SLOVENSKI STANDARD
oSIST prEN 81-71:2020

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Varnostna pravila za konstruiranje in vgradnjo dvigal (liftov) - Posebne izvedbe osebnih in osebno-tovornih dvigal - 71. del: Dvigala, odporna proti vandalizmu

Safety rules for the construction and installation of lifts - Particular applications to passenger lifts and goods passenger lifts - Part 71: Vandal resistant lifts

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Besondere Anwendungen für Personen- und Lastenaufzüge - Teil 71: Schutzmaßnahmen gegen mutwillige Zerstörung

Règles de sécurité pour la construction et l'installation des élévateurs - Applications particulières pour les ascenseurs et ascenseurs de charge - Partie 71 : Ascenseurs résistants aux actes de vandalisme

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EUROPEAN STANDARD

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English Version

Safety rules for the construction and installation of lifts - Particular applications to passenger lifts and goods passenger lifts - Part 71: Vandal resistant lifts

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

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword

This document (prEN 81-71:2020) has been prepared by Technical Committee CEN/TC 10 “Lifts, escalators and moving walks”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

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 will supersede EN 81-71:2018+A1:2019.

In comparison with the previous edition, the following significant changes have been made:

— The removal of reference to Category 0;

— All externally referenced standards have now been dated;

— Editorial corrections to assist in understanding;

— A new Annex ZA has been developed in order to be aligned with the requirements of the EU Commission Standardization Request “M/549 C(2016) 5884 final”.

No technical changes have been made during this revision.

The content of this document provides the enhanced design rules, examinations and tests for lifts where protection is needed against vandalism.

This document is intended to be used in conjunction with the EN 81-20:2020, which gives the basic requirements for passenger and goods passenger lifts.

This document is part of the EN 81 series of standards. The structure of the EN 81 series is described in CEN/TR 81-10:2008.

Introduction

This document is a type-C standard as stated in EN ISO 12100:2010.

The lifts concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

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

This document provides requirements for the design of lifts where it is considered that additional measures are required in order to protect against the risk of vandalism. Every lift is subject to some amount of careless and rough use. Additional protective measures against deliberate acts that may result in equipment damage or injury to persons for lifts are referred to in this document as Category 1 or Category 2.

The following assumptions were made whilst writing this document:

— The potential for vandalism of lifts depends on the following factors:

  — the degree of accessibility to the lift installation;

  — the surrounding area;

  — observation of the lift by others in the vicinity;

  — the extent of building security and surveillance of the lift;

  — period of access to the building, including the lift (24 h);

  — vulnerability of lift.

— The forces exerted on the lift and its equipment will be as a result of manual effort or by item(s) such as those listed in Annex E.

1 Scope

This document gives requirements in order to ensure the safety of persons when using lifts which are subject to different expected levels of vandalism:

— Category 1, where lifts are in general public, in locations which are unobserved and limited acts of vandalism might occur, e.g. an enclosed lift in a shopping center;

— Category 2, where lifts are in general public, in locations which are unobserved where stronger acts of vandalism can be expected e.g. a lift in a public car park.

NOTE See Annex A for further information with regard to the selection of the vandal resistance category to be applied.

This document is not applicable to lifts installed before the date of its publication.

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 81-20:2020, *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 81-72:2020, *Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts - Part 72: Firefighters lifts*

EN 81-73:2020, *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 13501-1:2018, *Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests*

EN 60529:1991[1)], *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN 81-20:2020 and the following 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
car ceiling
parts of the car roof accessible from inside the car

1) As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

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 document, identified by risk assessment as significant for this type of lift and which require action to eliminate or reduce the risk (see Table 1).

Table 1 — List of significant hazards

Hazards as listed in EN ISO 12100:2010, Annex B	Relevant clauses
Mechanical hazards due to:	
– Crushing	5.2.1.2, 5.2.1.3, 5.2.2.1, 5.2.2.2, 5.3.5, 5.4.2.1, 5.4.2.4 and 5.5.2
– Shearing	5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.2.1, 5.2.2.2, 5.2.3, 5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.4.1.2, 5.4.1.3, 5.4.1.4, 5.4.1.6, 5.4.2.1, 5.4.2.4, 5.5.1.1 and 5.5.2
– Cutting	5.4.1.2, 5.5.1.8, 5.5.4, 5.6.1.3 and 5.6.2.1
– Trapping	5.4.2.3, 5.4.2.4, 5.4.2.5, 5.4.5 and 5.7
– Impact hazard	5.4.4
– Slipping, tripping and falling	5.2.1.1, 5.2.2.2, 5.2.3, 5.3.3, 5.3.4, 5.3.5, 5.3.6, 5.4.1.2, 5.4.1.3, 5.4.2.1, 5.4.2.3, 5.4.2.4, 5.4.6, 5.5.1.1, 5.5.1.6, 5.5.2 and 5.8
Electrical hazards due to live parts	5.5.1.9, 5.5.4, 5.6.1.1, 5.6.1.3, 5.6.1.4 and 5.6.2.1
Thermal hazards due to flame	5.2.1.1, 5.3.1, 5.3.7, 5.4.1.1, 5.5.1.4, 5.5.4, 5.6.1.1, 5.6.1.5 and 5.9
Hazards due to human behaviour	5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.2.1, 5.2.2.2, 5.2.3, 5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.3.6, 5.4.1.5, 5.4.1.6, 5.4.1.7, 5.4.1.8, 5.4.2.1, 5.4.2.3, 5.4.3, 5.4.4, 5.4.5, 5.4.6, 5.5.1.1, 5.5.1.2, 5.5.1.3, 5.5.1.5, 5.5.1.7, 5.5.1.8, 5.5.1.9, 5.5.2, 5.5.3, 5.5.4, 5.6.1.2, 5.6.1.3, 5.6.1.4, 5.6.2.1, 5.6.2.2, 5.7 and 5.9

5 Safety requirements and/or protective measures

5.1 General

Category 1 and Category 2 vandal resistant lifts shall comply with the safety requirements and/or protective measures of the following clauses. In addition, lifts shall be designed according to the principles of EN ISO 12100:2010 for hazards relevant but not significant that are not dealt with by this document.

5.2 Lift well

5.2.1 Well enclosure

5.2.1.1 Well enclosures shall be imperforate. The walls, floor and ceiling shall be made of materials such as steel, brick, concrete etc. with a mechanical strength such that when a force of 2 500 N being evenly distributed over an area of 100 cm² in round or square section is applied at right angles to the surface at any point on either face they shall resist without:

a) permanent deformation;

b) elastic deformation greater than 15 mm.

The materials used for the well enclosure shall be non-combustible, e.g. according to Class A1 of EN 13501-1:2018.

If the material used is glass, it shall be of an equivalent strength to the glass used for landing doors – see 5.4.1.

5.2.1.2 For Category 1 lifts with a partially enclosed well the height of the enclosure according to EN 81-20:2020, 5.2.5.2.3 b) shall be a minimum of 5,0 m.

5.2.1.3 Category 2 lifts shall be provided with a totally enclosed well.

5.2.2 Access and emergency doors - Access trap doors - Inspection doors

5.2.2.1 Access and emergency doors, access trap doors and inspection doors shall be of such a construction that it is not possible to open them with any of the items as listed in Table E.1.

5.2.2.2 Access and emergency doors, access trap doors and inspection doors with their locks shall be of sufficient strength that, in the locked position when a force of 2 500 N (from the side which is normally accessible to persons) is applied at right angles to the panel, at any point on the exposed face, evenly distributed over an area of 100 cm^2 of round or square section; they shall:

a) resist the force without permanent deformation;

b) resist without elastic deformation greater than 15 mm;

c) not have their safety function affected during and after such a test;

d) operate afterwards.

5.2.3 Ventilation

Ventilation openings shall be in accordance with 5.3.3 and 5.3.4.

5.3 Machinery spaces, pulley rooms and machinery cabinets

5.3.1 The materials used in the construction of any machinery space, pulley room or machinery cabinet outside of the well shall comply with 5.2.1.1.

5.3.2 Windows, if provided and accessible to persons, shall:

a) be of a strength as specified in 5.2.2.2;

b) have laminated glass panel(s).

Windows are not recommended.

5.3.3 If ventilation openings are accessible to persons from the outside, individual openings shall:

a) not be greater than 250 mm × 250 mm;

b) be provided with a means of protection so that a straight rod of any cross section, shall not pass through.

5.3.4 The means of protection in 5.3.3 shall be of a strength as specified in 5.2.1.1.

5.3.5 Doors and access trap doors with their locks shall meet the requirements of 5.2.2.2.

5.3.6 For Category 2 lifts, an intruder alarm system shall operate if any of the following doors are opened:

— machine room and/or pulley room door;

— inspection doors, emergency doors and access trap doors;

— machinery cabinet doors.

The intruder alarm system shall operate an audible alarm within 30 s after opening any of the above doors.

The audible alarm shall:

a) be audible at both the point of intrusion and at the main access floor, with an adjustable sound level between 70 dB(A) and 85 dB(A);

b) stop automatically after an adjustable period between 5 min and 15 min.

It shall be possible to deactivate and re-activate the alarm system by the device referred to in 5.4.2.2.

In the event of loss of the electrical supply, the alarm system shall remain operative for at least two hours.

5.3.7 In the case of a Category 2 lift, machinery located in the pit, e.g. machine, tank, controller, shall be covered with a metallic enclosure. This enclosure is to prevent rubbish from entering the equipment and causing dangerous malfunctions or the ignition of the material or the creation of smoke.

5.4 Landing and car doors

5.4.1 Landing and car doors shall be of the automatically horizontally sliding power operated type.

5.4.1.1 Materials used for car and landing doors shall comply with the following:

a) with the exception of decorative finishes, the materials used for door panels and frames/architraves shall be non-combustible, e.g. according to Class A1 of EN 13501-1:2018;

b) for Category 2 lifts the materials used for decorative finishes shall be non-combustible according to Class A1 or A2 of EN 13501-1:2018.

5.4.1.2 Independently of their material, landing and car door assemblies, together with their frames and fixings shall withstand the soft pendulum shock test as specified in EN 81-20:2020, 5.3.5.3.4 a) without component failure or permanent deformation which would affect the proper function of the doors, but with the pendulum fall height as:

a) for Category 1 lifts: 700 mm;

b) for Category 2 lifts: 1 000 mm.

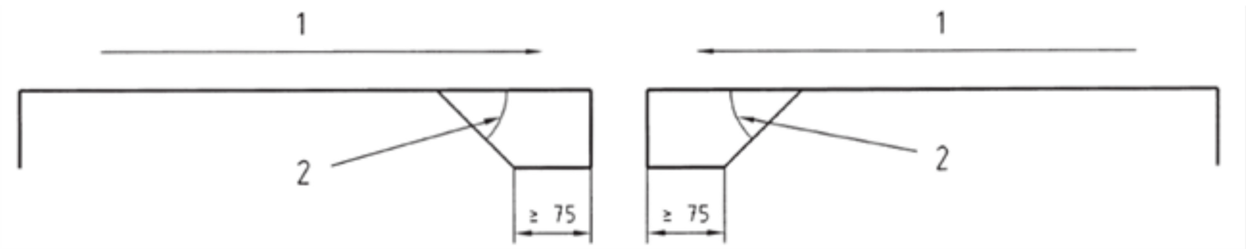
The door assemblies shall remain operative after the test.

5.4.1.3 Door panels with their retainers shall withstand the soft pendulum shock test as specified in EN 81-20:2020, 5.3.5.3.2 with a falling height increased to 1 400 mm.

5.4.1.4 For Category 2 lifts glass panels shall not be used.

5.4.1.5 For Category 2 lifts, the distance between each landing door panel, or its attachments at the leading edge, and the car door(s), or its attachments at the leading edge, shall not exceed 35 mm. This distance shall be maintained back from the leading edge over a length of not less than 75 mm and returned at an angle not exceeding 45° to the rear of the door panel. This return angle may be omitted over a length not exceeding 200 mm at the top and/or bottom of the door panel to allow the fixing of door equipment. Where the distance is maintained back for a length of 200 mm or more, then the return angle is not required (see Figure 1).

Dimensions in millimetres



Key

1 direction of closing

2 return angle: maximum 45°

Figure 1 — Plan view of door panel with angled return

5.4.1.6 For Category 2 lifts, in addition to the requirements of EN 81-20:2020, 5.3.5.3.3, it shall not be possible to pass a rod of 10 mm diameter directly from the landing side of the entrance into the well.

5.4.1.7 For Category 2 lifts, where panels are mechanically linked, the linkage shall be so designed or located that it cannot be disengaged by a user, with an item as described in Annex E within a period of 60 s.

5.4.1.8 For Category 2 lifts, the leading edge profile of car and landing doors shall be formed as an integral part of the door.

5.4.2 Landing door security system – Category 2 lifts

5.4.2.1 At any floor where the car is not present, a security system shall prevent opening the landing door with an emergency unlocking key as stated in EN 81-20:2020, 5.3.9.3.1 or by using an item as described in Annex E, unless this system has been de-activated.

5.4.2.2 A device to manually activate and de-activate the system shall be in at least one of the following locations:

a) the machine room;

b) control cabinet;

c) emergency and inspection panel.

The device shall be clearly marked with a pictogram as shown in Annex C. The pictogram shall also be located on or adjacent to the lift entrance at the main entry/exit floor of the building.

5.4.2.3 After manual de-activation, the system shall be automatically re-activated after a period of between 30 min and 60 min, to prevent the doors being left without the security system operative. However, when the lift is placed on inspection control, or a stopping device to EN 81-20:2020, 5.12.1.11 is operated, this time sequence shall stop. Once the lift is returned to normal operation, the time sequence shall be re-initiated. Each manual re-activation shall reduce any remaining time delay to a value between 30 s and 60 s.

5.4.2.4 In the event of failure of the main power supply, the system shall remain operative for at least two hours by means of a back-up power supply. In the event of disconnection of the main switch, the system shall be immediately deactivated.

5.4.2.5 Where this system is installed for use in:

a) firefighters lifts in conformity with EN 81-72:2020, 5.8, it shall be automatically de-activated when the lift is recalled (phase 1) or in firefighters control (phase 2);

b) lifts in conformity with EN 81-73:2020, 5.1, it shall be automatically de-activated when the lift is recalled.

5.4.3 Door coupling mechanism

For Category 2 lifts, whilst the car is stationary in the unlocking zone it shall not be possible to de-couple the car and landing doors by hand or the use of an item as described in Annex E within a period of 60 s.

5.4.4 Door reversal mechanism

For Category 2 lifts, any protective devices for reversing the car and landing door movement when closing shall be positioned such as to be inaccessible to unauthorised persons.

5.4.5 Locking of car doors

The car door(s) shall be provided with a mechanical locking device in compliance with EN 81-20:2020, 5.3.9.2.

5.4.6 Manipulation of door operator and locks

For Category 2 lifts, in addition to the requirements of EN 81-20:2020, it shall not be possible to manipulate the door operator and locks, to render them ineffective by use of any of the item described in Annex E within 60 s.

5.5 Car

5.5.1 Car bodywork, Interior and fixings

5.5.1.1 The walls of the car shall have a mechanical strength at least equal to the landing doors as specified in 5.4.1.2 a) or b) as applicable.

5.5.1.2 For Category 1 lifts, the car ceilings shall:

a) be able to support the mass of 150 kg at any point from which persons can suspend themselves;

b) be so fixed to prevent unauthorised displacement, within a period of 60 s, either by hand or the use of items as described in Annex E.

5.5.1.3 For Category 2 lifts the ceiling shall be so designed that there are no points from which persons can suspend themselves.