear	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Partition between moving parts of multiple lifts	5.5.2	<input type="radio"/> Yes <input type="radio"/> No	High	1. Fit partition acc. EN 81-1/2, 5.6.2.1 at the lowest point of travel 2. Fit full height partition to EN 81-1/2, 5.6.2.2 where distances < 500 mm	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Imperforate walls	5.5.3.1	<input type="radio"/> Yes <input type="radio"/> No	High	1. Enclose well with a mesh and a hole size according to EN 294 2. Fit imperforate well enclosure	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Height of partially enclosed well in accordance with EN 81-1/2, 5.2.1	5.5.3.2	<input type="radio"/> Yes <input type="radio"/> No	High	Increase enclosure height acc. EN 81-1/2, 5.2.1.2	<input type="radio"/> Yes <input type="radio"/> No	
	Safe access to pit	5.5.4	<input type="radio"/> Yes <input type="radio"/> No	High	Provide access to pit acc. EN 81-1, 5.7.3.2 and EN 81-2, 5.7.2.2	<input type="radio"/> Yes <input type="radio"/> No	
	Stopping device in pit and pulley room	5.5.5	<input type="radio"/> Yes <input type="radio"/> No	High	Fit switch as per EN 81-1, 5.7.3.4/ 6.4.5 and EN 81-2, 5.7.2.5/ 6.4.5	<input type="radio"/> Yes <input type="radio"/> No	

"to be continued"

Table B.2 — Safety check-list for existing lifts (to be continued)

Nr.	Requirements to be checked	Clause	Requirement fulfilled ?	Level of risk	Corrective action (Risk reduction measure)	Applicability	Remarks
	Locked access doors to well and pit ; car stopped when doors opened.	5.5.6	<input type="radio"/> Yes <input type="radio"/> No	High	1. Provide locking system for authorised person only 2. Fit safety contact acc. EN 81 1/2, 5.2.2	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Top and pit clearances	5.5.7	<input type="radio"/> Yes <input type="radio"/> No	Mid	Ensure headroom and pit clearances are in accordance with EN 81-1, 5.7.1, 5.7.2, 5.7.3 and EN 81-2, 5.7.1, 5.7.2 or with prEN 81-21	<input type="radio"/> Yes <input type="radio"/> No	
	Counterweight or balancing weight screen	5.5.8	<input type="radio"/> Yes <input type="radio"/> No	Low	Fit counterweight or balancing weight screen as per EN 81-1/2, 5.6.1	<input type="radio"/> Yes <input type="radio"/> No	
	Lighting of the well	5.5.9	<input type="radio"/> Yes <input type="radio"/> No	High	Fit lighting of the well as defined in EN 81-1/2, 5.9	<input type="radio"/> Yes <input type="radio"/> No	
	Alarm device in well (car roof and pit)	5.5.10	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit 2-way-communication as per EN 81-1/2, 5.10 for pit and car roof	<input type="radio"/> Yes <input type="radio"/> No	
6 Machine and pulley rooms							
	Safe access to machine - and pulley room	5.6.1	<input type="radio"/> Yes <input type="radio"/> No	High	Fit safe access means reflecting EN 81 1/2, 6.2	<input type="radio"/> Yes <input type="radio"/> No	
	Different levels in machine/ pulley rooms	5.6.2	<input type="radio"/> Yes <input type="radio"/> No	High	1. Fit devices as per EN 81-1/2, 6.3.2.4 and 6.3.2.5 2. Carry out 'on site' risk assessment"	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Lighting and socket outlets in machine and pulley room	5.6.3	<input type="radio"/> Yes <input type="radio"/> No	High	Install electrical lighting and/or socket outlets as per EN 81-1/2, 6.3.6 and 6.4.7	<input type="radio"/> Yes <input type="radio"/> No	
	Protection from the machinery	5.6.4	<input type="radio"/> Yes <input type="radio"/> No	High	1. Cover electrical and mechanical moving equipment by guards (IP2X) 2. Instructions to 'switch off lift during work'	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Non-slip floor of machine and pulley room	5.6.5	<input type="radio"/> Yes <input type="radio"/> No	Low	Provide non-slip floor acc. EN 81-1/2, 6.3.1.2 and 6.4.1.2	<input type="radio"/> Yes <input type="radio"/> No	
	Lifting beam (eye) in machine room and well with tested and displayed working load at suitable position	5.6.6	<input type="radio"/> Yes <input type="radio"/> No	Mid	Test and display safe working load on lifting means and check for suitable position	<input type="radio"/> Yes <input type="radio"/> No	
7 Landing doors							
	Landing door locks with pre-locking	5.7.1	<input type="radio"/> Yes <input type="radio"/> No	High	Replace all landing doors locks to EN 81-1/2, 7.7.	<input type="radio"/> Yes <input type="radio"/> No	
	Emergency unlocking of landing door with special device (e.g. triangular key) including instruction on its use	5.7.2.1	<input type="radio"/> Yes <input type="radio"/> No	High	Fit unlocking device as per EN 81-1/2, 7.7.3.2	<input type="radio"/> Yes <input type="radio"/> No	
	Non-accessibility of landing door lock from outside the well	5.7.2.2	<input type="radio"/> Yes <input type="radio"/> No	High	1. Fit imperforate wall enclosure 2. Fit protection around landing door lock	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	

"to be continued"

Table B.2 — Safety check-list for existing lifts (continued)

Nr.	Requirements to be checked	Clause	Requirement fulfilled?	Level of risk	Corrective action (Risk reduction measure)	Applicability	Remarks
	Landing doors with glass	5.7.3	<input type="radio"/> Yes <input type="radio"/> No	High	1. Reduce size of window to be in acc. with EN 81-1/2, 7.6.2 2. Remove vision panel and add car indicator 3. Fit glass to EN 81-1/2, annex J	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Automatic closing of horizontally sliding landing doors	5.7.4	<input type="radio"/> Yes <input type="radio"/> No	High	Replace closing device acc. to EN 81-1/2, 7.7.3.2	<input type="radio"/> Yes <input type="radio"/> No	
	Fire resistance of landing doors	5.7.5	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fire rated lift landing doors acc. to national regulations	<input type="radio"/> Yes <input type="radio"/> No	
	Lighting on landing	5.7.6	<input type="radio"/> Yes <input type="radio"/> No	Mid	Install sufficient lighting on each landing acc. EN 81-1/2, 7.6.1	<input type="radio"/> Yes <input type="radio"/> No	
	Vertical surface connected to landing door sill and projections	5.7.7	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit landing door sill (apron) acc. EN 81-1/2, 5.4.3	<input type="radio"/> Yes <input type="radio"/> No	
	Protection against trapping of children hands in horizontally sliding car or landing doors with glass	5.7.8	<input type="radio"/> Yes <input type="radio"/> No	Low	Fit protection acc. to EN 81-1/2, 7.2.3.6 and 8.6.7.5 or a) polish critical parts (e.g. Teflon inlayed polish); b) making glass opaque up to a height of 1,1 m; c) fit finger detector	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Power operated horizontal sliding car door only functions if swing landing door is closed	5.7.9	<input type="radio"/> Yes <input type="radio"/> No	Mid	a) Ensure landing door is not unlocked until the car door is fully open b) Ensure car door does not start to close until the landing door has closed	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Design and condition of landing door fixings	5.7.10	<input type="radio"/> Yes <input type="radio"/> No	High	Replace door fixings acc. to EN 81-1/2, 7.2.3.1 and 7.4.2.1	<input type="radio"/> Yes <input type="radio"/> No	
8 Car, counterweight and balancing weight							
	Load control	5.8.1	<input type="radio"/> Yes <input type="radio"/> No	Low	Fit load control acc. EN 81-1/2, 14.2.5	<input type="radio"/> Yes <input type="radio"/> No	
	Presence of car door(s)	5.8.2	<input type="radio"/> Yes <input type="radio"/> No	High	Fit car door(s) acc. EN 81-1/2, 8.6	<input type="radio"/> Yes <input type="radio"/> No	
	Car and landing door protective devices	5.8.3	<input type="radio"/> Yes <input type="radio"/> No	High	Fit devices in acc. with EN 81 1/2, 7.5.2	<input type="radio"/> Yes <input type="radio"/> No	
	a) Horizontal distance between car sill to inner well surface <= 150 mm or b) car door lock in accordance with EN 81-1/2, 11.2.1	5.8.4.1	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	High	a) Fit car door lock as in EN 81-1/2, 8.11 b) Fit means to reduce the distance	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Car apron	5.8.4.2	<input type="radio"/> Yes <input type="radio"/> No	High	Fit car apron as in EN 81-1/2, 8.4 if not possible in accordance with prEN 81-21	<input type="radio"/> Yes <input type="radio"/> No	
	Emergency lighting in the car	5.8.5	<input type="radio"/> Yes <input type="radio"/> No	Mid	1. Fit emergency lighting acc. EN 81-1/2, 8.17.4 2. Illuminated alarm button	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	

"to be continued"

Table B.2 — Safety check-list for existing lifts (to be continued)

Nr.	Requirements to be checked	Clause	Requirement fulfilled ?	Level of risk	Corrective action (Risk reduction measure)	Applicability	Remarks
	Protection against falling from car roof	5.8.6	<input type="radio"/> Yes <input type="radio"/> No	High	1. Fit car roof balustrade in acc. with EN 81 1/2, 8.13.3 or with EN 81-21 2. Reduce free distance 3. Full height partition	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Sufficient strength of car roof and emergency trap door to carry two people	5.8.7	<input type="radio"/> Yes <input type="radio"/> No	Low	Reinforce car roof and emergency trap door acc. EN 81-1/2, 8.13.1	<input type="radio"/> Yes <input type="radio"/> No	
	Sufficient car ventilation	5.8.8	<input type="radio"/> Yes <input type="radio"/> No	Mid	Provide additional ventilation	<input type="radio"/> Yes <input type="radio"/> No	
	Sufficient lighting in the car	5.8.9	<input type="radio"/> Yes <input type="radio"/> No	Mid	Install lighting system to reach min. 50 lux at floor level	<input type="radio"/> Yes <input type="radio"/> No	
	Electrical locking of emergency trap door	5.8.10	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit locking device in acc. with 8.12.4.2 of EN 81-1/2	<input type="radio"/> Yes <input type="radio"/> No	
9 Suspension, compensation and over speed protection							
	Adequate safety gear and over speed governor system for elevators with ropes or chains	5.9.1	<input type="radio"/> Yes <input type="radio"/> No	High	1. Fit modern safety gear as per EN 81-1/2, 9.8 and 2. Compatible over speed governor system as per EN 81-1, 9.9 or EN 81-2, 9.10.2	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Ascending car over speed protection	5.9.2	<input type="radio"/> Yes <input type="radio"/> No	Mid	Over speed device : a) on car, b) on counterweight, c) on the rope system, d) on traction sheave	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Protection for traction sheaves and pulleys	5.9.3	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit protection according to EN 81-1, 9.7 and EN 81-2, 9.4	<input type="radio"/> Yes <input type="radio"/> No	
	Protection against uncontrolled downward movement of hydraulic lifts	5.9.4.1	<input type="radio"/> Yes <input type="radio"/> No	High	1. Fit rupture valve 2. Fit clamping device 3. Fit safety gear with governor 4. Electrical anti-creep system	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Automatic return to the lowest floor level when an electric anti-creep system is used	5.9.4.2	<input type="radio"/> Yes <input type="radio"/> No	High	Fit automatic return control to lowest floor acc. EN 81-2, 14.2.1.5	<input type="radio"/> Yes <input type="radio"/> No	
	Safety contact in governor rope tensioning device	5.9.5	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit safety contact as in EN 81-1, 9.9.11.3 and EN 81-2, 9.10.2.10.3	<input type="radio"/> Yes <input type="radio"/> No	
	Over speed governor of electric lifts (Rem. : electric lifts with slack rope safety gear)	5.9.6	<input type="radio"/> Yes <input type="radio"/> No	High	Fit over speed governor in accordance with EN 81-1, 9.9	<input type="radio"/> Yes <input type="radio"/> No	
10 Guide rails, buffers and final limit switches							
	Adequate buffers	5.10.1	<input type="radio"/> Yes <input type="radio"/> No	High	Fit buffers acc. EN 81-1/2, 10.3 or carry out risk assessment if buffers are present	<input type="radio"/> Yes <input type="radio"/> No	
	Guides for counterweight : rigid guides or min. 4 wire ropes	5.10.2	<input type="radio"/> Yes <input type="radio"/> No	Low	Counter-/balancing weight guided by 2 ropes : 1. Fit rigid guide system acc. EN 81-1, 10.2.1 2. Fit full height mesh partition	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	

"to be continued"

Table B.2 — Safety check-list for existing lifts (continued)

Nr.	Requirements to be checked	Clause	Requirement fulfilled?	Level of risk	Corrective action (Risk reduction measure)	Applicability	Remarks
	Adequate final limit switch	5.10.3	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit final limit switch acc to EN 81 1/2, 10.5	<input type="radio"/> Yes <input type="radio"/> No	
11 Clearances between car door and landing door							
	Horizontal distance between : — car door and landing door is less than 120 mm — hinged landing door and folding car door is less than 150 mm	5.11	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	High	Put the installation in acc. with EN 81 1/2, 11.2.3 and 11.2.4.2	<input type="radio"/> Yes <input type="radio"/> No	
12 Lift machine							
	Emergency operation system (rescue of trapped passengers)	5.12.1	<input type="radio"/> Yes <input type="radio"/> No	High	1. Fit emergency operation system acc EN 81-1, 12.5 resp. EN 81-2, 12.9 2. Electrical emergency control (> 400 N) 3. Provide rescue instructions	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Hand pump for hydraulic lifts	5.12.1	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit hand pump to EN 81-2, 12.9	<input type="radio"/> Yes <input type="radio"/> No	
	Double electro-mechanical brake (traction lifts)	5.12.2	<input type="radio"/> Yes <input type="radio"/> No	High	Fit double acting brake as required in EN 81-1, 12.4.2	<input type="radio"/> Yes <input type="radio"/> No	
	Low pressure device (hydraulic lifts)	5.12.3	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit low pressure device acc. to EN 81-2, 12.9.1.5 to prevent manual lowering of the cylinder	<input type="radio"/> Yes <input type="radio"/> No	
	Shut-off valve (hydraulic lifts)	5.12.4	<input type="radio"/> Yes <input type="radio"/> No	Low	Fit shut-off valve according to EN 81-2, 12.5.1	<input type="radio"/> Yes <input type="radio"/> No	
	Slack rope/chain device for indirect hydraulic lifts and positive drive electric lifts	5.12.5	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit slack rope/chain safety device according to EN 81-1, 12.9 or EN 81-2, 12.13	<input type="radio"/> Yes <input type="radio"/> No	
	Run time limiter for electric traction lifts	5.12.6	<input type="radio"/> Yes <input type="radio"/> No	Low	Incorporate run time limiter acc. EN 81-1, 12.10	<input type="radio"/> Yes <input type="radio"/> No	
	Independent starting contactors	5.12.7	<input type="radio"/> Yes <input type="radio"/> No	High	Fit independent starting contactors acc. to EN 81-1, 12.7 or EN 81-2, 12.4	<input type="radio"/> Yes <input type="radio"/> No	
13 Electric installations and appliances							
	Protection against electric shock (IP2X)	5.13.1	<input type="radio"/> Yes <input type="radio"/> No	High	1. Cover or replace electrical equipment 2. Fit FI switch (miniature circuit breakers) 3. Fit markings/ warning signs 4. Fit lockable main switch	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Presence of over temperature protection of electrical equipment	5.13.2	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit over-temperature protection as per EN 81 1/2, 13.3.3 and 13.3.6	<input type="radio"/> Yes <input type="radio"/> No	
	No dangerous malfunction of the lift in the case of power phase reversal	5.13.3	<input type="radio"/> Yes <input type="radio"/> No	Low	Fit phase reversal protection and phase failure protection	<input type="radio"/> Yes <input type="radio"/> No	

"to be continued"

Table B.2 — Safety check-list for existing lifts (concluded)

Nr.	Requirements to be checked	Clause	Requirement fulfilled ?	Level of risk	Corrective action (Risk reduction measure)	Applicability	Remarks
14 Protection against electric faults, controls, priorities							
	Emergency alarm device	5.14.1	<input type="radio"/> Yes <input type="radio"/> No	High	Fit two way communication system. Connect to 24 hours service centre	<input type="radio"/> Yes <input type="radio"/> No	
	Inspection control station and stopping device on car roof	5.14.2	<input type="radio"/> Yes <input type="radio"/> No	High	1. Fit car inspection box acc. to EN 81-1/2, 14.2.1.3 2. Audible / visual indicator to ensure lift is in correct mode	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No	
	Communication system between car and machine room	5.14.3	<input type="radio"/> Yes <input type="radio"/> No	Mid	Fit intercom system or similar device as per EN 81-1/2, 14.2.3.4	<input type="radio"/> Yes <input type="radio"/> No	
15 Notices, markings and operating instructions							
	Information on safe use and maintenance of lift	5.15	<input type="radio"/> Yes <input type="radio"/> No	Mid	Provide correct notices , markings, and operating instructions based on EN 81-1, 15.2.1, 15.3, 15.4, 15.5.1, 15.5.3, 15.7, 15.11 and 15.15 and on EN 81-2, 15.2.1, 15.2.5, 15.3, 15.4, 15.5.1, 15.5.3, 15.7, 15.11, 15.15, 15.17 and 15.18.	<input type="radio"/> Yes <input type="radio"/> No	

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