SLOVENSKI STANDARD
SIST EN 81-71:2018+AC:2019

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Nadomešča:
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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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91.140.90 Dvigala. Tekoče stopnice Lifts. Escalators

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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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EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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European foreword

This document (EN 81-71:2018+AC: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of an identical text or by endorsement, at the latest by November 2018, and conflicting national standards shall be withdrawn at the latest by ▌AC〉 May 2020 〈AC▐.

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 81-71:2005+A1:2006.

This document includes Corrigendum 1 issued by CEN on 23 January 2019 to correct the date of withdrawal in the European foreword.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags ▌AC〉 〈AC▐.

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.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

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

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

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

This document provides guidance to the building designer, customer etc. and requirements for design, where it is considered additional security or other measures may be required in order to protect against the risk of vandalism. The customer will need to consider the extent of additional protection required, as covered by the enclosed proposals, which may be adopted according to the environment in which the lift installation is situated and the type of vandalism that is likely to be experienced. Every lift is subject to some amount of careless or rough use. Lifts built to EN 81-20 offer a reasonable degree of protection against this and are referred to in this document as Category 0. This document addresses additional protective measures against deliberate acts that may result in equipment damage or injury to persons for lifts referred to in this document as Category 1 or Category 2.

With regard to potential hazards for vandalism the following factors are taken into consideration:

— degree of accessibility to the installation;

— the surrounding area;

— observation by others in the vicinity;

— extent of building security and surveillance of lift(s);

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

— vulnerability of lift.

The clauses in this document apply to both Category 1 lifts and Category 2 lifts as defined in this document (see Annex A) unless otherwise stated in the text.

The following assumptions were made whilst writing this document:

— the lift is designed to meet the basic requirements detailed in EN 81-20;

— the building and/or the lift structure are at least in accordance with the advice given in Annex A, which form the basis of the negotiations outlined in EN 81-20:2014, 0.4.2;

— the lift, its well, landing and access areas, machinery spaces(s) and all associated equipment are properly maintained in good, safe working order.

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

1 Scope

This document gives additional and deviating requirements to EN 81-20 as applicable in order to ensure the safety of lift users and the availability of lifts, which may be used for vandal resistant purposes. In all other respects such lifts are designed in accordance with EN 81-20. This document deals with the significant hazards, hazardous situations and events relevant to lifts which can be affected by vandalism (as listed in Clause 4) when they are used under the conditions as foreseen by the installer.

It does not cover building security or Category 0 lifts (see definition 3.2).

For other types of lifts, e.g. inclined lifts according to EN 81-22, this standard can usefully be taken as a 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 81-20:2014, *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, *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 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

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 81-20:2014 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

3.2
Category 0 lift
lift in conformity with EN 81-20

3.3
Category 1 lift
lift in conformity with EN 81-20 and fulfilling supplementary requirements, in order to protect the lift installation from moderate acts of vandalism

Note 1 to entry: See Annex A.

3.4
Category 2 lift
lift in conformity with EN 81-20 and fulfilling supplementary requirements in order to protect the lift installation from severe acts of vandalism

Note 1 to entry: See Annex A.

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, such lifts shall be designed according to the principles of EN ISO 12100 for hazards relevant but not significant that are not dealt with by this document (e.g. sharp edges).

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 cm^2 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.

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

NOTE The above requirements apply in addition to any national regulations.

5.2.1.2 For Category 1 lifts with a partially enclosed well the height of the enclosure according to EN 81-20:2014, 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 Doors and trap 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 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 inspection traps;

— cabinet doors.

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

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.

NOTE Time periods and sound level settings may depend upon local Regulation.

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;

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.

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 81-20:2014, 5.3.5.3.4 a) without component failure or permanent deformation which would affect the proper function of the doors. The door assemblies shall remain operative after the test. The falling heights for the tests shall be as follows:

a) for Category 1 lifts: 700 mm;

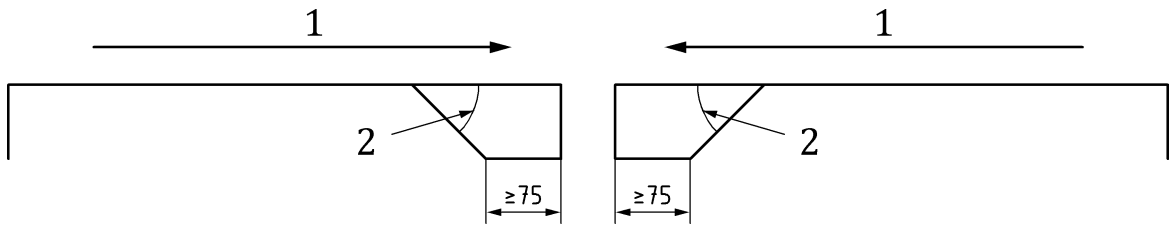
b) for Category 2 lifts: 1 000 mm.

5.4.1.3 Door panels with their retainers shall withstand the soft pendulum shock test as specified in EN 81-20:2014, 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, 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 81-20:2014, 5.3.5.3.3, it shall not be possible to pass a rod of 10 mm diameter from the landing side of the entrance into the well.