SLOVENSKI STANDARD
SIST EN 81-40:2020

01-december-2020

Varnostna pravila za konstruiranje in vgradnjo dvigal (liftov) - Posebna dvigala za prevoz oseb in blaga - 40. del: Priprave za vzpenjanje po stopnicah in dvižne ploščadi z diagonalnim pomikanjem za osebe z omejenimi gibalnimi sposobnostmi

Safety rules for the construction and installation of lifts - Special lifts for the transport of persons and goods - Part 40: Stairlifts and inclined lifting platforms intended for persons with impaired mobility

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Spezielle Aufzüge für den Personen- und Gütertransport - Teil 40: Treppenschrägaufzüge und Plattformaufzüge mit geneigter Fahrbahn für Personen mit Behinderungen

Règles de sécurité pour la construction et l'installation des élévateurs - Élévateurs spéciaux pour le transport des personnes et des charges - Partie 40 : Ascensièges et plates-formes élévatrices inclinées à l'usage des personnes à mobilité réduite

Ta slovenski standard je istoveten z: **EN 81-40:2020**

ICS:

11.180.10	Pripomočki in prilagoditve za gibanje	Aids and adaptation for moving
91.140.90	Dvigala. Tekoče stopnice	Lifts. Escalators

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EUROPEAN STANDARD
NORME EUROPÉENNE
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Supersedes EN 81-40:2008

English Version

Safety rules for the construction and installation of lifts - Special lifts for the transport of persons and goods - Part 40: Stairlifts and inclined lifting platforms intended for persons with impaired mobility

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This European Standard was approved by CEN on 29 June 2020.

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This European Standard exists 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 81-40:2020) 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 March 2021, and conflicting national standards shall be withdrawn at the latest by September 2022.

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 81-40:2008.

EN 81-40:2020 constitutes a full revision of the standard. The main changes from the previous edition are:

— support for screw and nut drive has been removed;

— verification tests have been added for static overload, chair levelling, edges and surfaces and self-sustaining system;

— requirements for the interface of the stairlift in the building have been added;

— a requirement for lightning protection has been added;

— all normative references to other standards have been dated;

— a new Annex ZA, including a detailed Table ZA.1, has been developed.

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

Introduction

The population of Europe is ageing and the prevalence of disability, including disability associated with the ageing process, is increasing. Older people and people with disabilities at present are estimated to number some 80 million people – a large and growing proportion of the European Union population. The changing demography presents both opportunities and challenges for the Union. The economic, social and cultural potential of older people and people with disabilities is underexploited at present. However, there is a growing recognition that society needs to exploit this potential for the economic and social benefit of society generally.

This is one of the reasons that led to this document on vertical lifting platforms for people with impaired mobility being one means to provide accessibility to buildings.

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

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery 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.

Assumptions

With the aim of clarifying the intentions of the standard and avoiding doubts when reading it, the following assumptions were made when producing it:

a) components without specific requirements are:

   1) designed in accordance with the usual engineering practice and calculation codes, including all failure modes;

   2) of sound mechanical and electrical construction;

b) general electrical hazards are dealt with according to B level electrical safety standards;

c) components are kept in good repair and working order, in accordance with the maintenance manual, so that the required characteristics remain despite wear;

d) by design of the load bearing elements, a safe operation of the machine is ensured throughout the entire maximum working load range;

e) a mechanical device built according to good practice and the requirements of the standard, will not deteriorate to a point of creating a hazard without the possibility of detection;

f) the ambient temperature is between 0 °C and +40 °C, at the place of use of the machinery;

g) Negotiation occurs between the manufacturer (the person applying the CE mark) and the user concerning the specificity of the use and places of use of the stairlift:

   1) suitability for user (see Annex D);

   2) the place of installation allows a safe use for the machine (see Annex C);

   3) any additional fire protection requirements.

1 Scope

1.1 This document deals with safety requirements for construction, manufacturing, installation, maintenance and dismantling of electrically operated stairlifts (chair, standing platform and wheelchair platform) affixed to a building structure, moving in an inclined plane and intended for use by persons with impaired mobility:

— travelling over a stair or an accessible inclined surface;

— intended for use by one person;

— whose carriage is directly retained and guided by a guide rail or rails;

— supported or sustained by rope (5.4.4), rack and pinion (5.4.5), chain (5.4.6), friction/traction drive (5.4.7), and guided rope and ball (5.4.8).

1.2 This document identifies hazards as listed in Clause 4 which arise during the various phases in the life of such equipment and describes methods for the elimination or reduction of these hazards when used as intended by the manufacturer.

1.3 This document does not specify the additional requirements for:

— operation in severe conditions (e.g. extreme climates, strong magnetic fields);

— operation subject to special rules (e.g. potentially explosive atmospheres);

— handling of materials, the nature of which could lead to dangerous situations;

— use of energy systems other than electricity;

— hazards occurring during manufacture;

— earthquakes, flooding, fire;

— evacuation during a fire;

— stairlifts for goods only;

— concrete, hardcore, timber or other foundation or building arrangement;

— design of anchorage bolts to the supporting structure.

NOTE For the actual type of machinery, noise is not considered a significant nor relevant hazard.

1.4 This document is not applicable to power operated stairlifts which are manufactured before the date of publication of this document by CEN.

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 81-50:2020, *Safety rules for the construction and installation of lifts — Examinations and tests — Part 50: Design rules, calculations, examinations and tests of lift components*

EN 1021-2:2014, *Furniture — Assessment of the ignitability of upholstered furniture — Part 2: Ignition source match flame equivalent*

EN 12385-4:2002+A1:2008, *Steel wire ropes — Safety — Part 4: Stranded ropes for general lifting applications*

EN 16005:2012/AC:2015, *Power operated pedestrian doorsets — Safety in use — Requirements and test methods*

EN 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016, modified)*

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

EN 60664-1:2007, *Insulation coordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests (IEC 60664-1:2007)*

EN 60695-11-10:2013, *Fire hazard testing — Part 11-10: Test flames — 50 W horizontal and vertical flame test methods (IEC 60695-11-10:2013)*

EN 60747-5 (all parts), *Discrete semiconductor devices and integrated circuits — Part 5: Optoelectronic devices (IEC 60747-5 all parts)*

EN 60947-1:2007[2], *Low-voltage switchgear and controlgear — Part 1: General rules (IEC 60947-1:2007)*

EN 60947-4-1:2010/A1:2012, *Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters (IEC 60947-4-1:2009/A1:2012)*

EN 60947-5-1:2017, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices (IEC 60947-5-1:2016)*

EN 61249-2-1:2005, *Materials for printed boards and other interconnecting structures — Part 2-1: Reinforced base materials, clad and unclad — Phenolic cellulose paper reinforced laminated sheets, economic grade, copper-clad (IEC 61249-2-1:2005)*

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[1] This document is impacted by the amendments EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013 and the corrigendum EN 60529:1991/AC:2016-12.

[2] This document is impacted by the amendments EN 60947-1:2007/A1:2011 and EN 60947-1:2007/A2:2014.

EN 61508-2:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems (IEC 61508-2:2010)*

EN 61508-3:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 3: Software requirements (IEC 61508-3:2010)*

EN IEC 61558-1:2019, *Safety of transformers, reactors, power supply units and combinations thereof — Part 1: General requirements and tests (IEC 61558-1:2017)*

EN 62305 (all parts), *Protection against lightning (IEC 62305)*

EN 62326-1:2002, *Printed boards — Part 1: Generic specification (IEC 62326-1:2002)*

EN ISO 9773:1998[3], *Plastics — Determination of burning behaviour of thin flexible vertical specimens in contact with a small-flame ignition source (ISO 9773:1998)*

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

EN ISO 13854:2019, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)*

EN ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

EN ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

ISO 606:2015, *Short-pitch transmission precision roller and bush chains, attachments and associated chain sprockets*

ISO 7000:2019, *Graphical symbols for use on equipment — Registered symbols*

ISO 9772:2012, *Cellular plastics — Determination of horizontal burning characteristics of small specimens subjected to a small flame*

IEC 60417:2002 DB, *Graphical symbols for use on equipment*

IEC 60617 (all parts), *Graphical symbols for diagrams*

3 Terms and definitions

For the purposes of this document, the 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 https://www.iso.org/obp

[3] This document is impacted by the amendment EN ISO 9773:1998/A1:2003.

3.1
barrier arm
bar or similar device so arranged as to provide protection against persons falling from a stairlift

3.2
brake
mechanism employed to bring the stairlift to a stop and hold it in position

3.3
carriage
mobile trolley which is retained, supported and guided by one or more rails, upon which a chair, platform or other purpose-made adaptation to carry the user is supported and securely attached

3.4
competent person
person, suitably trained and qualified by knowledge and practical experience, and provided with the necessary instructions to enable the required work to be carried out safely

3.5
drive unit
mechanical unit, including the motor, that drives and stops the carriage

3.6
electrical safety chain
total of the electric safety devices, which can either be switches or safety circuits, connected in series with each other

3.7
electrical safety circuit
electrical or electronic circuit with an equivalent degree of safety to a switch containing electrical safety contacts

3.8
electrical safety contact
contact in which the separation of the circuit breaking elements is made by positive means

3.9
electrical safety device
either an electrical switch incorporating one or more electrical safety contacts, or a safety circuit

3.10
final limit device
last electric safety device situated beyond terminal floors

3.11
guide rail
rigid components which provide guiding for the carriage

3.12
guided rope
rope that is either fixed or moving, and is completely guided over its entire length such that it may transmit a load either in thrust or tension

3.13
impaired mobility
difficulty in using stairs because of impairment

Note 1 to entry: Some examples, but not restricted to, are: wheelchair user, person with walking difficulties, persons with impaired mobility and/or children with impaired mobility and elderly persons.

Note 2 to entry: This definition is specific to the sense of this document and not a full definition of the term.

3.14
journey
movement of the carriage between any two levels which incorporates one start and one stop

[SOURCE: ISO 9386-2:2000, 3.24]

3.15
maximum working load
rated load + overload

3.16
overload
25 % of rated load

3.17
overspeed detection device
device which interrupts the electric safety chain and if necessary causes the safety gear to be applied when the stairlift attains a pre-determined speed

3.18
public access
location where the user is unknown

3.19
rated load
load for which the equipment has been designed

3.20
rated speed
design speed of the carrier

3.21
safety factor
ratio, either of the yield load, or the ultimate tensile load to the load that can be imposed upon a member by the rated load for a material under static or dynamic conditions

3.22
safety gear
mechanical device for stopping and maintaining the carriage stationary on the guide rail/s in case of overspeeding in the downward direction or the breaking of the suspension

3.23
self-sustaining drive system
system that, under free running conditions, ensures that the speed of the stairlift decreases

3.24
sensitive edge
device attached to any edge to provide protection against a trapping, shearing or crushing hazard

3.25
sensitive surface
device similar in effect to a sensitive edge but so arranged to protect a whole surface

3.26
slack rope/chain device
device, or combination of devices, arranged to stop the stairlift if any suspension rope or chain slackens by a pre-determined amount

3.27
stairlift
appliance for transporting a person (either seated or standing) or person in a wheelchair between two or more boarding points by means of a guided carriage moving in an inclined plane

3.28
terminal device
device or combination of devices arranged to stop the stairlift at or near a boarding point

3.29
unlocking zone
zone extending above and below a boarding point in which the carriage has to be positioned to enable the corresponding ramp(s) and barrier arm(s) to be unlocked

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 machinery and which require action to eliminate or reduce the risk.

The significant hazards are based upon EN ISO 12100:2010. Also shown are the subclause references to the safety requirements and/or protective measures in this document.

Table 1 shows the hazards which have been identified and where the corresponding requirements have been formulated in this document, in order to limit the risk or reduce these hazards in each situation.

NOTE Hazards resulting from allergic reactions to persons are not addressed in this document.

Table 1 — Significant hazards relating to the general design and construction of stair lifts

Group	Significant hazard in accordance with EN ISO 12100:2010, Table B.1	Relevant clauses in this document
General, for many machines relevant		
1	**Mechanical hazards**	
1.1	Due to machine parts or workpieces, e.g. — by mechanical strength (break-up)	5.1.7, 5.1.9, 5.4.5.1, 5.4.5.2
	Due to machine parts or workpieces, e.g. — by kinetic energy (acceleration, deceleration, moving/rotating elements)	5.1.9
1.2	by stored energy, e.g. — elastic elements (springs)	5.6.2.4.3
1.3	Crushing	5.1
1.4	Shearing	5.1
1.5	Cutting or severing	5.6.2.2
1.6	Entanglement	5.1
1.7	Drawing-in or trapping	5.1.3
1.8	Impact	5.6.4.3
1.10	Friction or abrasion	5.6.2.5
1.12	Slipping, tripping and falling	5.6.2.1, 5.6.2.3, 5.6.3.1, 5.6.3.2, 5.6.3.3, 5.6.4.1, 5.6.4.4, 5.6.4.5, 5.6.4.6, 5.6.4.7
1.13	Instability	5.1.7
2	**Electrical hazards**	
2.1	Touching live parts	5.5.1, 5.5.4.1, 5.5.9, 5.5.12.1, 5.5.12.4
2.2	Parts which have become live under fault conditions	5.5.5.1, 5.5.12.6
2.7	Short-circuit	5.5.5.1, 5.5.9.2, 5.5.12.5, 5.5.12.10
2.8	Overload	5.5.1.2, 5.5.8, 5.5.12.3, 5.5.12.8, 5.5.12.11
4	**Noise hazards**	
4.1	Permanent hearing loss, tinnitus	Not covered
5	**Vibration hazards**	
5.1	Vibrations transmitted to the operator when sitting during operation	5.1.1
6	**Radiation hazards**	
6.2	Radio frequency electromagnetic radiation	5.5.13