SLOVENSKI STANDARD

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

Regles de sécurité pour la construction et l'installation des élévateurs - Applications particulieres pour les ascenseurs et les ascenseurs de charge - Partie 71 : Ascenseurs résistant aux actes de vandalisme

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This European Standard was approved by CEN on 17 December 2004.

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Foreword

This document (EN 81-71:2005) 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of an identical text or by endorsement, at the latest by October 2005 and conflicting national standards shall be withdrawn at the latest by January 2007.

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 organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and 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 1070.

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 81-1 or EN 81-2 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.

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 81-1 or EN 81-2, including Amendment A2;

— 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 0.2.5 of EN 81-1:1998 or EN 81-2:1998;

— 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 81-1 and EN 81-2 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 81–1, including Amendment A2 or EN 81-2, including Amendment A2. 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 O lifts (see definition 3.2).

2 Normative references

The following referenced documents are indispensable for the application 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 81-1:1998, *Safety rules for the construction and installation of lifts – Part 1: Electric lifts*

EN 81-2:1998, *Safety rules for the construction and installation of lifts – Part 2: Hydraulic 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 81-73:2005, *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 1050:1996, *Safety of machinery – Principles for risk assessment*

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

EN 60529, *Specification for degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN ISO 12100-1, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles (ISO 12100-2:2003)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 81-1:1998 and EN 81-2:1998 apply as well as the following additional definitions.

3.1
car ceiling
parts of the car roof accessible from inside the car

3.2
category 0 lift
lift designed to meet the basic requirements of EN 81-1 or EN 81-2

3.3
category 1 lift
lift designed to meet the requirements of EN 81-1 or EN 81-2 and fulfilling supplementary requirements, in order to protect the lift installation from moderate acts of vandalism (see Annex A)

3.4
category 2 lift
lift designed to meet the requirements of EN 81-1 or EN 81-2 and fulfilling supplementary requirements in order to protect the lift installation from severe acts of vandalism (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.

Table 1 – List of significant hazards

Significant hazards according to EN 1050:1996, Annex A	Relevant clauses
1.1 Crushing	5.1.1.2, 5.1.1.3, 5.1.2.1, 5.1.2.2, 5.2.5, 5.3.2.1, 5.3.2.4 and 5.4.2
1.2 Shearing	5.1.1.1, 5.1.1.2, 5.1.1.3, 5.1.2.1, 5.1.2.2, 5.1.3, 5.2.1, 5.2.2, 5.2.3, 5.2.4, 5.2.5, 5.3.1.2, 5.3.1.3, 5.3.1.4, 5.3.1.6, 5.3.2.1, 5.3.2.4, 5.4.1.1 and 5.4.2
1.3 Cutting	5.3.1.2, 5.4.1.8, 5.4.4.2, 5.5.1.3 and 5.5.2.1
1.5 Trapping	5.3.2.3, 5.3.2.4, 5.3.2.5, 5.3.5 and 5.6
1.6 Impact hazard	5.3.4.
2.0 Electrical	5.4.1.9, 5.4.4.2, 5.5.1.1, 5.5.1.3, 5.5.1.4 and 5.5.2.1.
3.0 Thermal hazard	5.1.1.1, 5.2.1, 5.2.7, 5.3.1.1, 5.4.1.4, 5.4.4.2, 5.5.1.1, 5.5.1.5 and 5.8
8.6 Human behaviour	5.1.1.1, 5.1.1.2, 5.1.1.3, 5.1.2.1, 5.1.2.2, 5.1.3, 5.2.1, 5.2.2, 5.2.3, 5.2.4, 5.2.5, 5.2.6, 5.3.1.5, 5.3.1.6, 5.3.1.7, 5.3.1.8, 5.3.2.1, 5.3.2.3, 5.3.3, 5.3.4, 5.3.5, 5.3.6, 5.4.1.1, 5.4.1.2, 5.4.1.3, 5.4.1.5, 5.4.1.7, 5.4.1.8, 5.4.1.9, 5.4.2, 5.4.3, 5.4.4.2, 5.5.1.2, 5.5.1.3, 5.5.1.4, 5.5.2.1, 5.5.2.2, 5.6 and 5.8
19 Slip, trip and fall	5.1.1.1, 5.1.2.2, 5.1.3, 5.2.3, 5.2.4, 5.2.5, 5.2.6, 5.3.1.2, 5.3.1.3, 5.3.2.1, 5.3.2.3, 5.3.2.4, 5.3.6, 5.4.1.1, 5.4.1.6, 5.4.2 and 5.7

5 Safety requirements and/or protective measures

Vandal resistant lifts shall comply with the safety requirements and/or measures of Clause 5. In addition, vandal resistant lifts shall be designed according to the principles of EN ISO 12100-1 and EN ISO 12100-2 for hazards relevant but not significant which are not dealt with by this document (e.g. sharp edges).

5.1 Lift well

5.1.1 Well enclosure

5.1.1.1 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:

a) without permanent deformation;

b) without 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 5.3.1.

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

5.1.1.2 For Category 1 lifts with a partially enclosed well the height of the enclosure according to 5.2.1.2 a) of EN 81-1:1998 or EN 81-2:1998 shall be a minimum of 5,0 m.

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

5.1.2 Inspection and emergency doors and inspection traps

5.1.2.1 Inspection and emergency doors and inspection traps 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.

5.1.2.2 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.

5.1.3 Ventilation

Ventilation openings shall be in accordance with 5.2.3 and 5.2.4.

5.2 Machinery spaces, pulley space(s) and machinery cabinets

5.2.1 The materials used in the construction of any machinery space, pulley spaces or cabinet outside of the well shall comply with 5.1.1.1.

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

a) be of a strength as specified in 5.1.2.2.

b) be laminated if the material used is glass.

NOTE Windows are not recommended.

5.2.3 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.

5.2.4 The means of protection in 5.2.3 shall be of a strength as specified in 5.1.1.1.

5.2.5 Doors and trap doors with their locks shall meet the requirements of 5.1.2.2.

5.2.6 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 5.3.2.2.

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.

5.2.7 In the case of a Category 2 machine-room-less lift, equipment located in a machinery space 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.

5.3 Landing and car doors

5.3.1 Landing and car door construction

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

5.3.1.1 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) the materials used for decorative finishes shall:

1) for Category 1 lifts, be of limited flammability e.g. according to Class C of EN 13501-1;

2) for Category 2 lifts, be non-combustible e.g. according to Class A2 of EN 13501-1.

5.3.1.2 Car and landing door assemblies, together with their frames and fixings shall withstand the soft pendulum shock test as specified in Annex J of EN 81-1:1998 or EN 81-2:1998 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.

NOTE It is recognised that Annex J in EN 81-1:1998 or EN 81-2:1998 applies to glass doors. However, for the purpose of this document, the test is considered appropriate for all materials, although J.5 f) still only applies to glass doors.

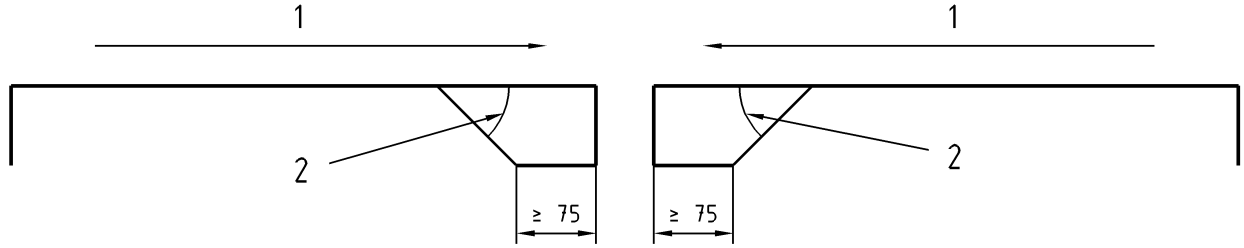
5.3.1.3 Doors shall be provided with a means for retaining the door panels in position should the roller or guide shoe assemblies fail. These devices shall withstand, on their own, the soft pendulum shock test as specified in Annex J of EN 81-1:1998 or EN 81-2:1998 with a falling height increased to 1 400 mm without loss of integrity of the door assembly.

NOTE After this test the doors do not need to be able to operate.

5.3.1.4 For Category 2 lifts vision panels shall not be used.

5.3.1.5 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

5.3.1.6 For Category 2 lifts, in addition to the requirements of 7.2.3.2 of EN 81-1:1998 and EN 81-2:1998, it shall not be possible to pass a rod of 10 mm diameter from the landing side of the entrance into the well.

5.3.1.7 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.

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