



SLOVENSKI STANDARD

SIST EN 115-1:2017

01-november-2017

Nadomešča:

SIST EN 115-1:2009+A1:2010

Varnost tekočih stopnic in tekočih stez - 1. del: Konstrukcija in vgradnja

Safety of escalators and moving walks - Part 1: Construction and installation

Sicherheit von Fahrtreppen und Fahrsteigen - Teil 1: Konstruktion und Einbau

Sécurité des escaliers mécaniques et trottoirs roulants - Partie 1 : Construction et installation

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **EN 115-1:2017**

SIST EN 115-1:2017
http://www.sist.si/standards/standards/EN-115-1-2017/90-4075-bd23-09d40c863038/sist-en-115-1-2017

ICS:

91.140.90 Dvigala. Tekoče stopnice Lifts. Escalators

SIST EN 115-1:2017

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 115-1:2017

<https://standards.iteh.ai/catalog/standards/sist/d267aa90-5a90-4075-bd23-09d40c863038/sist-en-115-1-2017>

EUROPEAN STANDARD

EN 115-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2017

ICS 91.140.90

Supersedes EN 115-1:2008+A1:2010

English Version

Safety of escalators and moving walks - Part 1: Construction and installation

Sécurité des escaliers mécaniques et trottoirs roulants
- Partie 1: Construction et installation

Sicherheit von Fahrtreppen und Fahrsteigen - Teil 1:
Konstruktion und Einbau

This European Standard was approved by CEN on 1 May 2017.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of 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 United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/d267aa90-5a90-4075-bd23-09d40c863038/sist-en-115-1-2017>



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

	Page
European foreword.....	6
Introduction	8
1 Scope.....	10
2 Normative references.....	10
3 Terms and definitions, symbols and abbreviations.....	12
3.1 Terms and definitions	12
3.2 Symbols and abbreviations	15
4 List of significant hazards	17
4.1 General.....	17
4.2 Mechanical hazards.....	17
4.3 Electric hazards	18
4.4 Radiation hazards.....	18
4.4.1 Electromagnetic radiation generated by the machine	18
4.4.2 Electromagnetic radiation received from outside	18
4.5 Fire hazard.....	18
4.6 Hazards generated by neglecting ergonomic principles in machinery design.....	18
4.7 Hazard generated by failure of control circuit.....	18
4.8 Hazards generated by break-up during operation.....	19
4.9 Slipping, tripping and falling hazards.....	19
4.10 Hazards specific for this type of machine.....	19
4.11 Significant hazards due to seismic events.....	20
5 Safety requirements and/or protective measures.....	20
5.1 General.....	20
5.2 Supporting structure (truss) and enclosure	20
5.2.1 General.....	20
5.2.2 Angle of inclination.....	21
5.2.3 Access to the interior	21
5.2.4 Inspection covers	21
5.2.5 Structural design.....	21
5.3 Steps, pallets, belt.....	21
5.3.1 General.....	21
5.3.2 Dimensions.....	22
5.3.3 Structural design.....	22
5.3.4 Guiding of steps, pallets and belt.....	27
5.3.5 Clearance between steps or pallets	27
5.3.6 Missing step or pallet device.....	27
5.4 Drive unit	27
5.4.1 Driving machine	27
5.4.2 Braking system	28
5.4.3 Steps and pallets drive	31
5.4.4 Belt drive.....	32
5.5 Balustrade.....	32
5.5.1 General.....	32
5.5.2 Dimensions of balustrade	32
5.5.3 Skirting.....	33
5.5.4 Newel	36
5.5.5 Clearance between steps, pallets or belt and skirting.....	36

5.6	Handrail system	37
5.6.1	General	37
5.6.2	Profile and position	37
5.6.3	Distance between the handrail centre lines	37
5.6.4	Handrail entry.....	37
5.6.5	Guiding	37
5.7	Landings.....	38
5.7.1	Surface properties.....	38
5.7.2	Configuration of steps, pallets and belts	38
5.7.3	Combs.....	39
5.8	Machinery spaces, driving station and return stations	39
5.8.1	General	39
5.8.2	Dimensions and equipment.....	40
5.8.3	Lighting and socket outlets	40
5.9	Fire protection.....	41
5.10	Transportation	41
5.11	Electric installations and appliances.....	48
5.11.1	General	48
5.11.2	Contactors, relay contactors, components of failsafe circuits.....	49
5.11.3	Main switches.....	50
5.11.4	Electric wiring.....	50
5.12	Electric control system	51
5.12.1	Protective devices and functions	51
5.12.2	Safety devices and functions.....	53
5.12.3	Control devices and functions.....	61
6	Verification of the safety requirements and/or protective measures	67
6.1	General	67
6.2	Specific data, test reports and certificates	71
7	Information for use.....	72
7.1	General	72
7.2	Signals and warning devices.....	72
7.2.1	Plates, inscriptions and notices for use	72
7.2.2	Special indicators for escalators and moving walks starting automatically.....	73
7.3	Inspection and test.....	73
7.3.1	General	73
7.3.2	Constructional inspection and acceptance inspection and test.....	73
7.4	Accompanying documents (in particular, instruction handbook)	74
7.4.1	Contents	74
7.4.2	Presentation of the instruction handbook	77
7.4.3	Advice for drafting and editing information for use.....	77
7.5	Marking	77
Annex A (normative)	Building interfaces	78
A.1	General	78
A.2	Free space for users	78
A.3	Machinery spaces outside the truss.....	79
A.4	Measures to prevent access of shopping trolleys and baggage carts.....	80
A.4.1	General	80
A.4.2	Barriers	80
A.5	Fixed guiding barriers and traffic columns.....	81
A.6	Electric power supply.....	82

Annex B (normative) Electronic components - Failure exclusion	86
B.1 Scope	86
B.2 Failure exclusions - conditions	86
Annex C (normative) Drafting and assessing failsafe circuits	90
Annex D (normative) Testing of failsafe circuits containing electronic components and/or safety related electrical, electronic and programmable electronic devices (E/E/PE)	91
D.1 General	91
D.2 General provisions	91
D.2.1 Failsafe circuits containing electronic components	91
D.2.2 Safety related electrical, electronic and programmable electronic devices (E/E/PE)	91
D.3 Test samples	91
D.4 Mechanical tests	92
D.4.1 General	92
D.4.2 Vibrations	92
D.4.3 Bumping	92
D.5 Climatic stress testing	93
D.5.1 Temperature tests	93
D.5.2 Humidity tests	93
D.6 Functional and safety test of E/E/PE	93
Annex E (informative) Design guideline for safety circuits	94
Annex F (informative) Examples of possible dynamic torsional tests for steps and pallets	95
F.1 General	95
F.2 Torsional test 1	95
F.3 Torsional test 2	96
Annex G (normative) Safety signs for the user of escalators and moving walks	98
Annex H (informative) Guidelines for selection and planning of escalators and moving walks	100
H.1 Maximum capacity	100
H.2 Escalators or moving walks for public transport	100
Annex I (normative) Requirements on escalators and moving walks intended to transport shopping trolleys and baggage carts	101
I.1 Escalators	101
I.2 Moving walks	102
Annex J (informative) Determination of anti-slip properties of the tread surfaces of steps and pallets, of comb plates and floor plates	103
J.1 Introduction	103
J.2 Testing and assessing anti-slip properties	103
Annex K (informative) Determination of sliding properties of footwear on balustrade skirting	105

K.1	Introduction.....	105
K.2	Testing and assessing sliding properties.....	105
	Annex L (informative) Major modification.....	106
	Annex M (normative) Escalators and moving walks subject to seismic conditions	107
M.1	Introduction.....	107
M.2	Structural requirements	107
M.2.1	General	107
M.2.2	Supports.....	107
M.2.3	Arrangement	107
M.2.4	Mechanical safety devices for escalators and moving walks.....	107
M.3	Design requirements.....	107
M.3.1	General	107
M.3.2	Truss.....	107
M.3.3	Mass for the truss of escalators and moving walks	108
M.3.4	Condition of loading and deformation during a seismic event.....	108
M.3.5	Calculation procedure according to EN 1998-1:2004	108
M.4	Machinery.....	108
M.5	Electrical installation and other equipment.....	108
	Annex N (normative) Interpretations of EN 115-1	110
N.1	Format of an interpretation request.....	110
N.2	Format of an interpretation.....	111
	Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC aimed to be covered.....	112
	Bibliography	113

European foreword

This document (EN 115-1:2017) 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 January 2018, and conflicting national standards shall be withdrawn at the latest by January 2019.

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 115-1:2008+A1:2010.

The need for a replacement was based on the following points:

- a) improvement in safety due to changes in proven technology;
- b) the need to reflect changes to the state of the art;
 - new structure for electric requirements with clauses for protective, safety and control devices and functions;
 - requirements for step inserts/fixings;
 - expansion of operational brake by electrical braking;
 - update on test material for skirting; [SIST EN 115-1:2017](https://standards.iteh.ai/catalog/standards/sist/d267aa90-5a90-4075-bd23-09d40c863038/sist-en-115-1-2017)
 - inclusion of fire protection requirements; <https://standards.iteh.ai/catalog/standards/sist/d267aa90-5a90-4075-bd23-09d40c863038/sist-en-115-1-2017>
 - introduction of 2-direction-mode;
 - inclusion of a stop switch indicator;
 - introduction of inspection control actuated by the use of both hands;
 - description of barriers to prevent access of trolley;
 - requirements for fixed devices in the unrestricted area;
 - inclusion of seismic design requirements;
- c) incorporation of essential health and safety requirements from the relevant EU Directives;
- d) elimination of reported errors;
- e) clarification of the text and incorporation of proposals resulting from interpretation requests ¹⁾);
- f) improvement of the references to other standards according to the progress in that field;

1) Within CEN/TC 10 an interpretation committee has been established to answer questions about the spirit in which the experts have drafted the various clauses of this standard. All such interpretations are published within CEN/TS 115-4 [1] until incorporated by amendment into the standards concerned.

g) adaption to CEN Guide 414:2014.

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 Directives.

For relationship with EU Directives, see informative Annex ZA, which are integral parts of this document.

This standard is part of the EN 115 series of standards: “*Safety of escalators and moving walks*”.

EN 115 is currently composed with the following parts:

- *Part 1: Construction and installation* [the present document];
- *Part 2: Rules for the improvement of safety of existing escalators and moving walks*;
- *Part 3: Correlation between EN 115:1995 and its amendments and EN 115-1:2008* [Technical Report];
- *Part 4: Interpretations related to EN 115 family of standards* [Technical Specification].

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. (standards.iteh.ai)

SIST EN 115-1:2017

<https://standards.iteh.ai/catalog/standards/sist/d267aa90-5a90-4075-bd23-09d40c863038/sist-en-115-1-2017>

Introduction

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 the 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 -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.

The purpose of this standard is to define safety requirements for escalators and moving walks in order to safeguard people and objects against risks of accidents during installation, operation, maintenance and inspection work.

The contents of this standard are based on the assumption that persons using escalators and moving walks are able to do so unaided. However, physical and sensory abilities in a population can vary over a wide range, escalators and moving walks are also likely to be used by persons with a range of other disabilities.

Some individuals, in particular older people, might have more than one impairment. Some individuals are not able to use an escalator or moving walk independently and rely on assistance/support being provided by a companion. Furthermore some individuals can be encumbered by objects or be responsible for other persons, which can affect their mobility. The extent to which an individual is incapacitated by impairments and encumbrances often depends on the usability of products, facilities and the environment.

The use of wheelchairs on escalators and moving walks can lead to dangerous situations which cannot be mitigated by machine designs and therefore should not be permitted.

The use of lifts is the preferred method of vertical travel for most people with disabilities and in particular wheelchair users and persons with guide dogs.

Additional signs should be provided to indicate the location of other facilities, these facilities should be in close proximity to the escalators and moving walks and easy to find.

The risks arising from the configuration of escalators and moving walks within a building (e.g. obstructions or voids adjacent to escalators) should be risk assessed according to methodology of the

ISO 14798 by the building designer/owner at the building design stage and measures identified to eliminate hazards or reduce risk to an acceptable level.

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

- a) intended use of the escalator or moving walk;
- b) environmental conditions;
- c) civil engineering problems;
- d) other aspects related to the place of installation.

Planning of traffic flows and evacuation/rescue purposes are under the responsibility of the building designer/owner.

If escalators or moving walks are intended to be operated under special conditions, such as directly exposed to the weather or explosive atmosphere, or in exceptional cases serve as emergency exits, appropriate design criteria, components, materials and instructions for use should be used that satisfy the particular conditions.

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. The formats of an interpretation request and the interpretation are given in Annex N.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 115-1:2017](https://standards.iteh.ai/catalog/standards/sist/d267aa90-5a90-4075-bd23-09d40c863038/sist-en-115-1-2017)

<https://standards.iteh.ai/catalog/standards/sist/d267aa90-5a90-4075-bd23-09d40c863038/sist-en-115-1-2017>

1 Scope

This European Standard is applicable for new escalators and moving walks (pallet or belt type) as defined in Clause 3.

This European Standard deals with all significant hazards, hazardous situations and events relevant to escalators and moving walks when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

This European Standard is not applicable to escalators and moving walks which were manufactured before the date of its publication. It is, however, recommended that existing installations be adapted to this standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1929-2:2004, *Basket trolleys — Part 2: Requirements, tests and inspection for basket trolleys with or without a child carrying facility, intended to be used on passenger conveyors*

EN 1929-4:2005, *Basket trolleys — Part 4: Requirements and tests for basket trolleys with additional goods carrying facility(ies), with or without a child carrying facility, intended to be used on passenger conveyors*

EN 1990:2002², *Eurocode — Basis of structural design*

EN 1993-1-1:2005, *Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings*

EN 1998-1:2004, *Eurocode 8: Design of structures for earthquake resistance — Part 1: General rules, seismic actions and rules for buildings*

EN 10025-1:2004, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

EN 10025-2:2004, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10025-3:2004, *Hot rolled products of structural steels — Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*

EN 10025-4:2004, *Hot rolled products of structural steels — Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels*

EN 10025-5:2004, *Hot rolled products of structural steels — Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance*

EN 10025-6:2004+A1:2009, *Hot rolled products of structural steels — Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition*

EN 10083-1:2006, *Steels for quenching and tempering — Part 1: General technical delivery conditions*

2) This standard is currently impacted by the amendment EN 1990:2002/A1:2005.

EN 10083-2:2006, *Steels for quenching and tempering — Part 2: Technical delivery conditions for non alloy steels*

EN 10083-3:2006, *Steels for quenching and tempering — Part 3: Technical delivery conditions for alloy steels*

EN 12015:2014, *Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Emission*

EN 12016:2013, *Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Immunity*

EN 13501-1:2007+A1:2009, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 60068-2-6:2008, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal) (IEC 60068-2-6:2007)*

EN 60068-2-14:2009, *Environmental testing — Part 2-14: Tests — Test N: Change of temperature (IEC 60068-2-14:2009)*

EN 60068-2-27:2009, *Environmental testing — Part 2-27: Tests — Test Ea and guidance: Shock (IEC 60068-2-27:2008)*

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2006, modified)*

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

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

EN 60947-4-1:2010³, *Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters (IEC 60947-4-1:2009)*

EN 60947-5-1:2004⁴, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices (IEC 60947-5-1:2004)*

EN 61249 (all parts), *Materials for printed boards and other interconnecting structures (IEC 61249, all parts)*

EN 62061:2005⁵, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061:2005)*

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

EN ISO 868:2003, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868:2003)*

3) This standard is currently impacted by the amendment EN 60947-4-1:2010/A1:2012.

4) This standard is currently impacted by the amendment EN 60947-5-1:2004/A1:2009.

5) This standard is currently impacted by the amendment EN 62061:2005/A1:2013.

EN 115-1:2017 (E)

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

EN ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design (ISO 13850:2015)*

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO 3864-3:2012, *Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs*

HD 60364-4-41:2007, *Low-voltage electrical installations — Part 4-41: Protection for safety — Protection against electric shock*

3 Terms and definitions, symbols and abbreviations**3.1 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1.1**angle of inclination**

maximum angle to the horizontal in which the steps, the pallets or the belt move

3.1.2**authorized person**

suitably trained person with authorization to access restricted areas of escalators and moving walks (e.g. machinery spaces, separate machine rooms) and to work there for the purpose of inspection, testing and maintenance

Note 1 to entry: Authorized persons should be competent for the tasks they have been authorized for (see also 3.1.8).

3.1.3**balustrade**

part of the escalator/moving walk which ensures the user's safety by providing stability, protecting from moving parts and supporting the handrail

3.1.4**balustrade decking**

transverse member of the balustrade which meets the handrail guidance profile and which forms the top cover of the balustrade

3.1.5**brake load**

load on the step/pallet/belt which the brake system is designed to stop the escalator/moving walk

3.1.6**comb**

pronged section at each landing that meshes with the grooves

3.1.7**comb plate**

platform at each landing to which the combs are attached

3.1.8**competent person**

person who is in possession of the necessary technical knowledge, skills, qualification and experience to perform a work or task

Note 1 to entry: National Regulation may require certification of competence.

3.1.9**escalator**

power-driven, inclined, continuous moving stairway used for raising or lowering persons in which the user carrying surface (e.g. steps) remains horizontal

Note 1 to entry: Escalators are machines - even when they are out of operation - and cannot be considered as fixed staircases.

3.1.10**exterior panel**

part of the exterior side of the enclosure of an escalator or moving walk

3.1.11**failsafe circuit**

safety related electrical and/or electronic system with defined failure mode behaviour

3.1.12**handrail**

power-driven moving rail for persons to grip while using the escalator or moving walk

3.1.13**interior panel**

panel located between the skirting or lower inner decking and the handrail guidance profile or balustrade decking

3.1.14**lower inner decking**

profile that connects the skirting with the interior panel when they do not meet at a common point

3.1.15**lower outer decking**

profile that connects the exterior panels with the interior panel

3.1.16**machinery**

escalator or moving walk machine(s) mechanisms and associated equipment

3.1.17**machinery spaces**

space(s) inside or outside of the truss where the machinery as a whole or in parts is placed

3.1.18**maximum capacity**

maximum flow of persons that can be achieved under operational conditions

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 115-1:2017
<https://standards.iteh.ai/catalog/standards/sist/d267aa90-3a90-4075-bd23-09d40c863038/sist-en-115-1-2017>