BS EN 81-80:2019

BSI Standards Publication

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

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National foreword

This British Standard is the UK implementation of EN 81-80:2019. It supersedes BS EN 81-80:2003, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MHE/4, Lifts, hoists and escalators.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Règles de sécurité pour la construction et l'installation des élévateurs - 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 European Standard was approved by CEN on 1 March 2019.

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European foreword

This document (EN 81-80:2019) has been prepared by Technical Committee CEN/TC 10 “Lifts, escalators and moving walks”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2020, and conflicting national standards shall be withdrawn at the latest by August 2021.

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

This document supersedes EN 81-80:2003.

EN 81-80:2019 is a full revision of the standard which reflects developments since the publication of EN 81-80:2003 and experience gained from its application. The main changes can be identified as:

— eleven new hazards have been added which are now covered in EN 81-20 or which have been identified by risk assessment;

— due to these new hazards the numbering has been changed in order to keep a logical order of hazards following the sequence in EN 81-20:—; however for tracking purposes the hazard numbers of EN 81-80:2003 are listed in a separate column;

— the methodology for the identification of hazards, the evaluation of the hazardous situations and the risk levels as well as the classification of priority levels including the filtering process have been moved to Clause 5;

— all technical requirements for protective measures have been incorporated in the checklist in the normative Annex A which combines now the previous chapter 5 and the previous checklist in Annex A; this combination prevents duplication of technical requirements in the standard and allows simplification of its use;

— the checklist also contains a column in which the risk levels and subsequent priority levels for items in compliance with EN 81-1:1998 and EN 81-2:1998 or items upgraded according to EN 81-80:2003 are listed in relation to today’s state-of-the-art according to EN 81-20:—.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

This document was developed to establish a methodology to specify at national level procedures for improving the safety of existing lifts. A word of explanation:

a) Background of this document:

More than 6 million lifts are in use today (2019) in Europe and approximately 50 % were installed more than 20 years ago.

Lifts were installed to the safety level appropriate at time of installation. This level is often lower than today's state-of-the-art for safety.

New technologies, experiences and social expectations have led to today's state-of-the-art for safety. This has led to the situation today with different levels of safety, causing accidents. However, users and authorized persons expect a common minimum level of safety wherever they go.

In addition, there is a growing trend for people to live longer and for disabled people to expect access and design for all. Therefore it is especially important to provide a safe means of vertical transport for elderly and disabled persons.

Lift attendants and in many cases building caretakers are not so common anymore, so it is important that relevant safety features for the rescue of trapped persons should be provided.

Furthermore the life cycle of a lift is longer than most other transportation systems and building equipment, which therefore means that lift design, performance and safety can fall behind modern technologies. If existing lifts are upgraded to today's state-of-the-art for safety, the number of injuries is very likely to decrease (especially in buildings which can be accessed by the general public).

b) The approach behind the creation of this document:

This document:

1) categorizes various hazards and hazardous situations, each of which has been analysed by a risk assessment;

2) is intended to provide corrective actions to progressively and selectively improve, step by step, the safety of all existing passenger and goods passenger lifts towards today's state-of-the-art for safety;

3) 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;

4) lists the high, medium and low risks and corrective actions which can be applied in separate steps in order to mitigate the risks.

Other designs to previous national regulations or standards, providing they have an equivalent safety level, may be acceptable.

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c) Use of this document:

This document can be used as a guideline for:

1) national authorities to determine their own programme of implementation in a step by step process via a filtering process (see Clause 5) in a reasonable and practicable[1)] way based on the level of risk (e.g. high, medium, low) and social and economic considerations;

2) owners to follow their responsibilities according to existing regulations;

3) maintenance companies and/or inspection bodies to inform the owners on the safety level of their installations and to propose risk reduction measures;

4) owners to upgrade their existing lifts on a voluntary basis in accordance with 3) if no regulations exist.

NOTE 1 Owner of the installation: natural or legal person who has the power of disposal of the installation and takes the responsibility for its operation and use.

In making an audit of an existing lift installation Annex A can be used to identify the hazards and corrective actions in this document. However, where a hazardous situation is identified which is not covered in this document a separate risk assessment should be made. This risk assessment should be based on EN ISO 14798.

NOTE 2 The risk profile according to EN ISO 14798 has been slightly modified in order to define different priorities for the upgrading of items on existing lifts depending on the risk levels of the existing means (see 5.3 and 5.4). The probability level D is covering a large range of probabilities between level C and level E. Due to this reason the largest number of risks in existing lifts would fall into level D. Therefore level D has been split into 3 smaller sub-levels C-D, D and D-E. Higher probalilities C-D which may lead to a high number of incidents are close to C and therefore are considered with high priority for severities 1 and 2 and with medium priority for severity 3. Lower probabilities D-E where only very few incidents may be expected being close to E are considered with medium priority for severity 1 in between high for 1 D and low for 1 E and with low priority for severity 2 as for 2 E.

1) "Reasonable and practicable" is defined as follows: "In deciding what is reasonable and practicable the seriousness of a risk to injury should be weighed against the difficulty and cost of removing or reducing that risk. Where the difficulty and cost are high, and a careful assessment shows that the risk is rather low, short or medium term action may not need to be taken. On the other hand where the risk is high, action should be taken at whatever cost."

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1 Scope

This document gives a methodology for improving the safety of existing lifts with the aim of reaching an equivalent level of safety to that of a newly installed lift by the application of today's state-of-the-art for 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 for safety.

This document applies to permanently installed passenger or goods passenger lifts, with traction, positive or hydraulic drive serving defined landing levels, having a car designed for the transportation of persons or persons and goods and moving along guide rails inclined not more than 15° to the vertical.

This document includes the improvement of safety of existing lifts for:

a) passengers;

b) maintenance and inspection personnel;

c) persons outside the well, machinery space(s) and the pulley room(s) (but in their immediate vicinity);

d) any other authorized persons.

This document is not applicable to:

e) lifts with drive systems others than those mentioned above;

f) lifting appliances such as paternosters, mine lifts, theatre 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;

g) installations where the inclination of the guide rails to the vertical exceeds 15°;

h) lifting appliances with a rated speed lower than or equal to 0,15 m/s;

i) safety during transport, installation, repairs and dismantling of lifts.

However, this document can usefully be taken as a reference basis.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 81-20:—,[2] *Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Part 20: Passenger and goods passenger lifts*

EN 81-21:2018, *Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Part 21: New passenger and goods passenger lifts in existing building*

[2] Under preparation. Stage at time of publication: prEN 81-20:2018.

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EN 81-28, *Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Part 28: Remote alarm on passenger and goods passenger lifts*

EN 81-58, *Safety rules for the construction and installation of lifts — Examination and tests - Part 58: Landing doors fire resistance test*

EN 81-72, *Safety rules for the construction and installation of lifts — Particular applications for passenger and goods passenger lifts — Part 72: Firefighters lifts*

EN 81-73, *Safety rules for the construction and installation of lifts — Particular applications for passenger and goods passenger lifts — Part 73: Behaviour of lifts in the event of fire*

EN 81-77, *Safety rules for the construction and installations of lifts — Particular applications for passenger and goods passenger lifts — Part 77: Lifts subject to seismic conditions*

EN 81-82, *Safety rules for the construction and installation of lifts — Existing lifts — Part 82: Rules for the improvement of the accessibility of existing lifts for persons including persons with disability*

CEN/TS 81-83, *Safety rules for the construction and installation of lifts — Existing lifts — Part 83: Rules for the improvement of the resistance against vandalism*

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

3 Terms and definitions

For the purposes of this document, the following term and definition apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
existing lift
lift which is in service

4 List of significant hazards

4.1 Significant hazards dealt with by this document

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

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Table 1 — List of significant hazards

No.	Hazard/Hazardous situation	No. in EN 81-80:2003
1	**General**	
1.1	No or limited accessibility for disabled persons	2
1.2	No or inadequate vandal resistance	4
1.3	Inadequate firefighters lift	Not covered
1.4	No or inadequate behaviour of the lift in the event of fire	5
1.5	No or inadequate earthquake resistance	Not covered
1.6	Presence of harmful materials	1
2	**Well**	
2.1	Inadequate locking devices on access, emergency and inspection doors to well and pit	8
2.2	No stopping of car when access, emergency and inspection doors to well or pit are opened	8
2.3	Well enclosures with perforate walls	6
2.4	Well enclosures with perforate walls near door locks	33
2.5	Partially enclosed well with too low enclosure	7
2.6	Inadequate vertical surface below landing door sills	9
2.7	Counterweight/balancing weight without safety gear in case of accessible spaces below well	10
2.8	No or inadequate screen of counterweight/balancing weight in the pit	11
2.9	No or inadequate partition in the pit for lifts in a common well	12
2.10	No or inadequate partition between moving parts of lifts in a common well	13
2.11	Insufficient refuge spaces and clearances in headroom	14
2.12	Insufficient refuge spaces and clearances in pit	14
2.13	No or inadequate means to enter the pit	15
2.14	No or inadequate lighting of the well	17
2.15	No or inadequate stopping device in the pit	16
2.16	No alarm initiation devices in pit and on car roof	18
2.17	Excessive horizontal distance between the inner surface of the well and the sill, door frame of the car or closing edge of car sliding doors	58
2.18	Excessive horizontal distance between car door and landing door	59

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No.	Hazard/Hazardous situation	No. in EN 81-80:2003
2.19	Too large distance between leading edges of car and landing doors	Not covered
3	**Machinery spaces and pulley rooms**	
3.1	No or unsafe means of access to machinery spaces and pulley rooms	19
3.2	Inadequate lighting in machinery spaces and pulley rooms	23
3.3	No or inadequate stopping device(s) in the pulley room	16
3.4	Inadequate suspension points for handling of equipment in machinery spaces and top of the well	24
3.5	Slippery floor in machinery spaces or pulley rooms	20
3.6	Insufficient horizontal or vertical clearances in machinery spaces	21
3.7	No or inadequate protection on different levels and recesses in the machine room	22
3.8	No or inadequate intercom system between car and the location of the emergency operation	72
4	**Landing doors and car doors**	
4.1	Perforate landing doors	25
4.2	Perforate car doors	25
4.3	Inadequate strength of landing doors	26
4.4	Inadequate strength of car doors	Not covered
4.5	Inadequate glass in landing doors other than vision panels	27
4.6	Inadequate glass in car doors other than vision panels	27
4.7	Inadequate glass vision panels in landing doors	27
4.8	Inadequate glass vision panels in car doors	27
4.9	No or inadequate protective device (e.g. light curtain) for re-opening of power operated car and landing sliding doors	30
4.10	No or inadequate protective device (150 N) for re-opening of power operated sliding doors	30
4.11	No or inadequate protective device (150 N) for re-opening of power operated doors other than sliding doors	Not covered
4.12	No or inadequate means against dragging of children hands in horizontally sliding car doors or landing doors with glass	28
4.13	No or inadequate lighting on landings	29
4.14	No safe locking device on landing door	31

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No.	Hazard/Hazardous situation	No. in EN 81-80:2003
4.15	No special device (e.g. triangular key) for emergency unlocking of landing door	32
4.16	No or inadequate self-closing and locking of the landing door after opening for whatever reason when the car is outside the unlocking zone	34
4.17	Inadequate link between multiple panels of landing doors (missing interlink or missing locking)	35
4.18	Inadequate fire resistance of landing doors	36
4.19	Car door moving with open (hinged) landing door	37
4.20	Car without door(s)	40
4.21	No car door restrictor where the landing door locking device is accessible when the car door is opened outside of the door zone	Not covered
5	**Car, counterweight and balancing weight**	
5.1	Large car area in relation to rated load	38
5.2	No car apron or inadequate length of car apron	39
5.3	Unsafe locking of emergency trap door on the car	41
5.4	Insufficient strength of car roof and emergency trap door	42
5.5	No or inadequate protection against falling from car roof	43
5.6	Insufficient ventilation in car	44
5.7	Inadequate lighting in car	45
5.8	No or inadequate emergency lighting in car	46
5.9	No emergency lighting on the car roof	Not covered
5.10	No or inadequate load control	73
5.11	No or inadequate remote alarm system	71
6	**Suspension means, compensation means, precautions against free fall, excessive overspeed, unintended car movement and creeping of the car**	
6.1	No or inadequate protection against injury from traction sheaves, pulleys or sprockets	47
6.2	No or inadequate protection against rope/chains leaving the sheaves, pulleys or sprockets	48
6.3	No or inadequate protection against the introduction of objects between ropes/chains and sheaves, pulleys or sprockets	49
6.4	No or inadequate protection against free fall or descent with excessive speed	50 54

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No.	Hazard/Hazardous situation	No. in EN 81-80:2003
6.5	No or inadequate protection means against ascending car overspeed on traction drive lifts with counterweight	52
6.6	No or inadequate protection means against unintended car movement with open doors	53
6.7	No or inadequate protection against creeping on hydraulic lifts	54
6.8	No or inadequate slack rope switch for governor rope	51
6.9	No or inadequate slack rope/chain detection device	63
7	**Guide rails, buffers and final limit switches**	
7.1	Inadequate guidance system for counterweight or balancing weight	55
7.2	No or inadequate buffers	56
7.3	No or inadequate final limit switches	57
8	**Lift machine**	
8.1	Inadequate machine brake (only one brake set)	Not covered
8.2	No or inadequate emergency operation system	60
8.3	No or inadequate means for stopping the machine and checking its stopped position	62
8.4	No motor run-time limiter	64
8.5	No shut-off valve (hydraulic lifts)	61
8.6	No or inadequate low cylinder pressure device on hydraulic lifts	65
9	**Electric installations and appliances**	
9.1	Insufficient protection against electric shock (direct contact)	66
9.2	Insufficient marking of connection terminals which remain live after switching off the main switch	66
9.3	No or inadequate protection against overheating of lift machine motor	67
9.4	No lockable main switch	68
9.5	No or inadequate stopping device at the machine in the machinery space	Not covered
10	**Protection against electric faults, controls, priorities**	
10.1	No earth fault protection in circuits with electric safety devices or in circuits controlling the brake or the down valve	Not covered
10.2	No protection against phase reversal	69
10.3	Inadequate levelling and/or stopping accuracy	3

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No.	Hazard/Hazardous situation	No. in EN 81-80:2003
10.4	No or inadequate inspection control station and stopping device on the car roof	70
10.5	No or inadequate inspection control station in the pit	Not covered
11	**Notices, markings and operating instructions**	
11.1	Missing notices, markings and operating instructions	74

4.2 Significant hazards not dealt with by this document

— Fire in well, machinery spaces and pulley rooms;

— environmental conditions including e.g. flooding;

— electromagnetic compatibility;

— cutting due to sharp edges.

5 Methodology for improving the safety of existing lifts

5.1 General

All technical solutions for upgrading existing lifts shall be aligned as much as possible to the state-of-the-art solutions applicable for new lifts. The requirements and/or protective measures documented in today's state-of-the-art standards for new lifts shall not be considered as the only possible solution. Alternatives are permitted, provided they lead to an equivalent safety level. Although immediate upgrading of all existing lifts to the state-of-the-art would be preferable from the safety point of view, this may not be possible in a short period of time mainly due to economic reasons.

This document does not provide legally binding requirements for measures to be carried out or for the period of time for such measures. Such obligations for existing lifts are subject to national legislation. The procedures described in this clause are intended to assist in setting up national regulations and/or providing a systematic approach to the lift owners for increasing the safety of existing lifts by showing:

— how to identify hazards;

— how to evaluate the existing hazardous situations; and

— how to classify priority levels which apply to the relevant hazards and risk reduction measures.

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

For specific safety requirements such as accessibility (see EN 81-82), requirements against vandalism (see CEN/TS 81-83), firefighters lifts, behaviour of lifts in the event of fire, seismic requirements and the treatment of harmful materials, this standard does not provide detailed rules for these applications. In these cases the conditions in the building shall be checked to see what is relevant and practical to be applied for lifts.

Before upgrading a lift by one or several of the appropriate measures, the consequences to other parts of the lift shall be considered. This may lead to further modifications to align the interfaces and to prevent lowering the safety in other areas of the lift.

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