

BS EN 115-2:2010



BSI Standards Publication

Safety of escalators and moving walks

Part 2: Rules for the improvement of safety of existing escalators and moving walks

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National foreword

This British Standard is the UK implementation of EN 115-2:2010.

The UK participation in its preparation was entrusted to Technical Committee MHE/4, Lifts, hoists and escalators.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Safety of escalators and moving walks - Part 2: Rules for the improvement of safety of existing escalators and moving walks

Sécurité des escaliers mécaniques et trottoirs roulants -
Partie 2: Règles pour l'amélioration de la sécurité des
escaliers mécaniques et des trottoirs roulants existants

Sicherheit von Fahrtreppen und Fahrsteigen - Teil 2:
Regeln für die Erhöhung der Sicherheit bestehender
Fahrtreppen und Fahrsteige

This European Standard was approved by CEN on 12 June 2010.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 115-2:2010) 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of an identical text or by endorsement, at the latest by January 2011, and conflicting national standards shall be withdrawn at the latest by January 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

The EN 115 series of standards consists of the following parts, under the general title *Safety of escalators and moving walks*:

- *Part 1: Construction and installation;*
- *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.*

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

Background of this standard

More than 75 000 escalators and moving walks are in use today in the European Union (EU) and European free Trade Association (EFTA) and almost 50 % were installed more than 20 years ago. However, this standard compares the safety level of escalators and moving walks installed after 1970 with those within EN 115-1:2008. This recognises that the first attempt to have a common standard for escalators and moving walks was the CIRA Recommendation 28 [1]. Escalators and moving walks were installed to the safety level appropriate at that time. This level is less than today's state of the art for safety.

New technologies and social expectations have led to today's state of the art for safety. This has led to the situation today of different levels of safety across Europe causing accidents. However, users and authorised persons expect a common acceptable level of safety.

Furthermore the life cycle of escalators and moving walks is longer than most other transportation systems and building equipment, which therefore means that the design, performance and safety can fall behind modern technologies. If all existing escalators and moving walks are not upgraded to today's state of the art of safety the number of injuries will increase (especially in areas which can be accessed by the general public, recognizing the change of behaviour and changing attitudes towards safety in general). If escalators or moving walks were installed before 1970 on the base of manufacturer's and national standards or were installed after 1970 but not in accordance with CIRA Recommendation 28, then they should be the subject of a separate risk assessment in addition to the recommendations of this standard to determine whether a safety upgrade or a full replacement is appropriate.

Approach of this standard

This standard

- categorises various hazards and hazardous situations, each of which has been analysed by a risk assessment (see in particular Annex A);
- is intended to provide corrective actions to progressively and selectively improve, step by step, the safety of all existing escalators and moving walks towards today's state of the art for safety (see Clause 5);
- enables each escalator and moving walk to be audited and safety measures to be identified and implemented in a step by step and selective fashion according to the frequency and severity of any single risk (see Table B.2);
- lists the high, medium and low risks and corrective actions which can be applied in separate steps in order to mitigate the risks (see Table B.2).

Use of this standard

This standard can be used as a guideline for:

- a) national authorities to determine its own programme of implementation in a step by step process via a filtering process (see Annex A) in a reasonable and practicable¹⁾ way based on the level of risk (e.g. high, medium, low) and social and economic considerations;

1) "Reasonable and practicable" is defined as follows: "In deciding what is reasonably practicable the seriousness of a risk to injury should be weighted against the difficulty and cost of removing or reducing that risk. Where the difficulty and costs are high, and a careful assessment of the risk shows it to be comparatively unimportant, action may not need to be taken. On the other hand where the risk is high, action should be taken at whatever cost."

- b) owners to follow their responsibilities according to existing regulations (e.g. use of Work Equipment Directive);
- c) maintenance companies and/or inspection bodies to inform the owners on the safety level of their installations;
- d) owners to upgrade the existing escalator or moving walk on a voluntary basis in accordance with c) if no regulations exist.

In making an audit of an existing escalator or moving walk installation Annex B can be used to identify the hazards and corrective actions in this standard. However, where a hazardous situation is identified which is not covered in this standard a separate risk assessment should be made. This risk assessment should be based on ISO 14798 [2].

1 Scope

1.1 This European Standard gives rules for improving the safety of existing escalators and moving walks with the aim of reaching an equivalent level of safety to that of a newly installed escalator and moving walk by the application of today's state of the art for safety.

NOTE Due to situations such as the existing machine or building designs, it may not be possible in all cases to reach today's state of the art for safety. Nevertheless the objective is to improve the level of safety wherever possible.

1.2 This standard includes the improvement of safety of existing escalators and moving walks for:

- a) users;
- b) maintenance and inspection personnel;
- c) persons outside the escalator or moving walk (but in its immediate vicinity);
- d) authorised persons.

1.3 This standard is not applicable to:

- a) safety during transport, installation, repairs and dismantling of escalators and moving walks;
- b) spiral escalators;
- c) accelerating moving walks.

However, this standard can usefully be taken as a reference basis.

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 115-1:2008+A1:2010, *Safety of escalators and moving walks — Part 1: Construction and installation*

EN 13015:2001+A1:2008, *Maintenance for lifts and escalators — Rules for maintenance instructions*

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

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

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003, EN 115-1:2008+A1:2010 and the following apply.

**3.1
authorised person**

person with permission from the owner of the installation to perform defined activities

**3.2
existing escalator or moving walk**

escalator or moving walk which is in service at the disposal of its owner

**3.3
owner of the installation**

natural or legal person who has the power of disposal of the installation and takes the responsibility for its operation and use

4 List of significant hazards

4.1 General

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessments as significant for existing escalators and moving walks and which require action to eliminate or reduce the risk.

4.2 Significant hazards dealt with by this standard

Table 1 below contains a list of significant hazards including their priority levels and relevant clauses of the present standard.

Table 1 — List of significant hazards

Nr.	Hazard/hazardous situation	Priority level	Relevant clause of EN 115-2
1	Affect of harmful materials (e.g. asbestos)	H	5.1
2	Contact with moving machinery parts (e.g. driving unit, handrail drive, step or pallet) normally not accessible to the public	M	5.2.1, 5.4.1, 5.12.2, 5.13.2.1
3	Fire inside the supporting structure and machinery spaces	M	5.2.2, 5.9
4	Slipping on steps/pallets/belt and landing areas	H	5.3.1, 5.7.1
5	Falling due to insufficient step demarcation	M	5.3.2
6	Trapping between skirting and steps	H	5.3.3, 5.5.3
7	Trapping between step and step or pallet and pallet	H	5.3.4
8	Missing steps or pallets	H	5.3.5
9	Collision between fixed and moving parts of the step/pallet/belt system	M	5.3.6
10	Uncontrolled movement or a failure to stop of the machine resulting from missing second independent main contactor	H	5.4.1, 5.4.2.3
11	Excessive speed and unintended reversal of direction	M	5.4.2.1, 5.4.2.2, 5.4.2.5
12	Effect of excessive stopping distance	L	5.4.2.4
13	Falling due to reduced stopping distance	H	5.4.2.6
14	Falling over the balustrade	M	5.5.2.1, 5.5.2.2
15	Falling resulting from sliding on the outside of the balustrade	L	5.5.2.3
16	Climbing on the outside of the balustrade or falling from the landing	H	5.5.2.3, 5.13.1.6
17	Falling due to handrail speed deviation	M	5.6.1
18	Crushing of fingers between handrail and balustrade	H	5.6.2
19	Drawing-in at handrail entry into the balustrade	H/M	5.6.3.1
20	Trapping at handrail entry (between handrail and floor)	M	5.6.3.2
21	Trapping between comb and step/pallet	H	5.7.2, 5.7.3
22	Trapping of users resulting from sagging of the step/pallet	H	5.7.4
23	Miscellaneous equipment in workers' area not related to the installation	M	5.8.1

Table 1 (continued)

Nr.	Hazard/hazardous situation	Priority level	Relevant clause of EN 115-2
24	Insufficient space in workers' area	H	5.8.2, 5.13.2.4, 5.13.2.5, 5.13.2.6
25	Injuries due to missing lifting equipment for heavy loads	M	5.8.3
26.1	Missing lighting in the workers' area and access to it	H	5.8.4
26.2	Inadequate lighting in the workers' area and access to it	M	5.8.4, 5.13.2.2, 5.13.2.3
27.1	Missing emergency stopping device (working area)	H	5.8.5
27.2	Inadequate emergency stopping device (working area)	L	5.8.5
28	Contact of persons with live parts - Insufficient isolation	H	5.11.1.2, 5.13.3
29	Contact of persons with live parts – Isolation failure	H	5.11.1.3, 5.11.1.4, 5.13.3
30.1	Unsafe working conditions due to missing main switch	H	5.11.2
30.2	Unsafe working conditions due to or inadequate main switch	M	5.11.2
31	Electrostatic discharge from moving components	L	5.11.3
32.1	Injuries due to missing stop switch for emergency situation	H	5.12.1
32.2	Injuries due to inadequate stop switch for emergency situation	M	5.12.1
33	Impact on bodies caused by collision with building structures (wall, roof, criss-cross arrangement)	H	5.13.1.1, 5.13.1.2, 5.13.1.3
34	Crushing due to restricted circulation areas	M	5.13.1.4
35	Crushing of persons resulting from traffic congestion on succeeding escalators or moving walks	L	5.13.1.5
36	Falling due to inadequate lighting at the landings	M	5.13.1.7
37	Missing safety signs	M	5.14
38.1	Missing devices resulting in misuse of escalators by transporting other items than persons (e.g. shopping trolleys or baggage carts)	H	5.15.1
38.2	Inadequate devices to prevent use of trolleys or baggage carts on escalators	M	5.15.1
39	Crushing due to incompatible trolleys on moving walks	L	5.15.2
Key			
H high, M medium, L low			

4.3 Significant hazards not dealt with by this standard

- Environmental conditions including e.g. earthquake and flooding;
- electromagnetic interferences;
- shearing due to sharp edges on machinery;
- non-conformance with national building codes;
- fire in the building.

5 Safety requirements and/or protective measures

5.1 General

The following requirements and/or protective measures shall not be considered as the only possible solution. Alternatives are permitted, provided they lead to an equivalent safety level.

A risk assessment shall be made on a case by case basis to identify hazards or hazardous situations not covered in this standard.

Where the requirements of this standard cannot be met technically and a residual risk remains, or cannot be avoided, the level of risk shall be reduced as far as it is practicable. When residual risk remains the use of appropriate procedures such as signs, instructions and training should be considered.

Harmful materials such as asbestos in brake linings, contactor shields, cladding including machinery spaces and separate machine rooms or control cabinet locations, etc. shall be replaced by materials which ensure the same performance level.

NOTE These should be considered in relation to national requirements.

For specific requirements such as accessibility, the conditions in the building shall be assessed to determine what is practical to be applied for escalators and moving walks.

If an escalator or moving walk has been upgraded by one of the measures described in this standard, the consequences to other parts of the escalator or moving walk shall be considered with special regard to EN 115-1:2008+A1:2010.

5.2 Supporting structure (truss) and enclosure

5.2.1 General

All mechanically moving parts of the escalator or moving walk shall be completely enclosed within panels or walls. Exempt from this are the accessible steps, the accessible pallets, the accessible belt and that part of the handrail available for the user. Ventilation apertures in compliance with EN ISO 13857:2008, Table 5 are permitted.

Exterior panels which are designed to be opened (e.g. for cleaning purposes), inspection covers and floor plates shall be provided with an electric safety device according to EN 115-1:2008+A1:2010, Table 6 n). For inspection covers and floor plates it shall only be possible to open them by a key or a tool suited for that purpose.

If rooms behind inspection covers and floor plates can be entered, it shall be possible to open them from the inside without a key or a tool even when locked.

It is permissible to omit an enclosure of the mechanically moving parts if other measures (such as rooms with locked doors accessible to authorised personnel only) make a hazard to the public impossible.

5.2.2 Fire hazard

5.2.2.1 Accumulation of combustible material inside the truss due to the daily environmental pollution can generate a fire hazard. Therefore, the inner part of the escalator/moving walk shall be cleaned regularly.

5.2.2.2 Depending on the maintenance conditions, e.g. access, fire protection systems shall be installed.

5.3 Steps, pallets and belt

5.3.1 Tread surfaces for escalators and moving walks shall provide a secure foothold taking into consideration the operational and environmental conditions.

5.3.2 Demarcation (e.g. groove in the step tread) shall be provided to highlight at the landings the rear edge of the steps.

5.3.3 The lateral displacement of the steps or pallets out of their guiding system shall not exceed 4 mm at either side and 7 mm for the sum of clearances measured at both sides.

The vertical displacement shall not exceed 4 mm for steps and pallets and 6 mm for belts.

5.3.4 Clearances for steps with cleated risers and pallets with meshing front and rear edges shall not exceed 6 mm between two consecutive steps or pallets in any usable position measured at the tread surface.

Clearances for steps with plain risers and pallets without meshing shall not exceed 5 mm between two consecutive steps or pallets in any usable position measured at the tread surface.

In the area of the transition curves of moving walks with meshed front edges and rear edges of the pallets, this clearance is permitted to be increased to 8 mm.

5.3.5 A missing step/pallet shall be detected and the escalator/moving walk stopped before the gap (resulting from the missing step/pallet) emerges from the comb. This shall be ensured by a device according to EN 115-1:2008+A1:2010, Table 6 k), provided at each driving and return station.

5.3.6 The step/pallet chains and the belt shall be tensioned continuously. The escalator/moving walk shall be stopped automatically before the tensioning device moves excessively (see EN 115-1:2008+A1:2010, 5.4.3.3 and Table 6 e) and f)). Springs working in tension are not permitted for the tensioning device. When weights are used for tensioning they shall be safely retained should their suspension break.

5.4 Drive units

5.4.1 Driving machine

Stopping the escalator or moving walk by means of the electric safety devices shall be effected as follows:

The supply shall be interrupted by two independent contactors, the contacts of which shall be in series in the supply circuit. If, when the escalator or moving walk is stopped, one of the main contacts of one of the contactors has not opened, starting shall be impossible.

If a hand winding device is provided it shall be easily accessible and safe to operate. If the hand winding device is removable an electric safety device shall be actuated when or before the hand winding device is put on the machine. Crank handles or perforate hand wheels are not permitted.

5.4.2 Braking system

5.4.2.1 If the design does not prevent excessive speed, escalators and moving walks shall be equipped in such a way that they stop automatically before the speed exceeds a value of 1,2 times the nominal speed. Where speed control devices are used for this purpose they shall have switched off the escalator or moving walk before the speed exceeds a value of 1,2 times the nominal speed and shall be provided with an electrical safety device in accordance with EN 115-1:2008+A1:2010, Table 6 c).

5.4.2.2 Escalators and inclined ($\alpha \geq 6^\circ$) moving walks shall be equipped with an electrical safety device in accordance with EN 115-1:2008+A1:2010, Table 6 c) in such a way that they stop automatically by the time the steps and pallets or the belt change from the pre-set direction of travel.

5.4.2.3 The interruption of the electricity supply to an electromechanical brake shall be effected by at least two independent electric devices. They can be those which break the supply to the machine. If after the stop of the escalator or moving walk one of these electric devices has not opened, restarting shall be prevented.

5.4.2.4 A device shall be provided to monitor the lifting of the braking system after starting the escalator/moving walk.

5.4.2.5 Escalators and inclined moving walks shall be equipped with auxiliary brake(s) if

- a) the connection between the operational brake and the driving sprockets of the steps/pallets or the drum of the belt is not accomplished by shafts, gear wheels, multiplex chains, or more than one single chain, or

- b) the operational brake is not an electro-mechanical brake, or
- c) the rise exceeds 6 m.

The connection between the auxiliary brake and the driving sprockets of the steps/ pallets or the drum of the belt shall be accomplished by shafts, gear wheels, multiplex chains or more than one single chain. It is not permissible for the connection to comprise friction drives, i.e. clutches.

The auxiliary braking system shall be dimensioned in such a way that escalators and moving walks travelling with brake load downward are brought to rest and maintained stationary.

NOTE Upon operation of auxiliary brakes it is not necessary to keep the stopping distances defined for the operational brake.

5.4.2.6 The stopping distances for unloaded and downward moving loaded escalators shall be as indicated in Table 2.

Table 2 — Stopping distances for escalators

Nominal speed v	Stopping distance between
0,50 m/s	0,20 m and 1,00 m
0,65 m/s	0,30 m and 1,30 m
0,75 m/s	0,40 m and 1,50 m

The stopping distances for unloaded and horizontally or downward moving loaded moving walks shall be as indicated in Table 3.

Table 3 — Stopping distances for moving walks

Nominal speed v	Stopping distance between
0,50 m/s	0,20 m and 1,00 m
0,65 m/s	0,30 m and 1,30 m
0,75 m/s	0,40 m and 1,50 m
0,90 m/s	0,55 m and 1,70 m

For intermediate speeds the stopping distances shall be interpolated.

The stopping distances shall be measured from the time the electric device for stopping is actuated.

5.5 Balustrade

5.5.1 General

Balustrades shall be installed on each side of the escalator or moving walk.

5.5.2 Dimension of balustrades

5.5.2.1 In the inclined section the vertical height from step nose or pallet surface or belt surface to top of the handrail shall be not less than 0,90 m and not exceed 1,10 m.

5.5.2.2 The lower inner decking and the interior panel shall have an angle of inclination of at least 25° to the horizontal. This does not apply to the horizontal part of the lower inner decking that directly joins the interior panel.

5.5.2.3 Appropriate measures shall be taken to discourage people from climbing on the outsides of the balustrade if there is a danger of people falling from them.

On escalators and moving walks devices shall be provided on the outer decking at a point $(1\ 000 \pm 50)$ mm above the floor level where the bottom of the device intersects with the balustrade decking and shall extend to a length of at least 1 000 mm parallel with the balustrade decking where no stepping is possible. The device shall extend to at least a height in line with the top of the handrail.

Where handrail level balustrade deckings are provided between escalators/inclined moving walks and adjacent walls, anti-slide devices shall be provided on the balustrade decking when the distance between the structure of the building (wall) and the centreline of the handrail is greater than 300 mm, or, on adjacent escalators/inclined moving walks when the distance between the centrelines of the handrails is greater than 400 mm. These devices shall consist of objects fastened to the balustrade decking, no closer than 100 mm to the handrail and spaced no greater than 1 800 mm apart. The height shall be not less than 20 mm. The devices shall have no sharp corners or edges.

NOTE All dimensions detailed in 5.5.2.3 are illustrated in EN 115-1:2008+A1:2010, Figure 4.

5.5.3 Skirting

On escalators, the possibility of trapping between skirting and steps shall be minimised by the installation of skirt deflectors in accordance with EN 115-1:2008+A1:2010, 5.5.3.4 c).

NOTE Where it is not practical to achieve the required distances between the underside of the rigid part of the deflector device and the step nose line, then the maximum dimension should be achieved without protruding above the existing inner decking profile. The minimum dimension permissible is 8 mm between the underside of the rigid part of the deflector device and the step nose line.

5.6 Handrail system

5.6.1 Handrail speed monitoring

A handrail speed monitoring device shall be provided in accordance with EN 115-1:2008+A1:2010, 5.6.1 and Table 6 m).

If this is not reasonably practicable, a movement detection device shall be installed and shall stop the escalator or moving walk in the event of no hand rail movement for a period of 15 s while the step/pallet/belt is running.

5.6.2 Profile and position

The handrail profiles and their guides on the balustrades shall be formed or enclosed in such a way that the possibility of pinching or trapping of fingers or hands is reduced.

The distance between the handrail profile and guide or cover profiles shall under no circumstances be wider than 8 mm.

5.6.3 Handrail entry

5.6.3.1 At the point of entry of the handrail into the newel a guard shall be installed to prevent the pinching of fingers and hands.

An electric safety device in accordance with EN 115-1:2008+A1:2010, Table 6 i) shall be provided.

5.6.3.2 If extended newels are fitted they shall be of the correct profile in accordance with EN 115-1:2008+A1:2010, 5.6.4.2 or appropriate guarding shall be fitted to prevent trapping.

5.7 Landings

5.7.1 The landing area of escalators and moving walks (i.e. comb plate and floor plate) shall have a surface that provides a secure foothold for a minimum distance of 0,85 m measured from the root of the comb teeth.

Exempt from this are the combs.

5.7.2 The combs shall have such a design that upon trapping of foreign bodies either their teeth deflect and remain in mesh with the grooves of the steps, pallets or belt, or they break.

5.7.3 In the case of objects being trapped which are not dealt with by the means described in 5.7.2 and in the case of comb/step/pallet impact the escalator or moving walk shall be stopped automatically.

5.7.4 If any part of the step or pallet is sagging so that meshing of the combs is no longer ensured a safety device shall be provided to stop the escalator or moving walk. This safety device shall be arranged before each transition curve at a sufficient distance before the comb intersection line to ensure that the step or pallet which has sagged does not reach the comb intersection line. The monitoring device may be applied at any point on the step or pallet and shall be in accordance with EN 115-1:2008+A1:2010, Table 6 j).

5.8 Machinery spaces, driving stations and return stations

5.8.1 These rooms/spaces shall be used only for accommodating the equipment necessary for the operation and maintenance and inspection of the escalator or moving walk. Effective protection and guards shall be provided for moving and rotating parts if they are accessible.

5.8.2 In all machinery spaces, especially in driving and return stations inside the truss, space with a sufficiently large standing area shall be kept free from fixed parts of any kind. The size of the standing area shall be at least 0,30 m² and the smaller side shall be at least 0,50 m long.

Where these minimum dimensions are not achievable and in order to minimise the risk, devices to detect persons in a machinery space shall be provided (e.g. light beam). If a person is detected both normal and inspection modes of operation shall be blocked. If no persons are detected along with an open floor plate condition, operation only in the inspection mode shall be possible.

5.8.3 If the controller cabinet has to be moved or lifted for maintenance purposes, then suitable attachments for lifting shall be provided.

5.8.4 Provisions for electric lighting in driving and return stations and machinery spaces inside the truss shall be provided by one or more socket outlets in each of these places.

The light intensity shall be at least 200 Lux in working areas.

5.8.5 There shall be a stop switch in the driving and return station.

Escalators and moving walks with the driving unit arranged between the user side of the step, pallet or belt and the return line, or outside the return stations, shall have additional stop switches in the area of the driving unit.

The operation of these stop switches shall cause the disconnection of the power supply from the driving machine and allow the operational brake to become effective to stop the escalator or moving walk.

The stop switches shall be in accordance with EN ISO 13850 and achieve a category 0 stop.

When activated it shall prevent the escalator or moving walk from starting.

The switching positions shall be marked clearly and permanently.

SPECIFIC CASE: A stop switch need not be provided in a machinery space if a main switch according to EN 115-1:2008+A1:2010, 5.11.4 is located therein.

5.9 Fire protection

Fire protection and building requirements differ from country to country and so far neither have been harmonised. Therefore, this standard cannot include specific requirements for fire protection and building requirements.

5.10 (kept free)

5.11 Electric installations and appliances

5.11.1 General

5.11.1.1 Introduction

The following items address the common hazardous situations regarding the electrical installation. However, there may be other specific hazardous situations, e.g. the existing wiring and connections; any risks of electrical shock or bridging of a safety circuit. These shall be checked on a case by case basis using a risk assessment when carrying out an audit to Annex B taking into account the regulations/standards which existed at the time of the installation of the escalator or moving walk.

Escalators and moving walks shall comply with EN 60204-1 or the requirements of the national rules of the country where they are installed.

5.11.1.2 Protection against direct contact

5.11.1.2.1 For protection against direct contact the requirements of EN 60204-1:2006, 6.2 shall apply.

5.11.1.2.2 If, after the opening of the main switch or switches of the escalator or moving walk, some connection terminals remain live, they shall be clearly separated from terminals which are not live. If the voltage exceeds 50 V, they shall be suitably marked.

In these instances the requirements of EN 60204-1:2006, 5.3.5 and 16.2 apply.

5.11.1.3 Voltage limit for control and safety circuits

For control and safety circuits, the value in direct current or the r.m.s. value in alternating current between conductors or between conductors and earth shall not exceed 250 V.

5.11.1.4 Conductor for neutral and earth-continuity

The earth-continuity conductor shall be in accordance with EN 60204-1:2006, Clause 8.

5.11.2 Main switches

5.11.2.1 In the vicinity of the machine or in the return stations, or in the vicinity of the control devices, there shall be a main switch capable of breaking the supply to the motor, the brake releasing device and to the control circuit in the live conductors.

This switch shall not cut the supply to the socket outlets or to the lighting circuits necessary for inspection and maintenance (see 5.8.4).

When separate supplies are provided for auxiliary equipment such as heating, balustrade lighting and comb lighting, it shall be possible to switch them off independently. The corresponding switches shall be located close to the main switch and be marked unambiguously.

5.11.2.2 The main switches as defined in EN 115-1:2008+A1:2010, 5.11.4.1 shall be capable of being locked or otherwise secured in the "isolated" position, with the use of a padlock or equivalent, to ensure no inadvertent operation by others (see EN 60204-1:2006, 5.3.3). The control mechanism of the main switch shall be easily and rapidly accessible after opening of the doors or trap doors.

5.11.2.3 Main switches shall be capable of interrupting the highest current involved in normal operating conditions of the escalator or moving walk. They shall comply with the requirements of EN 60204-1:2006, Clause 5.

5.11.2.4 Where the main switches of several escalators or moving walks are positioned together it shall be possible to easily identify to which escalator or moving walk they refer.

5.11.3 Protection against electrostatic loading

Means to discharge electrostatic loading shall be provided (e.g. antistatic brushes).

5.12 Protection against electric faults - controls

5.12.1 Stopping

5.12.1.1 Stop switch for emergency situations, manually operated

5.12.1.1.1 Stop switch for emergency situations shall be provided to stop the escalator or moving walks in the event of an emergency. They shall be placed in conspicuous and easily reachable positions at or near to the landings of the escalator or moving walk (see EN 115-1:2008+A1:2010, 7.2.1.2.2 for visual appearance).

The distances between stop switches for emergency situations shall not exceed:

- 30 m on escalators;
- 40 m on moving walks.

If necessary, additional stop switches shall be provided to maintain the distance.

For moving walks intended to transport shopping and luggage trolleys, see EN 115-1:2008+A1:2010, I.2.

5.12.1.1.2 Stop switch for emergency situations shall be electric safety devices according to EN 115-1:2008+A1:2010, 5.12.1.2.

NOTE Devices according to EN ISO 13850 do not support the functional requirement for stop switches according to EN 115-1:2008+A1:2010, 5.12.2.2.3. For the specific purpose of safety for escalators and moving walks the stop switch for emergency situations is defined different to EN ISO 13850.

5.12.2 Inspection control

5.12.2.1 Escalators or moving walks shall be equipped with inspection controls to permit operation during maintenance or repair or inspection by means of portable and manually operated control devices.

5.12.2.2 For this purpose, one inspection outlet for the connection of the flexible cable of the portable manually operated control device shall be provided at least at each landing, e.g. in the driving station and the return station in the truss. The length of the cable shall be at least 3,0 m. Inspection outlets shall be located in such a way that any point of the escalator or moving walk can be reached with the cable.

5.12.2.3 The operating elements of this control device shall be protected against accidental operation. The escalator or moving walk is permitted to run only as long as the operating elements are switched on by permanent application of manual pressure. The direction of travel shall be distinctly recognisable from the indication on the switch. Each control device shall have a stop switch.

The stop switch shall

- a) be operated manually;
- b) have the switching positions marked clearly and permanently;
- c) be a safety switch satisfying EN 115-1:2008+A1:2010, 5.12.1.2.2;
- d) require manual reset.

When the inspection control device is plugged-in, the operation of the stop switch shall cause the disconnection of the power supply from the driving machine and the operational brake shall be activated.

5.12.2.4 When the inspection control device is used, all other starting devices shall be rendered inoperative in accordance with EN 115-1:2008+A1:2010, 5.12.1.2.

All inspection outlets shall be arranged in such a way that when more than one control device is connected, they all become inoperative. The electric safety devices (according to EN 115-1:2008+A1:2010, 5.12.2.2.4) shall remain effective with the exception of the electric safety devices mentioned in h), j), k), l), m) and n) of EN 115-1:2008+A1:2010, Table 6.

5.13 Building interfaces

5.13.1 Free space for users

5.13.1.1 The clear height above the steps of the escalator or pallets or belt of the moving walk at all points shall be not less than 2,30 m. The clear height shall extend to the end of the newel.

If this clear height is not achievable or is not continuous, then provide a level of illumination of at least 50 Lux, remove sharp edges from obstacles and building structures and arrange deflectors and/or warning signs.

5.13.1.2 The distance between the outer edge of the handrail and walls or other obstacles shall under no circumstances be less than 80 mm horizontally and 25 mm vertically below the lower edge of the handrail.

5.13.1.3 Where building obstacles can cause injuries, appropriate preventive measures shall be taken.

In particular, at floor intersections and on criss-cross escalators or moving walks, a vertical deflector of not less than 0,30 m in height, not presenting any sharp cutting edges shall be placed above the handrail level and extend at least 25 mm below the lower edge of the handrail, e.g. as an imperforate triangle.

5.13.1.4 At the exit(s) of each individual escalator or moving walk a sufficient unrestricted area shall be available to accommodate persons. The width of the unrestricted area shall at least correspond to the distance between the outer edges of the handrails plus 80 mm on each side. The depth shall be at least 2,50 m measured from the end of the balustrade. It shall be permissible to reduce it to 2,00 m if the width of the unrestricted area is increased to at least double the distance between the outer edges of the handrails plus 80 mm on each side.

If it is impractical to provide the unrestricted area as described above then additional stop switches for emergency situations shall be provided at a distance between 2,00 m and 3,00 m before the step, pallet or belt reaches the comb intersection line.

5.13.1.5 Stopping of a succeeding escalator or moving walk shall occur where an intermediate exit does not exist or the exit of the escalator or moving walk by structural measures is blocked (e.g. shutters, fire protection gates).

In the case of succeeding escalators or moving walks, stopping of preceding escalators or moving walks shall occur in the event of stoppage of the succeeding unit where there is a risk of overcrowding.

When the exit of an escalator or moving walk is blocked (e.g. shutters, fire protection gates, automatic doors) the unit shall be stopped.

5.13.1.6 Where it is possible for people to come into contact with the outer edge of a handrail at a landing and can be drawn into a hazardous situation, such as toppling over a balustrade, appropriate preventative measures shall be taken.

Some examples are:

- prevention of entry into the space by the placement of permanent barriers;
- increasing the height of the building structure of the fixed balustrade in the hazard area by at least 100 mm above the handrail level and positioned between 80 mm and 120 mm from the outer edge of the handrail.

5.13.1.7 The surrounds of the escalator or moving walk shall be illuminated, especially in the vicinity of the combs.

It is permissible to arrange the lighting in the surrounding space and/or at the installation itself. The intensity of illumination at the landings including the combs shall be related to the intensity of illumination of the general lighting in the area. The intensity of illumination shall be not less than 50 Lux at the comb intersection line measured at floor level.

5.13.2 Machinery spaces outside the truss

5.13.2.1 Machinery spaces shall be lockable and only accessible to authorised persons (see EN 13015:2001+A1:2008, 4.3.2.13).

5.13.2.2 Machinery spaces shall be provided with permanently installed electric lighting on the following basis:

- a) a minimum of 200 Lux at floor level in working areas;
- b) a minimum of 50 Lux at floor level in access routes leading to these working areas.

5.13.2.3 Emergency lighting shall be installed to allow the safe evacuation of all personnel working in any machinery space.

5.13.2.4 The dimensions of machinery spaces shall be sufficient to permit easy and safe working on equipment, especially the electrical equipment.

In particular there shall be provided at least a clear height of 2,00 m at working areas, and:

- a) a clear horizontal area in front of the control panels and the cabinets. This area is defined as follows:
 - 1) depth, measured from the external surface of the enclosures, at least 0,70 m;
 - 2) width, the greater of the following values: 0,50 m or the full width of the cabinet or panel;
- b) a clear horizontal area of at least 0,50 m × 0,60 m for maintenance and inspection of moving parts at points where this is necessary.

5.13.2.5 The clear height for movement shall not be less than 1,80 m.

The access ways to the clear spaces shall have a width of at least 0,50 m. This value may be reduced to 0,40 m where there are no moving parts.

This full height for movement is taken to the underside of the structural roof beams and measured from both:

- a) the floor of the access area;
- b) the floor of the working area.

5.13.2.6 In machinery spaces the clear height shall under no circumstances be less than 2,0 m.

5.13.3 Electric power supply

The installation shall comply with

- a) EN 60204-1 or
- b) the requirements of the national rules of the country where it is installed.

5.14 Safety signs for the user

Appropriate safety signs for the installation, as a minimum those shown in EN 115-1:2008+A1:2010, Annex G, shall be provided.

5.15 Use of shopping trolleys and baggage carts

5.15.1 Escalator

The use of both shopping trolleys and baggage carts on escalators is unsafe.

The principle reasons why the use of these products is considered to be unsafe are foreseeable misuse, overloading and width restriction.

Where shopping trolleys and/or baggage carts are available in the area around escalator installations, suitable barriers shall be provided to prevent access.

When assessing existing installations, consideration should be given to the note in EN 115-1:2008+A1:2010, I.1.

5.15.2 Moving walk

The use of suitably designed shopping trolleys and baggage carts on moving walks is permitted in accordance with EN 115-1:2008+A1:2010, I.2.

6 Verification of improvement measures

Before putting an escalator or moving walk back into service after modifications it shall be subject to examinations and tests in accordance with national regulations.

Modifications made on a specific component may have implications on the safety or function of other associated components. Therefore, the examinations and tests after modification shall not be limited only to those items modified but shall include these additional affected components and systems.

7 Information for use

Relating to a specific modification made to the unit, documentation related to use, maintenance, inspection and periodic checks shall be provided for those components which are modified or added as far as the safety of workers and users is affected.

Annex A (informative)

Method for national implementation of EN 115-2

A.1 General

All technical solutions for upgrading of existing escalators and moving walks to the state-of-the-art are listed in Clause 5 of this standard. Although immediate upgrading of all existing escalators and moving walks to the state-of-the-art would be sensible from the safety point of view this may not be possible to be realised in a short period of time mainly for economic reasons.

This European Standard cannot lay down binding requirements for measures to be carried out on which escalator or moving walk and within which period of time. Such obligations for existing escalators and moving walks are subject to national legislation. The procedures described in this annex are intended to assist in setting up national regulations for increasing the safety of existing escalators and moving walks by showing how to identify and evaluate the existing hazardous situations and how to classify priority levels which apply to the necessary hazard and risk reduction measures.

A.2 Identification of hazardous situations

Annex B contains a checklist which can be used for identification of the hazardous situations relative to an individual escalator or moving walk. This list contains all hazardous situations indicated in 4.2 of this standard. The hazardous situations mentioned there have been listed on the basis of experience gathered from registered accidents as well as specific risk assessments. The state-of-the-art for safety of the European escalator and moving walk industry in the last decades served as a basis. There may be additional hazardous situations for very old escalators or moving walks with special technology which are not covered by this standard. In this case additional risk assessments are necessary for the escalators and moving walks in question.

The identification of the hazardous situation can be carried out in the course of any periodical survey or special examination on a given installation, but only technically competent and sufficiently trained persons should be allowed to carry out these examinations. This can be subject to national regulations.

A.3 Evaluation of hazardous situations

The hazardous situations as listed in 4.2 were subjected to risk assessment in preparation for this standard.

The risk assessment was based on the assumption that an existing escalator or moving walk either has none or insufficient equipment for preventing the hazardous situations.

Table A.1 shows the original risk profile which can be present in existing installations which have not been brought up to today's state of the art safety levels in accordance with EN 115-1:2008+A1:2010.

In preparing this table the estimated population of escalators and moving walks has been combined with an expected life cycle of 25 years as a basis for evaluating the frequency of hazardous situations.

However Table A.1 does not strictly apply to every existing escalator or moving walk. The earlier local requirements valid in the individual member states may already include requirements which cover many hazardous situations of 4.2. Some of these requirements can be regarded as equivalent to the current requirements of the EN 115-1:2008+A1:2010 standard.

Some of these requirements only partly covered the hazardous situations, which means that the remaining residual risk may be still too high compared with the safety level which is achieved for an escalator or moving walk in accordance with EN 115-1:2008+A1:2010.

This is why re-evaluating the risks and comparing with previous national standards will lead to filtering the risk profile. On the one hand hazardous situations covered by equivalent requirements can be eliminated from the risk profile. On the other hand the residual risk can be re-evaluated and re-ranked in the risk profile.

Elimination of non-relevant risks and re-evaluation of some risks dependent on earlier valid standards is a filtering process which can be carried out on national level. This filtering process facilitates use of this standard by considerably reducing the number of relevant hazardous situations for existing escalators and moving walks (e.g. of certain years of manufacture) which must be subjected to check list examination and by integrating already existing equivalent solutions in the risk assessment.

Table A.1 — Original risk profile

Frequency per escalator in 25 years	Severity			
	I	II	III	IV
	Number of hazardous situation (acc. Table B.2)			
A > 10				
B 2-10			46, 47, 48	
C 1-2		7, 27, 30, 31, 32	8, 36	
C-D 0,2-1	33, 42.1, 61.1	1, 9, 10, 19, 24, 26, 37, 44.1	52, 60	
D 0,05-0,2	11, 13.1, 13.2, 16, 22, 35, 39.1, 40, 41, 51, 56, 57, 58, 59	3, 4, 5, 6.1, 6.2, 12, 25, 28, 34, 38, 44.2, 49, 54, 55	23	
D-E 0,0025-0,05	2, 13.3, 14, 15, 18, 20, 21, 29, 42.2, 45, 53, 61.2	17, 62		
E < 0,0025	39.2	43, 50		
F 0				
Frequency (hazard cause level): A Frequent, B Probable, C Occasional, D Remote, E Improbable, F Impossible		Severity (hazard effect category): I Catastrophic, II Critical, III Marginal, IV Negligible		
NOTE 1 Numbers in cells correspond to the number of hazardous situation as listed in Table 1.				
NOTE 2 For the significance of colours see Table A.2.				
NOTE 3 For reasons of practical application, the frequency category D was subdivided into C-D, D and D-E.				

A.4 Classification of priority levels

As mentioned before, upgrading all existing escalators and moving walks to the state-of-the-art for safety at the same time may not be possible for various reasons. This is why a procedure is recommended here which allows subdivision of the hazardous situations in priority levels which then can be removed in several timed steps by the respective measures proposed in this standard.

The safety levels of the risk profile according to ISO 14798 have been used for classifying the priority levels. The risk profile is subdivided in 5 priority levels (see Table A.2) where only three of them are of practical relevance.

These priority levels are defined in accordance with safety considerations only. However, implementation of measures to reduce the risk is also a question of economic considerations, as the costs of the measures to be carried out may differ significantly.

NOTE However, high risks should be addressed in the short term.

The priority levels can be assigned to a schedule for the realisation of the measures. Table A.2 also contains a possible schedule.

Table A.2 — Priorities and schedule

Fields in risk profile		Priority	Schedule
S	Frequency		
I II	A, B, C A	Extreme	Immediate, escalator/moving walk has to be stopped
I II III	C-D, D B, C, C-D A, B	High	Short term
I II III	D-E D C, C-D	Medium	Medium term or together with a major modernisation
I II III IV	E D-E, E D A, B	Low	Long term or together with a modernisation of the related component
I II III IV	F F D-E, E, F C, C-D, D, D-E, E, F	-	-
Frequency (hazard cause level): A Frequent, B Probable, C Occasional, D Remote, E Improbable, F Impossible		Severity (hazard effect category): I Catastrophic, II Critical, III Marginal, IV Negligible	

Annex B (informative)

Safety check list for existing escalators and moving walks

The safety check list proposed in this annex (Table B.2) is intended to be a tool to identify the significant hazards on an existing escalator or moving walk and to determine which type of protective measure(s) proposed by this standard is applicable (see Table B.1 for its principle of use). It can be amended taking into account national filtering (see Annex A) and local requirements.

A risk assessment should be made on a case by case basis to identify hazards or hazardous situations not covered in this standard.

NOTE If a risk is re-evaluated, this re-evaluation should be done following the risk analysis methodology (ISO 14798) used to establish this standard.

Table B.1 — The principle to use the check list

Nr.	Items to be checked	Clause	Requirement fulfilled?	Priority level	Protective measure(s) (risk reduction measure)	Possible measure to be adopted
1	Item	5.x.y	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	H	1. Action 1	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
			<input type="checkbox"/> Not applicable	M	2. Action 2	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
				L	3. Action 3	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2	Item	6.x.y	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	H	1. Action 1	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
			<input type="checkbox"/> Not applicable	M	2. Action 2	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
				L		

Table B.2 — Safety check-list for existing escalators and moving walks

Nr.	Items to be checked	Clause	Requirement fulfilled?	Priority level	Protective measure(s) (risk reduction measure) according to EN 115-1:2008+A1:2010	Possible measure to be adopted
5.1 General requirements						
1	Installation without harmful material, e.g. asbestos	5.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	- Removal of harmful material which is subject to disintegration (e.g. replacement of brake lining material) and - installation of warning label to prevent working if harmful material is not removed which may include the cladding	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
5.2 Supporting structure (truss) and enclosure						
2	Complete enclosure of mechanically moving parts	5.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide enclosures according to 5.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
3	Ventilation apertures according to EN ISO 13857:2008, Table 5	5.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide cover according to EN ISO 13857:2008, Table 5	<input type="checkbox"/> Yes <input type="checkbox"/> No
4	Protection of access to machinery spaces, driving and return spaces by safety contact	5.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide protection in accordance with 5.2.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
5	Safety devices for inspection covers and covers that can be opened	5.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide protection in accordance with 5.2.4	<input type="checkbox"/> Yes <input type="checkbox"/> No

Table B.2 (continued)

Nr.	Items to be checked	Clause	Requirement fulfilled?	Priority level	Protective measure(s) (risk reduction measure) according to EN 115-1:2008+A1:2010	Possible measure to be adopted
6.1	Cleaning procedure in place	5.2.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide instructions for regular cleaning	<input type="checkbox"/> Yes <input type="checkbox"/> No
6.2	Possibility for regularly cleaning to reduce the accumulation of combustible material	5.2.2.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Install fire extinguishing system	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.3 Steps, pallets and belt						
7	Secure foothold on tread surfaces	5.3.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide secure foothold on tread surfaces considering Annex J	<input type="checkbox"/> Yes <input type="checkbox"/> No
8	Presence of step demarcation	5.3.2	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	- Provide steps with demarcation according to 5.3.5 or - provide under-step lighting at the landings	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
9	No excessive lateral displacement of steps/pallets	5.3.3	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	Ensure clearances are in accordance with 5.3.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
10	No excessive clearance between consecutive steps/pallets	5.3.4	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	- Ensure clearances are in accordance with 5.3.5 or - ensure clearances for steps with plain risers and pallets without meshing do not exceed 5 mm	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
11	Presence of missing step/ pallet device	5.3.5	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Fit a device in accordance with 5.3.6	<input type="checkbox"/> Yes <input type="checkbox"/> No
12	Protection against excessive movement of chain/belt tensioning system	5.3.6	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide a device to detect breakage or undue elongation of parts immediately driving the steps, pallets or the belt in accordance with 5.4.3.3 and 5.4.4.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.4 Drive units						
13.1	Stopping the driving machine by two independent contactors	5.4.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide two independent contactors in accordance with 5.4.1.5 and 5.12.1.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
13.2	Proper re-starting conditions of two independent contactors	5.4.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Ensure operation of the braking system according to 5.4.1.5 and 5.4.2.1.2 (3)	<input type="checkbox"/> Yes <input type="checkbox"/> No
13.3	Safe operation for hand winding device	5.4.1	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide operation of hand winding device in accordance with 5.4.1.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
14	Protection against over speed	5.4.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide protection in accordance with 5.4.2.3.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
15	Protection against unintentional reversal of the direction of travel	5.4.2.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide protection in accordance with 5.4.2.3.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
16	Interruption of electricity supply to the brake by at least two independent electric devices	5.4.2.3	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Modify according to 5.4.2.1.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
17	Monitoring device for brake lifting	5.4.2.4	<input type="checkbox"/> Yes <input type="checkbox"/> No	L	Fit a device in accordance with 5.4.2.1.1.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
18	Presence of auxiliary brake	5.4.2.5	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Fit auxiliary brake in accordance with 5.4.2.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
19	Compliant stopping distances under no load conditions	5.4.2.6	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Ensure braking system achieves braking distances according to Tables 3 and 5 under no load condition	<input type="checkbox"/> Yes <input type="checkbox"/> No

Table B.2 (continued)

Nr.	Items to be checked	Clause	Requirement fulfilled?	Priority level	Protective measure(s) (risk reduction measure) according to EN 115-1:2008+A1:2010	Possible measure to be adopted
5.5 Balustrade						
20	Vertical handrail-height in inclined section not less than 0,90 m and not exceeding 1,10 m	5.5.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	L	Evaluate surrounding areas for adequate fall protection in accordance with A.2. Then: - Provide vertical handrail height in accordance with 5.5.2.1 or - adequate fall protection	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
21	Angle of inclination of inner decking at least 25° to the horizontal	5.5.2.2	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	L	Evaluate surrounding areas for adequate fall protection in accordance with A.2. Then provide inner decking profile in accordance with 5.5.2.6	<input type="checkbox"/> Yes <input type="checkbox"/> No
22	Anti-climbing devices provided on outer decking in accordance with EN 115-1:2008+A1:2010, 5.5.2.2	5.5.2.3	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	Provide devices on outer decking according to 5.5.2.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
23	Anti-sliding devices provided where handrail level balustrade decking installed between escalators/moving walks or adjacent walls	5.5.2.3	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	L	Provide anti-slide devices on handrail level balustrade decking according to 5.5.2.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
24	Skirt deflectors installed to minimise possibility of trapping between skirting and steps	5.5.3	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	Provide skirt deflectors in compliance with 5.5.3.4 c) If the dimensions do not permit compliance, a reduction in the clearance between the deflector device and the step nose line is permissible to 8 mm.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
5.6 Handrail system						
25	Presence of handrail speed monitoring device or movement detection device	5.6.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	- Install handrail speed monitoring device according to 5.6.1 or (if this is not possible) - install movement detection device to improve safety	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
26	Acceptable horizontal distance between handrail, cover profiles and guides	5.6.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Modify components where possible to achieve acceptable clearances in accordance with 5.6.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
27	Handrail entry fitted with a guard	5.6.3.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Fit guard to handrail entry point in accordance with 5.6.4.3	<input type="checkbox"/> Yes <input type="checkbox"/> No
28	Electric safety device at handrail inlet	5.6.3.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Install electric safety device in accordance with Table 6 i)	<input type="checkbox"/> Yes <input type="checkbox"/> No
29	Newels according to EN 115-1:2008+A1:2010	5.6.3.2	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	- Provide newels in accordance with 5.6.4.2 or - provide appropriate guarding	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
5.7 Landings						
30	Secure foothold at landing areas (comb plate and floor plate)	5.7.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide landing areas covering material to achieve secure foothold in accordance with Annex J	<input type="checkbox"/> Yes <input type="checkbox"/> No
31	Correct meshing of combs	5.7.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide meshing in accordance with 5.7.3.2.5 and 5.7.3.3	<input type="checkbox"/> Yes <input type="checkbox"/> No
32	Electric safety device fitted to the comb assembly	5.7.3	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Install electric safety device in accordance with 5.7.3.2.6	<input type="checkbox"/> Yes <input type="checkbox"/> No
33	Sagging step or pallet detection device	5.7.4	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Install electric safety device in accordance with 5.7.2.5 and Table 6 j)	<input type="checkbox"/> Yes <input type="checkbox"/> No

Table B.2 (continued)

Nr.	Items to be checked	Clause	Requirement fulfilled?	Priority level	Protective measure(s) (risk reduction measure) according to EN 115-1:2008+A1:2010	Possible measure to be adopted
5.8 Machinery spaces, driving stations and return stations						
34	Protection of accessible moving or rotating parts	5.8.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide protection in accordance with 5.8.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
35	Sufficient standing area	5.8.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	- Provide sufficient standing area in accordance with 5.8.2 or, if this is not possible, - provide a detection device (e.g. light beam)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
36	Suitable lifting attachments for removable controller cabinet	5.8.3	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide suitable lifting attachments in accordance with 5.8.2.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
37	Socket outlets for lighting in machinery spaces	5.8.4	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Install suitable electric socket outlets in accordance with 5.8.3	<input type="checkbox"/> Yes <input type="checkbox"/> No
38	Light intensity 200 Lux in working areas	5.8.4	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide lighting to achieve lighting levels in accordance with 5.8.3.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
39.1	Existing emergency stopping device in driving and return station (engineers' area)	5.8.5	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide emergency stopping device according to 5.8.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
39.2	Compliant emergency stopping device in driving and return station (engineer's area)	5.8.5	<input type="checkbox"/> Yes <input type="checkbox"/> No	L	Provide emergency stopping device according to 5.8.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.11 Electric installations and appliances						
40	Protection against electric shock: Sufficient covering of electric live parts	5.11.1.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide protection against direct contact of electric live parts according to 5.11.1.3 and 5.11.5.3.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
41	Protection against electric shock	5.11.1.3, 5.11.1.4, 5.13.3	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide protection means against electric shock: - Earthing - RCD (residual current device) according to A.4	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
42.1	Protection against unintentional energizing of the unit because of missing main switch	5.11.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Install main switch according to 5.11.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
42.2	Protection against unintentional energizing of the unit because of inadequate main switch	5.11.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Install main switch according to 5.11.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
43	Electrostatic discharge related to - handrail - step band	5.11.3	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	L	Provide electrical discharging devices according to 5.11.7 to - handrail - step band	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
5.12 Protection against electric faults - controls						
44.1	Stop switch for emergency situation available (user area)	5.12.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide stop switch for emergency situations according to 5.12.2.2.3	<input type="checkbox"/> Yes <input type="checkbox"/> No
44.2	Adequate design and position of stop switch for emergency situation (user area)	5.12.1	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide stop switch for emergency situations according to 5.12.2.2.3	<input type="checkbox"/> Yes <input type="checkbox"/> No
45	Availability of inspection control	5.12.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide outlets and inspection controls in accordance with 5.12.2.5	<input type="checkbox"/> Yes <input type="checkbox"/> No

Table B.2 (continued)

Nr.	Items to be checked	Clause	Requirement fulfilled?	Priority level	Protective measure(s) (risk reduction measure) according to EN 115-1:2008+A1:2010	Possible measure to be adopted
5.13 Building interfaces						
46	Clear height above the steps of the escalator or pallets or belt of the moving walk at all points not less than 2,30 m	5.13.1.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	- Provide clear height in accordance with A.2.1 or - provide a level of illumination of at least 50 Lux and remove sharp edges from obstacles and building structures. Arrange deflectors and/or warning signs	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
47	Sufficient clearance between handrail and building interfaces	5.13.1.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide clearances in horizontal direction of at least 80 mm	<input type="checkbox"/> Yes <input type="checkbox"/> No
48	Appropriate preventive measure at building obstacles that can cause injuries	5.13.1.3	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Install deflectors in accordance with A.2.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
49	Sufficient unrestricted area	5.13.1.4	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	- Provide unrestricted area in accordance with A.2.5 (1) or - provide additional stop switches for emergency situations with a distance between 2,0 m and 3,0 m before the step/pallet reaches the comb intersection line.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
50	Free access from landings or intermediate exits of consecutive escalators or moving walks	5.13.1.5	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	L	Provide electric safety devices according to Table 6 h)	<input type="checkbox"/> Yes <input type="checkbox"/> No
51	Adequate protection against falling from the landings	5.13.1.6	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	Provide appropriate barrier in accordance with A.2.7	<input type="checkbox"/> Yes <input type="checkbox"/> No
52	Adequate lighting at the comb intersection line	5.13.1.7	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide lighting in accordance with A.2.8/9	<input type="checkbox"/> Yes <input type="checkbox"/> No
53	Lockable machinery space outside the truss	5.13.2.1	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide lock in accordance with EN 13015:2001+A1:2008, 4.3.2.13	<input type="checkbox"/> Yes <input type="checkbox"/> No
54	Compliant lighting in machinery spaces and working areas outside the truss	5.13.2.2	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide lighting in accordance with A.3.3.	<input type="checkbox"/> Yes <input type="checkbox"/> No
55	Compliant emergency lighting for safe evacuation	5.13.2.3	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide emergency lighting in accordance with A.3.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
56	Compliant working areas in machinery spaces outside the truss	5.13.2.4	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	Provide adequate working areas in accordance with A.3.5	<input type="checkbox"/> Yes <input type="checkbox"/> No
57	Compliant access height and width to machinery spaces	5.13.2.5	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	Provide access height and width to machinery spaces in accordance with A.3.6	<input type="checkbox"/> Yes <input type="checkbox"/> No
58	Compliant clear height in machinery spaces	5.13.2.6	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	Provide clear height in accordance with A.3.7 or - remove sharp edges from obstacles and building structures. Arrange deflectors and/or warning signs	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
59	Compliant electric power supply	5.13.3	<input type="checkbox"/> Yes <input type="checkbox"/> No	H	Provide electric power supply in accordance with A.4	<input type="checkbox"/> Yes <input type="checkbox"/> No

Table B.2 (continued)

Nr.	Items to be checked	Clause	Requirement fulfilled?	Priority level	Protective measure(s) (risk reduction measure) according to EN 115-1:2008+A1:2010	Possible measure to be adopted
5.14 Safety signs for users						
60	Complete set of safety signs fitted	5.14	<input type="checkbox"/> Yes <input type="checkbox"/> No	M	Provide safety signs as required by the installation in accordance with Annex G	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.15 Use of shopping trolleys and baggage carts						
61.1	Barriers fitted to prevent access of baggage carts/luggage trolleys to escalator installation	5.15.1	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	H	Provide barriers to prevent access in accordance with I.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
61.2	Compliant barriers fitted to prevent access of baggage carts/luggage trolleys to escalator installation	5.15.1	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	M	Provide barriers to prevent access in accordance with I.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
62	Trolleys in use compatible with moving walk installation	5.15.2	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	L	Provide shopping trolleys or baggage carts in conformance with the moving walk design as indicated in I.2	<input type="checkbox"/> Yes <input type="checkbox"/> No

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- [1] CIRA Recommendation 28, *Construction et installation des escaliers mécaniques (Commission internationale pour la réglementation des ascenseurs et monte-charge)*
- [2] ISO 14798:2009, *Lifts (elevators), escalators and moving walks — Risk assessment and reduction methodology*

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