BS 5655 : Part 1 : 1986
EN 81 : Part 1 : 1985
UDC 621.876.11 – 83 : 62 – 78 : 614.8
Reprinted, incorporating Amendment No. 1

Lifts and service lifts

Part 1. Safety rules for the construction and installation of electric lifts

[EN title: Safety rules for the construction and installation of lifts and service lifts – Part 1: Electric lifts]

Ascenseurs et monte-charge
Partie 1. Règles de sécurité pour la construction et l'installation des ascenseurs électriques

Personen- und Lastenaufzüge sowie Kleingüteraufzüge
Teil 1. Sicherheitsregeln für die Konstruktion und den Einbau von elektrisch betriebenen Aufzügen

BSi
British Standards

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*EN 81-1 contains its own contents list on page 6 of the standard. See also the 'explanatory note on the arrangement of EN 81-1', which appears at the end of the national foreword.

National foreword

This Part of BS 5655 has been prepared under the direction of the Mechanical Handling Standards Committee and is identical with European Standard EN 81-1 : 1985 which reflects annex 1 of EEC Directive 84/529/EEC dated 17 September 1984.

This revision of BS 5655 : Part 1 becomes effective from 26 September 1986 and applies to all new lift installations tendered after that date. The 1979 edition of this standard will be superseded on that date by this revision but it will not be withdrawn until administrative amendments to the technical annex of the EEC Directive have been made.

NOTE. BSI Sales Department will respond to orders for BS 5655 : Part 1 by supplying this 1986 edition. Copies of the 1979 edition may be obtained by quoting the number 'BS 5655/1/79'.

It is the first Part of a British Standard relating to lifts and service lifts, which will be progressively published to supersede portions of relevant Parts of BS 2655, the relevant obsolescent requirements being retained for reference purposes and to enable existing lift installations to be maintained. The standard comprises the following Parts.

Part 1 Safety rules for the construction and installation of electric lifts (implementing EN 81-1), together with PD 6500 'Explanatory supplement to BS 5655 : Part 1'

Part 2 Specification for hydraulic lifts

Part 3*

Part 4*

Part 5 Specification for dimensions of standard electric lift arrangements (implementing ISO 4190/1 and ISO 4190/3)

Part 6 Code of practice for selection and installation

Part 7 Specification for manual control devices, indicators and additional fittings (implementing ISO 4190/5)

Part 8 Specification for eyebolts for lift suspension

Part 9 Specification for guide rails (implementing ISO 7465)

Part 10 Specification for testing and inspection of electric and hydraulic lifts

Part 11† Specification for modernization or reconstruction.

Further Parts are anticipated.

Subclause **0.1.4** of the general introduction to EN 81 (see the explanatory note at the end of this national foreword) permits each country to append to the European Standard certain amendments that are necessary to comply with current national legislation or codes of practice; the United Kingdom national variations for Part 1 of EN 81 are given in national appendix V.

Guidance (including UK views on the requirements specified in EN 81-1, clause **12.4.2.1**, paragraph 3) for purchasers and manufacturers of electric lifts regarding the adoption of EEC Council Directives 84/528/EEC and 84/529/EEC in the United Kingdom will be given in a Health and Safety Executive publication. It should be particularly noted that the Directive includes certification requirements for design and component type approval and inspection in support of the test procedures given in appendix F of EN 81-1. There are also in the Directives special requirements relating to clauses **12.4.2.1, 13.1.1.4, 13.1.2** and **F.0.1.6** in the standard.

EXPLANATORY NOTE ON THE ARRANGEMENT OF EN 81-1. EN 81-1 contains the 'General introduction' and the 'Scope and field of application' for EN 81 as a whole; these are followed by a contents list for Part 1 and then the text of Part 1 (beginning with the 'Introduction' to Part 1 and followed by the 'Scope and field of application' for Part 1).

Compliance with a British Standard does not of itself confer immunity from legal obligations.

*Reserved for future publications.
†In preparation.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 81
Part 1
December 1985

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Amendment 2-1984

Key words: lifts, goods lifts, definitions, building codes, installing, safety requirements, lift cars, landing doors, elevator shafts, compensating ropes, shock absorbers, machine rooms, electrical installations, safety devices, stopping devices, locking devices, name plate, instructions, maintenance, conformity tests, certification.

English version

Safety rules for the construction and installation of lifts and service lifts Part 1. Electric lifts

Règles de sécurité pour la construction et l'installation des ascenseurs et monte-charge
Partie 1. Ascenseurs électriques

Sicherheitsregeln für die Konstruktion und den Einbau von Personen- und Lastenaufzügen, sowie Kleingüteraufzügen
Teil 1. Elektrisch betriebene Aufzüge

This European Standard was accepted by CEN on 1985-06-26. The CEN members are bound to adhere to the CEN Internal Regulations which specify under which conditions this European Standard has to be given, without any alteration, the status of a national standard.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Central Secretariat or to any CEN member.

This European Standard is established by CEN in three official versions (English, French, German). A translation made by another member under its own responsibility, in its own language, and notified to CEN has the same status.

CEN members are the national standards organizations of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue Bréderode, 2, B-1000 Brussels

Ref. No. EN 81-1 : 1985 E

Brief history

This European Standard was drawn up by the Technical Committee CEN/TC 10 'Passenger, goods and service lifts', the secretariat of which is held by AFNOR.

This European Standard was adopted by CEN on the strength of its acceptance by the following member countries:

Belgium, Denmark, France, Germany, Italy, Netherlands, Portugal, Spain, United Kingdom.

Amendment 2 of this standard incorporates:

(a) certain technical changes in EN 81 : Part 1 : 1977 decided by the Council of EEC (see appendix 1 of Directive 84/529/EEC of 17 September 1984);

(b) updating of references to other standards (ISO etc.);

(c) certain interpretations and comments which clarify the text, but do not affect the technical content of the standard;

(d) improvement in the alignment of the three official CEN texts (French, English and German).

Amendment 2 was accepted by CEN as a result of the positive vote of the following member countries:

Denmark, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, United Kingdom.

Contents

0. General introduction

The object of this standard is to define safety rules related to passenger, goods and service lifts with a view to safeguarding persons and objects against the risk of accidents associated with the operation of lifts and service lifts.[1)]

0.1 In drawing up this standard the following methods have been adopted.

0.1.1 An analysis of the risks has been carried out for each component that may be incorporated in a complete lift or service lift installation.

Rules have been drawn up accordingly.

0.1.2 This standard, specially associated with lifts and service lifts, does not repeat all the general technical rules applicable to every electrical, mechanical or building construction. It is of course assumed that all components shall:

0.1.2.1 be correctly designed, be of sound mechanical and electrical construction, be made of materials with adequate strength and of suitable quality and be free of defects;

0.1.2.2 be kept in good repair and working order. It will in particular be ensured that the dimensional requirements remain fulfilled despite wear.

0.1.3 This special standard for lifts and service lifts does not give rules relating to the protection against fire of building elements. However, as these rules have a direct influence on the choice of landing doors and on the specification and design of electrical control systems, it is necessary to refer to them.

0.1.3.1 The choice of the landing doors which depends on the required behaviour in fire, is dealt with in **7.2.2.** The most common structural arrangements have been shown with the corresponding types of door designated by F and S.

However, if statutory requirements lay down for certain arrangements type F instead of type S, the National Committees may make the necessary amendment.

0.1.3.2 The electrical control systems recommended for each example of structural arrangement given are described in appendix G.

0.1.4 This special standard for lifts and service lifts cannot ignore certain specifications which do not belong intrinsically to the field of these appliances or which are not the cause of barriers to trade, but which have an effect on the safety of users or servicing personnel and the upkeep of the installation.

In certain countries these specifications come within the legislative field or accepted Codes of Practice. The National Committees may, therefore, make one or more of the following amendments to the specifications of the standard which refer to this clause:

(a) delete the marked text;
(b) provide additional clauses (for example, definitions, clauses concerned, frequency of inspections . . .);
(c) replace the value indicated by a value providing greater safety.

NOTE 1. Reference to this clause appears in the body of the standard in the form (N.a, b or c). The clauses concerned are indicated in the margin by the sign Ⓝ.

NOTE 2. These amendments shall form the subject, in each country, of a national appendix.

0.2 It has, however, seemed necessary to establish certain requirements of good construction, either because they are peculiar to lift manufacture or because in the case of lift utilization the requirements may be more stringent than elsewhere.

0.3 As far as possible the standard sets out only the requirements that materials and equipment have to meet in the interests of lift safety.

0.4 When mention is made of a design for the sake of clarity, this should not be considered to be the only possible design; any other solution leading to the same result can be applied if it is equivalent in operation and at least equally safe.

0.5 A study has been made of the various accidents possible with lifts in the following areas.

0.5.1 Types of possible accidents

(a) shearing;
(b) crushing;
(c) falling;
(d) impact;
(e) trapping;
(f) fire;
(g) electric shock;
(h) damage to material;
(i) due to wear;
(j) due to corrosion.

0.5.2 Persons to be safeguarded

(a) users;
(b) servicing and inspection personnel;
(c) persons outside the lift well, the machine room and pulley room (if any).

0.5.3 Objects to be safeguarded

(a) loads in car;
(b) components of the lift or service lift installation;
(c) the building in which the lift or service lift is installed.

0.6 In the standard it has been taken into account,

0.6.1 that the users have to be safeguarded against their own negligence and unwitting carelessness;

0.6.2 that there are other categories of users for whom certain rules may be less severe (N.a). In the remainder of the text these users are referred to as 'authorized and instructed users'.

In the absence of another definition (N.b), it is permissible Ⓝ for the use of a lift to be reserved for authorized and instructed users if the instructions given them concerning its use are issued by the person responsible for the lift and if one of the following two conditions are satisfied:

(a) operation of the lift is only possible when a key held by authorized and instructed users only is placed in a lock situated inside or outside the car;

(b) the lift is situated on premises to which access by the public is prohibited and which, when not locked, is permanently supervised by one or more agents of the person responsible for the lift.

0.6.3 that there are service lifts, the car of which is, by definition, not accessible to persons, for which certain rules may be less severe or even waived.

1) An interpretation committee has been established to make clear, if necessary, the spirit in which the experts have drafted the various clauses of this standard.

0.7 The standard has been drawn up, taking into account in certain cases the imprudent act of a user, but it is necessary to limit this and the possibility of two simultaneous acts of this nature or the abuse of instructions for use has not been considered.

0.8 This standard deals, in the appendices, with the way in which tests must be made on certain components, as well as on the completed lift installation, when such tests are required.

0.8.1 Referring to the lift itself, the appendices mentioned below indicate the maximum which can be required.

0.8.1.1 Appendix C. Technical dossier to be provided when a preliminary authorization is required.

0.8.1.2 Appendix D. Examinations and tests before putting a lift into service.

0.8.1.3 Appendix E. The periodical examination and tests, also the examinations and tests after an important modification or after an accident. The frequency of the periodical examination and test may be specified in the national regulations.

0.8.2 Appendix F. Type examinations on certain components of the lift permit limited and simplified testing after installation of a lift and make possible batch production of these components.

1. General scope and field of application

This standard deals with permanently installed new lifts serving defined landing levels, having a car designed for the transportation of persons and/or goods, suspended by rope(s) or chain(s) or supported by one or more rams and moving at least partially between vertical guides or guides slightly inclined to the vertical. (For appliances where the inclination of the guides to the vertical exceeds 15°, this standard may usefully be taken as a basis (N.a, b).)

It does not cover the lifts which come under the following headings: paternosters, rack and pinion elevators, screw-driven elevators, 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. However, this standard may usefully be taken as a basis.

This standard need not be applied (N.a) in the following cases:

(a) a lift installed in a private residence or as a means of access to a private residence in a building, such that the lift is inaccessible to the other occupants of the building and to the general public, and if there are specific national rules concerning this type of lift;

(b) the installation of lifts serving only two levels, specialized for transporting the handicapped and where the travel does not exceed 4 m, the speed does not exceed 0.1 m/s, and the movement of the car requires continuous pressure on a button.

Certain clauses need not be applied (N.b) to the extent that space does not permit, in the following cases:

(a) lifts installed in buildings in existence at the time this standard is brought into application;

(b) important modifications (appendix E) to a lift installed before this standard is brought into application.

This standard is divided into four Parts.

Part 1 deals with electric lifts.

Part 2 deals with hydraulic lifts (in preparation).

Part 3 deals with electric service lifts (in preparation).

Part 4 deals with hydraulic service lifts (in preparation).

Part 1. Electric lifts

Contents

Part 1. Electric lifts

0. Introduction

See general introduction (page 4).

1. Scope and field of application

Part 1 of this standard deals with the lifts defined in clause **3**, driven electrically, where the car is suspended by ropes or chains.

In particular, lifts serving exclusively for the transportation of goods, but having a car dimensioned and constructed to allow access by persons, shall be entered in the category 'lifts' and not in the category 'service lifts'. (See clause **3**, 'Definitions'.)

2. References

ISO 834-1975	Fire resistance tests — Elements of building construction
ISO 2532-1974	Steel wire ropes — Vocabulary
IEC Publication	Clearances and creepage distances for low-voltage contactors (in preparation within SC 28A of the IEC, at present Appendix B of IEC Publication 158/1)
CENELEC Harmonization Documents	
HD 21 S2 - 1981	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V
HD 22 S2 - 1981	Rubber insulated cables of rated voltages up to and including 450/750 V
HD 214 S2 - 1980	Recommended method for determining the comparative tracking index of solid insulating materials under moist conditions
HD 359 - 1976	Flat polyvinylchloride sheathed flexible cables
HD 360 - 1976	Rubber-insulated lift cables for normal use
HD 384-4-41 - 1980	Electrical installations of buildings Part 4: Protection for safety Chapter 41: Protection against electric shock
HD 419 - 1982	Low-voltage switchgear and control-gear contactors
HD 420 - 1982	Control switches (low-voltage switching devices for control and auxiliary circuits, including contactor relays)
HD	Classification of external influences (in preparation, at present Clause 32 of IEC Publication 364-3 - 1977)

3. Definitions

The following definitions are intended to indicate precisely the technical sense in which the terms are used in the present standard.

For convenience of reference they are grouped in alphabetical order rather than according to the types of equipment to which they apply. This is in order to avoid needless repetition.

authorized and instructed user (usager autorisé et averti) (befugter und eingewiesener Benutzer). Person authorized by the person responsible for the installation to use the lift and who has been instructed in its use.

available car area (surface utile de la cabine) (Nutzfläche des Fahrkorbes). Area of the car measured at a height of 1.0 m above floor level, disregarding handrails, which is available for passengers or goods during operation of the lift.

In the case of a car without doors, a strip 0.1 m deep in front of each car sill is omitted from the calculation of the available area.

buffer (amortisseur) (Puffer). A resilient stop at the end of travel, and comprising a means of braking using fluids or springs (or other similar means).

goods passenger lift (ascenseur de charge)[1] (Lastenaufzug). A lift mainly intended for the transport of goods, which are generally accompanied by persons.

guides (guides) (Führungsschienen). The components which provide guiding for the car sling or the counterweight, if there is one.

instantaneous safety gear (parachute à prise instantanée) (Sperrfangvorrichtung). A safety gear in which the full gripping action on the guides is almost immediate.

instantaneous safety gear with buffered effect (parachute à prise instantanée avec effet amorti) (Sperrfangvorrichtung mit Dämpfung). A safety gear in which the full gripping action on the guides is almost immediate, but the reaction on the car or counterweight is limited by presence of an intermediate buffering system.

levelling (nivelage) (Einfahren). An operation which improves the accuracy of stopping at landings.

lift (ascenseur) (Aufzug). A permanent lifting equipment serving defined landing levels, comprising a car, *whose dimensions and means of construction clearly permit the access of persons*; running at least partially between rigid vertical guides or guides whose inclination to the vertical is less than 15 °.

lift car (cabine) (Fahrkorb). A part of the lift which carries the passengers and/or other loads.

lift machine (machine) (Triebwerk). The unit including the motor which drives and stops the lift.

machine room (local des machines) (Triebwerksraum). A room in which machine or machines and/or the associated equipment are placed.

minimum breaking load of a lifting rope (charge de rupture minimale d'un câble) (Mindestbruchkraft eines Seiles). This load is the product of the square of the nominal diameter of the rope (in square millimetres) and the nominal tensile strength of the wires (in newtons per square millimetre) and a coefficient appropriate to the type of rope construction. (ISO 2532).

The effective breaking load obtained in a rupture test on a sample of rope following a defined method, shall be at least equal to the minimum breaking load.

non-commercial vehicle lift (monte-voitures) (Aufzug zur Beförderung von Kraftfahrzeugen). A lift whose car is suitably dimensioned for carrying private motor cars.

overspeed governor (limiteur de vitesse) (Geschwindigkeitsbegrenzer). A device which, when the lift attains a predetermined speed, causes the lift to stop, and if necessary causes the safety gear to be applied.

[1] The French expression 'ascenseur de charge' has been introduced into the French language document with the aim of harmonizing the texts in the three languages of CEN and of simplifying the wording. It does not in any way define a particular or supplementary category of lift.