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Lifts, escalators and moving walks

Part 8.1: Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Electric lifts with inclined path (EN 81-22:2014, MOD)

This national standard is the adoption of EN 81-22:2014 with national modifications as set out in the Appendix ZZ to take account of Australian conditions with the permission of the European Committee for Standardization — CEN, Rue de la Science 23, B — 1040 Brussels, Belgium.

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Association of Consultants in Access Australia
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Australian Building Codes Board
Australian Chamber of Commerce and Industry
Australian Elevator Association
Australian Industry Group
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Lift Engineering Society of Australia
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Preface

This Standard was prepared by the Standards Australia Committee ME-004, Lift Installations.

The objective of this document is to specify the safety rules for the construction and installation of permanently installed new electric lifts, with traction or positive drive, serving defined landings levels, having a vehicle designed to convey passengers or passengers and loads, suspended by ropes or chains and travelling in a vertical plan along guide rails that are inclined at an angle of between 15° and 75° in relation to the horizontal.

Vibrations are dealt with for electric parts only. Direct effects on human bodies are not considered as harmful.

This document does not cover—

(a) lifts with drives other than those stated in Clause 1.1;

(b) installation of electric lifts in existing buildings to the extent that space does not permit;

(c) important modifications (see Annex E) to a lift installed before this document is brought into application;

(d) 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;

(e) safety during transport, installation, repairs, and dismantling of lifts;

(f) lifts with rated speed ≤ 0,15 m/s; and

(g) noise in lifts.

This document does not specify the additional requirements necessary for the use of lifts in case of fire.

Considering the state of art, the scope of this document is limited as follows:

(i) inclination: a variation in inclination is permitted for the travel path;

(ii) travel path: confined within the vertical plane;

(iii) maximum capacity of the car: 7 500 kg (100 passengers); and

(iv) maximum rated speed (v): 4 m/s.

Both characteristics (capacity and speed) are linked by the relation given in Figure 1.

This document applies to all the constituent components of the lift including—

(A) running tracks;

(B) guides;

(C) safety gear operating device; and

(D) counter-rails.

This document excludes—

(1) supporting structures;

(2) civil engineering structures; and

(3) anchorages that are dealt with by other regulations.

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This document is not applicable for inclined lifts which are manufactured before 2014.

This document is an adoption with national modifications, and has been reproduced from, EN 81-22:2014, *Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Part 22: Electric lifts with inclined path*.

The modifications are additional requirements and are set out in Appendix ZZ, which has been added at the end of the source text.

Appendix ZZ lists the variations to EN 81-22:2014 for the application of this document in Australia.

As this document has been reproduced from an International Standard, the following applies:

(aa) In the source text "this European Standard" should read "this document".

(bb) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an "informative" appendix or annex is only for information and guidance.

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Foreword

This document (EN 81-22:2014) 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 November 2014, and conflicting national standards shall be withdrawn at the latest by November 2014.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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

This document is part of the EN 81 series of standards, *Safety rules for the construction and installation of lifts.*

This is the first edition of this European Standard.

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

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0 Introduction

0.1 General

This document is a type C standard as stated in EN ISO 12100.

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

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

The purpose of this standard is to define safety requirements for inclined lifts in order to safeguard persons and objects against risks of accidents during installation, operation, maintenance, inspection work and emergency operations of lifts.

0.2 Considerations

Consideration has been taken into account of various categories of lifts with inclined travel path to ascertain the related hazards and risks owing to the configuration of structures (civil engineering works), inclination and outside influences such as the following:

a) the large opening to the exterior;

b) the possibility to walk around inside the lift well;

c) the arrangement of the doors;

d) the horizontal component of deceleration in the event of stopping of the vehicle.

The prescriptions relating to the protection of workers and to the evacuation from the car are different when it is possible to walk inside the well and when the car roof is used as working station for the maintenance.

An Interpretation Committee has been established to clarify, if necessary, the spirit in which the clauses of the standard have been drafted and to specify the requirements appropriate to particular cases. Interpretation Requests can be sent to the National Standard Bodies which will contact the responsible Technical Committee CEN/TC 10 (see CEN/TR 81-10 [1] for information).

0.3 Principles

In drawing up this standard the following have been used.

This standard does not repeat all the general technical rules applicable to every electrical, mechanical, or building construction including the protection of building elements against fire.

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.

This standard does not only address the essential safety requirements of the Lift Directive, but additionally states minimum rules for the installation of lifts into buildings/constructions. There may be in some countries regulations for the construction of buildings, etc. which cannot be ignored.

Typical clauses affected by this are those defining minimum values for the height of the machine and pulley rooms and for their access doors dimensions.

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When the weight, size and/or shape of components prevent them from being moved by hand, they are:

a) either fitted with attachments for lifting gear, or

b) designed so that they can be fitted with such attachments (e.g. by means of threaded holes), or

c) shaped in such a way that standard lifting gear can easily be attached.

As far as possible the standard sets out only the requirements that materials and equipment will meet in the interests of safe operation of lifts.

0.4 Assumptions

The contents of this standard are based on the assumption that persons using inclined lifts are able to do so unaided.

It is assumed that negotiations have been made for each contract between the customer and the supplier/installer (see also Annex O) about:

a) intended use of the inclined lift;

b) environmental conditions;

c) civil engineering problems;

d) other aspects relating to the place of installation (e.g. high-voltage electric line, bridges, dangerous buildings, natural obstacle).

Possible risks have been considered of each component that may be incorporated in a complete lift installation. Rules have been drawn up accordingly.

Components are:

— designed in accordance with usual engineering practice and calculation codes, taking into account all failure modes;

— of sound mechanical and electrical construction;

— made of materials with adequate strength and of suitable quality;

— be free of defects.

Harmful materials, such as asbestos are not used.

Components are kept in good repair and working order, so that the required dimensions remain fulfilled despite wear.

Components will be selected and installed so that foreseeable environmental influences and special working conditions do not affect the safe operation of the lift.

Especially for the extreme temperatures which were agreed between the customer and the supplier, the choice of materials and components will be made with particular attention that they keep their characteristics for impact strength for the steel, rigidity and function for plastics, functional for the electronic components, viscosity for oils, etc.

By design of the load bearing elements, a safe operation of the lift is ensured for loads ranging up to 125 % (static) and up to 110 % (dynamic) of the rated load.

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The requirements of this European Standard regarding electrical safety devices are such that the possibility of a failure of an electric safety device (see 5.11.1.2) complying with all the requirements of this European Standard need not be taken into consideration."

Users should be safeguarded against their own negligence and unwitting carelessness when using the lift in the intended way.

A user may, in certain cases, make one imprudent act. The possibility of two simultaneous acts of imprudence and/or the abuse of instructions for use is not considered.

If in the course of maintenance work a safety device, normally not accessible to the users, is deliberately neutralized, safe operation of the lift is no longer ensured, but compensatory measures will be taken to ensure users safety in conformity with maintenance instructions.

It is assumed that maintenance personnel is instructed and works according to the instructions.

Horizontal forces and/or energies to consider are indicated in the applicable clauses of the standard. Typically:

— the static force that a person normally exerts is of the magnitude of 300 N;

— the energies resulting from impact depend on the lift component where the impact can occur; if not otherwise specified the resulting force is assumed to be 1 000 N.

With the exception of the items listed below, a mechanical device built according to good practice and the requirements of the standard will not deteriorate to a point of creating hazard without the possibility of detection.

The following mechanical failures are considered:

— breakage of the suspension;

— uncontrolled slipping of the ropes on the traction sheave;

— breakage and slackening of all linkage by auxiliary ropes, chains and belts;

— failure of one of the mechanical components of the electromechanical brake which take part in the application of the braking action on the drum or disk;

— failure of a component associated with the main drive elements and the traction sheave;

— ropes leaving the pulleys and, in case of change of inclination, leaving the rollers;

— blockage of the rope movement;

— blockage or derailment of the vehicle.

The possibility of the safety gear not setting, should the vehicle free fall from the lowest landing, before the vehicle strikes the buffer(s) is considered acceptable.

When the speed of the vehicle is linked to the electrical frequency of the mains up to the moment of application of the mechanical brake, the speed is assumed not to exceed 115 % of the rated speed or a corresponding fractional speed.

Means of access are provided for the hoisting of heavy equipment.

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

Access ways to the working areas are adequately lit.

Minimum passageways required by building regulations are not obstructed by the open door/trap of the lift and/or any protection means for working areas outside of the well, where fitted according to the maintenance instructions (see above Principles).

Where more than one person is working at the same time on a lift, an adequate means of communication between these persons is ensured.

The fixing system of guards, which will be removed during maintenance and inspection, remains attached to the guard or to the equipment when the guard is removed.

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1 Scope

1.1 This European Standard specifies the safety rules for the construction and installation of permanently installed new electric lifts, with traction or positive drive, serving defined landings levels, having a vehicle designed to convey passengers or passengers and loads, suspended by ropes or chains and travelling in a vertical plan along guide rails that are inclined at an angle of between 15° and 75° in relation to the horizontal.

1.2 In addition to the requirements of this standard, supplementary requirements should be considered in special cases (potentially explosive atmosphere, extreme climate conditions, seismic conditions, transporting dangerous goods, etc.).

1.3 This European Standard does not cover:

a) lifts with drives other than those stated in 1.1;

b) installation of electric lifts in existing buildings to the extent that space does not permit;

c) important modifications (see Annex E) to a lift installed before this standard is brought into application;

d) 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;

e) safety during transport, installation, repairs, and dismantling of lifts;

f) lifts with rated speed ≤ 0,15 m/s.

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

Noise is not dealt with in this standard because it is not relevant to the safe use of the lift.

Vibrations are dealt with for electric parts only. Direct effects on human bodies are not considered as harmful.

1.4 This European Standard does not specify the additional requirements necessary for the use of lifts in case of fire.

1.5 Taking into account the state of art, the scope of the present standard is limited as follows:

— inclination: a variation in inclination is permitted for the travel path;

— travel path: confined within the vertical plane;

— maximum capacity of the car: 7 500 kg (100 passengers);

— maximum rated speed (v): 4 m/s.

Both characteristics (capacity and speed) are linked by the relation given in the following Figure 1.

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