TECHNICAL REPORT

ISO/TR 14799-2

Third edition
2023-05

Comparison of worldwide escalator and moving walk safety standards —

Part 2: Abbreviated comparison and comments

Comparaison des normes mondiales de sécurité des escaliers mécaniques et trottoirs roulants —

Partie 2: Comparaison abrégée et commentaires

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 178, *Lifts, escalators and moving walks*.

This third edition cancels and replaces the second edition (ISO/TR 14799-2:2015), which has been technically revised.

The main changes are as follows:

— the content is updated according to the latest revision of EN 115-1:2017 and A17.1-2016/CSA B44-16 and Japan Codes 2016;

— the comments are updated;

— a new Clause 4 is introduced to provide an overview of comparable events of detection;

— A17.1-2016/CSA B44-16 content is not included due to copyright issues.

A list of all parts in the ISO 14799 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document is intended to aid standards writers in developing their safety requirements and to help standards users understand the basis for the requirements as they are applied throughout the world.

This document is not intended to replace existing safety standards which can have been updated. Conclusions are arrived at in some cases, but only where is unanimity amongst the various experts. In other cases, the reasons for the divergent views are expressed.

This document is to be read in conjunction with the various safety standards. Unless approved by the relevant standard writing organizations, the information contained in this document does not necessarily represent the opinions of these standards writing organizations.

This document was done with EN 115-1:2017 as a reference document shown as the only one in its normal sequence. All other codes are not in their normal sequence and logical order. They are structured differently to EN 115-1:2017. The result incorrectly leaves the impression of incompleteness of these standards. These standards in their original structure inclusive of their references to other standards and requirements are however complete.

This comparison no longer includes the Australian, Korean, and Russian safety codes as there are intentions on national level to bring theses codes in line with one of the remaining three codes.

Due to copyright issues, A17.1-2016/CSA B44-16 (North America) detailed text comparison is not covered in this document.

Due to copyright restrictions, in this document there is no code text of ASME A17.1/B44:2016 available, only references to relevant sections and clause numbers are made. The leading standard for the comparison is EN 115-1:2017. The numbering sequence of the first column follows the EN 115-1:2017 structure.

In addition to the compared standards and other regulations, escalators and moving walks can be required to conform to the requirements of other standards, as appropriate.

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Comparison of worldwide escalator and moving walk safety standards —

Part 2:
Abbreviated comparison and comments

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1 Scope

This document consists of a comparison of the requirements of selected topics as covered by the following worldwide safety standards (excluding local deviations):

a) Europe (CEN) – EN 115-1:2017, *Safety of escalators and moving walks — Part 1: Construction and installation*;

b) North America - ASME A17.1/CSA B44:2016, *Safety Code for Elevators and Escalators*;

c) Japan – Safety requirements mainly comprised of Building Standard Law Enforcement Order (BSLJ-EO), Notifications of Ministry of Construction (MOC-N), and Japan Elevator Association Standard (JEAS).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Abbreviated terms and list of terms used in the codes

4.1 Abbreviated terms

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
BSLJ	The Building Standard Law of Japan
BSLJ-EO	The Building Standard Law Enforcement Order (Japan)
CEN/CENELEC	Comité Européen de Normalization (European Committee for Standardization)
CIRA	Commission Internationale pour la Réglementation des Ascenseurs et Monte-charge
CSA	Canadian Standards Association

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EN	European Norm (standard)
EUIL-MO	Electrical Utilities Industry Law - Ministerial Ordinance of technical standards for electrical equipment
EXP	Explanation/Interpretation of BSLJ-EO, MOC-N (Japan)
IEC	International Electrotechnical Commission
ISO	International Standardization Organization
JEAC	Japan Electrical Association Code
JEAS	Japan Elevator Association Standard
JIS	Japanese Industrial Standard
MOC-N	Notifications of the Ministry of Construction (Japan)
MLIT-N	Notifications of the Ministry of Land, Infrastructure and Transport (Japan)
NEC	National Electrical Code (USA)
NFPA	National Fire Protection Association (USA)
OSHA	Occupational Safety and Health Administration (USA)

4.2 List of terms used in the codes

Table 1 shows those terms which are used differently for the same item in the standards dealt with. Definitions in the Japanese standard are based on unofficial translation, whereas the terms in European and American codes are official language.

The items in parenthesis reference the clauses where the terms are used in the various standards.

Table 1 — Differences in terminology (list of terms used in the codes)

EN 115–1:2017	A17.1-2016/CSA B44-16 (North America)	Japanese codes
Auxiliary brake (5.4.2.2)		
Balustrade decking (3.1.3, 5.5.2.2)	(6.1.6.3.1, 6.2.3.3.7, 6.2.6.3.1)	Deck board
Balustrade exterior panelling (mod)		Exterior panel
Balustrade interior panelling (mod)	(6.1.3.3.1, 6.2.3.3.4)	Interior panel
Brake load (3.1.4)	(6.1.3.9.3, 6.2.3.10.3, 6.2.5.3.1, 6.2.5.3.2)	
Criss-cross (A.2.3, A.2.4)	6.1.3.3.13	Criss-cross
Safety factor (5.4.1.3.2, 5.4.3.2)	(3.6.1, 3.6.4)	Safety factor
Height above the steps (A.2.1)	(8.10.4.1.1)	Height above the steps
Inclination (3.1.1)	(6.2.3.1, 6.2.3.7, 6.2.3.9.1)	
Inspection cover and floor plate (5.2.4)	(6.2.7.3.3)	
Lower inner decking (5.5.2.6)	(6.1.3.3.4)	
Multiplex chain (5.4.1.3.1, 5.4.2.2.1)		
Not easy to ignite (0.5.1)	(6.1.2.1, 6.2.2.1)	

[a] Definitions vary from code to code (see Annexes); terms in European, American, and Japanese code are official terms.

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Table 1 *(continued)*

EN 115–1:2017	A17.1-2016/CSA B44-16 (North America)	Japanese codes
Moving walk		Moving (side) walk
Rated load[a]	(6.2.3.10)	Rated load[a]
Rated speed[a](3.6)	(6.1.4, 6.2.4)	Rated speed[a]
Skirting (3.1.23, 5.5.3)	(6.1.3.3.6, 6.2.3.3.6)	Skirt guard (panel)
Structural load	(6.1.3.9.1, 6.2.3.10.1)	
Supporting structure (5.2)	(6.1.2, 6.1.3.7, 6.1.3.10.1, 6.2.3.11.1, 6.2.7.1.2)	Truss
Supporting structure (of the combs) (8.3.2.4, 8.3.2.6, 16.2.1.1.1)	(6.1.6.3.13, 6.2.6.3.11, 6.2.8.3), (6.1.7.3, 6.2.7.3)	Comb plate
Maximum capacity (Annex H.1)		
	6.1.6.3.6	Skirt guard switch [JEAS-406F (draft), 2.1] MOC-N (no. 1424–2000), 2(d)
Horizontal movement (5.7.2.1)	(6.1.3.6.5)	(Flat step)
[a] Definitions vary from code to code (see Annexes); terms in European, American, and Japanese code are official terms.		

5 Basis for escalator and moving walk safety standards

5.1 Historical origin and development of standards

5.1.1 European Standard EN 115-1

5.1.1.1 Rationale for EN 115-1

The ever-increasing number of escalators put in operation in Europe after the second world war required the drawing-up of guidelines for models and safety for escalators, especially as not all European countries had their own standard or national regulation for escalators.

Therefore, specialists/experts from the European countries joined together and developed the first draft of EN 115, which was accepted by CEN on 3rd January 1995 which has been continuously developed since then. The last complete revised document was published in 2017

According to the Internal Regulations of CEN/ CENELEC, the CEN members are bound to give this EN 115-1 the status of a National Standard without any national deviations.

The following countries are CEN Members:

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

5.1.1.2 What is the code (law, standard, requirement)?

The purpose of EN 115 is to define minimum safety requirements in order to reduce the possibility of accidents on escalators and moving walks.

The harmonized standard is essentially a method of demonstrating compliance with the essential safety requirements of the machinery directive which is embodied in the laws of each country member of CEN/CENELEC and therefore, demonstrates compliance with the laws of the member states.

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5.1.1.3 Is EN 115-1 a compulsory standard?

Some exceptions are possible (such as section 1).

5.1.1.4 Is EN 115-1 a technical description, a requirement, or a recommendation?

Conformity with EN 115-1 is one way to satisfy the requirements of the European Machinery Directive.

5.1.1.5 Is EN 115-1 a performance or a design standard?

EN 115-1 has to be considered as a minimum requirement for safe operation of escalators and moving walks.

5.1.2 North American Standard A17.1/B44

5.1.2.1 Rationale for A17.1/B44

A17.1/B44 is intended to enhance public health and safety. It serves as the basis for state, municipal, and other jurisdictional authorities in drafting regulations governing the installation, testing, inspection, maintenance, alteration, and repair of elevators, dumbwaiters, escalators, moving walks, material lifts with automatic transfer devices, wheelchair lifts, and stairway chair lifts. It is also intended as a standard reference of safety requirements for the guidance of architects, engineers, insurance companies, manufacturers, and contractors, and as a standard of safety practices for owners and managements of structures where equipment covered in the scope of the code is used.

5.1.2.2 What is the code (law, standard, requirement)?

The A17.1/B44 Safety Code for Elevators and Escalators is a voluntary reference standard that is used by people and organizations involved in the industry. Developed by a consensus of experts in the industry, it is used to guide them in maintaining a high level of safety in their respective functions.

After it is developed by the ASME under the auspices and consensus procedures established by ANSI, it becomes an American National Standard.

5.1.2.3 Is A17.1/B44 a compulsory standard?

As published, A17.1/B44 is a voluntary standard. It is used by authorities having jurisdiction as a basis for the code they enforce and becomes law when the governing legislative body over their jurisdiction adopts it.

5.1.2.4 Is A17.1/B44 a technical description, a requirement, or a recommendation?

A17.1/B44 presents most of its requirements as mandatory when following the standard. However, some rules can be in the form of a permissive recommendation.

5.1.2.5 Is A17.1/B44 a performance or a design standard?

The A17.1/B44 code is developed as a performance standard under the procedures established by the ASME and the CSA. Due to the unique nature of the industry, some rules are of a design nature, but efforts are continually underway to replace them with performance language.

5.1.3 Japanese codes

5.1.3.1 Rationale for Japanese codes?

The Japanese codes are established to protect life, health, and property of the nation, and thereby, to contribute to promoting public welfare.

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5.1.3.2 What is the code (law, standard, requirement)?

The codes consist of four kinds of laws (BSLJ, BSLJ-EO, MOC-N, and EUIL-MO) and three kinds of standards (JIS, JEAS, and JEAC).

5.1.3.3 Are the Japanese codes compulsory standards?

The Japanese codes are compulsory standards.

5.1.3.4 Are the Japanese codes a technical description, a requirement, or a recommendation?

The Japanese codes are technical descriptions, requirements, and recommendations.

5.1.3.5 Are the Japanese codes performance or design standards?

The Japanese codes are considered as performances and design standards.

5.2 General — Technical basis and structure of standards

Table 2 shows the abbreviated comparison and comments of worldwide escalator and moving walk safety standards. In Table 2, all comments from the ISO/TC 178/WG 5 are shown in italics. Reference to a table or figure refers to information from ISO/TR 14799-1 as well as to the original codes.

The following logic for the structure of comments is applied:

— Remark: to give clarification (Remark is equal to Note)

— Agreed upon: general acceptance of the consensus

— Fundamental differences: no possibility to find a consensus (e.g. caused by national building codes and regulations)

— Worldwide acceptance: giving the values today which fulfil all three codes

5.3 Abbreviated comparison and comments

Table 2 — Abbreviated comparison and comments of worldwide escalator and moving walk safety standards

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
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).	**1.1** **1.1.1**	**BSLJ-EO (Structure of escalator)** **Article 129-3** The provisions of this section shall apply to Escalator however for the escalators of special construction and use, Article 129–12, paragraph 1 is not applied.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
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.	No equivalent requirements.	**BSLJ (Exclusion of application)** **Article 3** BSLJ and related order etc. shall apply to the modification of existing escalators or escalators in case that the construction (modification) work is started after the enforcement of the provisions of a regulation.
No equivalent requirements.	**1.1.3** **1.3**	**BSLJ (Exclusion of application)** **Article 3** BSLJ and related order etc. shall not apply to existing escalators or escalators under work when the regulation is enforced.
No equivalent requirements.	**8.11.1.4**	No equivalent requirements.
No equivalent requirements.	**6.1.3.14** **6.2.3.17**	No equivalent requirements.
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	**Part 9**	No equivalent requirements.
3 Terms, 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.	**1.3**	No equivalent requirements.
3.1.1 **angle of inclination** maximum angle to the horizontal in which the steps, the pallets or the belt move.	**6.1.3.1**	No equivalent requirements.
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).	**1.3**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
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.	**6.1.3.3** **6.2.3.3**	No equivalent requirements.
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.	**1.3**	No equivalent requirements.
3.1.5 **brake load** load on the step/pallet/belt which the brake system is designed to stop the escalator/moving walk.	**6.1.3.9.3**	No equivalent requirements.
3.1.6 **comb** pronged section at each landing that meshes with the grooves.	**1.3**	No equivalent requirements.
3.1.7 **comb plate** platform at each landing to which the combs are attached.	**1.3**	No equivalent requirements.
3.1.8 **competent person** a person which 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	**1.3**	No equivalent requirements.
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.	**1.3**	**BSLJ-EO (Scope of application)** **Article 129–3, EXP. 1. (2)** The escalator means “power driven, continuous stairway or walkway for the transport of passengers”.
3.1.10 **exterior panel** part of the exterior side of the enclosure of an escalator or moving walk.	**1.3**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
3.1.11 **failsafe circuit** safety related electrical and/or electronic system with defined failure mode behaviour.	**1.3**	No equivalent requirements.
3.1.12 **handrail** power-driven moving rail for persons to grip while using the escalator or moving walk.	No equivalent requirements.	No equivalent requirements.
3.1.13 **interior panel** panel located between the skirting or lower inner decking and the handrail guidance profile or balustrade decking.	**1.3**	No equivalent requirements.
3.1.14 **lower inner decking** profile that connects the skirting with the interior panel when they do not meet at a common point.	**1.3**	No equivalent requirements.
3.1.15 **lower outer decking** profile that connects the exterior panels with the interior panel.	**1.3**	No equivalent requirements.
3.1.16 **machinery** escalator or moving walk machine(s) mechanisms and associated equipment.	**1.3**	No equivalent requirements.
3.1.17 **machinery spaces** space(s) inside or outside of the truss where the machinery as a whole or in parts is placed.	No equivalent requirements.	No equivalent requirements.
3.1.18 **maximum capacity** maximum flow of persons that can be achieved under operational conditions.	No equivalent requirements.	No equivalent requirements.
3.1.19 **moving walk** power-driven installation for the conveyance of persons in which the user carrying surface remains parallel to its direction of motion and is uninterrupted (e.g. pallets, belt). Note 1 to entry: Moving walks are machines - even when they are out of operation – and should not be used as a fixed access.	**1.3**	**BSLJ-EO (Scope of application)** **Article 129–3, EXP. 1. (2)** Inclination of a passenger conveyor: equal to or less than 15° Height difference between pallets: equal to or less than 4 mm

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
3.1.20 **Newel** End of balustrade.	**1.3**	No equivalent requirements.
3.1.21 **nominal speed** speed in the direction of the moving steps, pallets or the belt stated by the manufacturer for which the escalator or moving walk has been designed, without load on the steps/pallets/belt at nominal frequency and nominal voltage.	**1.3**	**BSLJ-EO (Structure of escalator)** **Article 129–12, EXP. 1. (5)** Rated speed: Speed in the up direction of the moving steps, pallets, or the belt when operating the equipment under no load condition.
***REMARK**: All codes have in common, that the speed definition is one of the design parameters for the escalator/moving walk.* ***FUNDAMENTAL DIFFERENCES:** In each code speed is named differently. EN 115-1 and JIS define the speed under no load condition where A17.1 defines speed under rated load condition.*		
3.1.22 **rise** vertical distance between the upper and lower finished floor levels.	**1.3**	No equivalent requirements.
3.1.23 **safety circuit** part of the electric safety system consisting of electrical safety devices	No equivalent requirements.	No equivalent requirements.
3.1.24 **safety devices** part of a safety circuit consisting of safety switches and/or failsafe circuits	No equivalent requirements.	No equivalent requirements.
3.1.25 **safety integrity level SIL** discrete level for specifying the safety integrity requirements of the safety functions to be allocated to the E/E/PE. Note 1 to entry: In this European Standard SIL 1 is representing the lowest level and SIL 3 the highest, even when it does not make use of SIL 3.	**1.3**	No equivalent requirements.
3.1.26 **Safety related electrical, electronic and programmable electronic devices, E/E/PE** system for control, protection or monitoring based on one or more electrical, electronic or programmable electronic devices, including all elements of the system such as power supplies, sensors and other input devices, data highways and other communication paths, and actuators and other output devices, used in safety related applications as listed in Table 8 and Table 9	**1.3**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
3.1.27 **safety system** safety related part of the electrical control system as an arrangement of safety circuits and monitoring devices	No equivalent requirements.	No equivalent requirements.
3.1.28 **skirting** vertical part of the balustrade interfacing with the steps, pallets or belt	**1.3**	No equivalent requirements.
3.1.29 **skirt deflector** device to minimize the risk of trapping between the step and the skirting.	No equivalent requirements.	No equivalent requirements.
3.1.30 **structural rated load** load which the structure is designed for	No equivalent requirements.	No equivalent requirements.
3.2 Symbols and abbreviations See Table 1	No equivalent requirements.	No equivalent requirements.
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 assessment as significant for escalators and moving walks and which require action to eliminate or reduce the risk. These significant hazards are based upon EN ISO 12100:2010.	No equivalent requirements.	No equivalent requirements.
4.2 Mechanical hazards Mechanical hazards on escalators and moving walks and in their immediate vicinity can occur because of the design of the machine or access to it. These include: — contact with moving machinery parts (e.g. driving unit, handrail drive) normally not accessible to the public (see 5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.5, 5.2.1.6, 5.2.3, 5.2.4, 5.8.1, 5.8.4, 5.12.3.13, A.3.2, A.3.3); — crushing and shearing of fingers between handrail and balustrade and between balustrades (see 5.5.2.5, 5.6.2); — cutting hazard caused by adjacent cover profile parts (see 5.5.2.4); — impact on bodies caused by collision with building structures (wall, roof, criss-cross arrangement), or with persons on adjacent escalators/moving walks (see A.2.1, A.2.2, A.2.3, A.2.4);	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— drawing-in at handrail entry into the balustrade (see 5.6.4.3, 5.6.5); — trapping between skirting and steps, between comb and step/pallet (see 5.3.4, 5.3.5, 5.5.3, 5.5.5, 5.7.2.5, 5.7.3, Fig. G.2); — trapping between the floor/fixed devices and the handrail (see 5.6.4.1, 5.6.4.2, A.5); — trapping between step and step or pallet and pallet (see 5.3.2).		
4.3 Electric hazards Electric hazardous situations can occur due to: — contact of persons with live parts (see 5.8.3.3, 5.11.1.3); — indirect contact (see 5.11.1.4, A.6); — inadequate emergency stops (see 5.12.3.8); — wrong assembly of electric components (see 5.11.4.4); — electrostatic phenomena (see 5.12.1.5); — external influences on electric equipment (see 5.12.2.4, 5.12.2.6.1.3).	No equivalent requirements.	No equivalent requirements.
4.4 Radiation hazards **4.4.1 Electromagnetic radiation generated by the machine** Electromagnetic radiation can be emitted by the escalator or moving walk during normal operation (see 5.11.1.2.3, 5.12.2.4). **4.4.2 Electromagnetic radiation received from outside** Electromagnetic radiation, like low frequency radiation, radio frequency radiation and microwaves, can be received by the escalator or moving walk during normal operation (see 5.11.1.2.3, 5.12.2.4).	No equivalent requirements.	No equivalent requirements.
4.5 Fire hazard Fire hazards can be generated by accumulation of combustible material inside the truss, by the insulation material for cables and overloading of drives (see 5.2.1.4, 5.9).	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
4.6 Hazards generated by neglecting ergonomic principles in machinery design Hazardous situation can occur because of: — neglecting ergonomic dimensions for the users (e.g. height of balustrade, width of handrail) (see 5.5.2.1, 5.6.2, 5.6.3); — inadequate lighting in the working places and access to them (see 5.8.3.1, 5.8.3.2, A.3.3, A.3.4); — insufficient space in working places (see 5.8.2.1, 5.8.2.2, 5.8.2.3, A.3.5, A.3.6, A.3.7); — missing lifting equipment for heavy loads (see 5.8.2.2, 5.10).	No equivalent requirements.	No equivalent requirements.
4.7 Hazard generated by failure of control circuit Hazardous situation can occur because of: — no stopping in case of dangerous situations (see 5.11.2, 5.12.1.2); — short circuit of electric wiring (see 5.11.1.4, 5.11.1.6, 5.11.4); — overload of electric wiring (see 5.12.1.3, 5.11.4, 5.12.1.2, 5.12.3); — unexpected start of machine after an interruption (see 55.12.3, 5.12.3.5.1); — unexpected reversal of drive (see 5.4.2.3, 5.12.1.2); — excessive speed (see 5.4.2.3, 5.12.1.2); — excessive deceleration during stopping (see 5.12.1.2).	No equivalent requirements.	No equivalent requirements.
4.8 Hazards generated by break-up during operation Even if the design of an escalator or moving walks follows the requirements of EN 115-1, there are specific hazards which can occur due to — greater than specified user and structural loads on the truss (see 5.2.5); — loads greater than specified onto the balustrade (see 5.5.2.3, 5.5.2.4); — loads greater than specified on the steps/pallets by unforeseeable misuse (see 5.3.3); — loads greater than specified on the drive unit (see 5.4.1.3, 5.4.3, 5.4.4).	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
4.9 Slipping, tripping and falling hazards Most of the dangerous situations on escalators and moving walks are caused by the slipping and falling of persons. These include: — slipping on steps/pallets/belt, on the comb plate and floor plate (see 5.3.1, 5.5.4, 5.7.1); — falling caused by handrail speed deviation (incl. standstill) (see 5.6.1, Fig. G.1, Fig. G.3); — falling caused by change of the direction of movement (see 5.4.2.3); — falling caused by increased acceleration/deceleration (see 5.2.2, 5.4.1.1, 5.4.1.2, 5.4.2.1, 5.4.2.2, 5.7.2.1, 5.7.2.2, 5.7.2.3, 5.7.2.4); — falling caused by unexpected start/stopping or excessive speed of the machine (see 5.12.3.5.1); — falling caused by inadequate lighting at the landings (see A.2.8, A.2.9).	No equivalent requirements.	No equivalent requirements.
4.10 Hazards specific for this type of machine Many hazards are specific for that type of machine. These include: — missing steps or pallets (see 5.3.6); — trapping by hand winding device (see 5.4.1.4); — misuse by transporting other items than persons (e.g. shopping or luggage trolleys, push chairs) (see 7.4.1 d), A.4, Fig. G.4, Annex I); — climbing on the outside of the balustrade (see 5.5.2.2); — sliding between balustrades (see 5.5.2.2); — climbing over the balustrade (see 5.5.2.6); — surfing on the handrail (see 5.5.2.2); — storage of merchandise adjacent to the balustrade (see 7.4.1 d)); — creation of traffic jam at blocked landings or intermediate exits of consecutive escalators or moving walks (see A.2.5, A.2.6); — disturbance of the person flow in connected escalators/moving walks (see A.2.5, A.2.6);	No equivalent requirements.	No equivalent requirements.

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EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— lifting by the handrail at the newel ends and falling over adjacent fixed barrier or the balustrade of the escalator/ moving walk (see A.2.7). NOTE For the actual type of machinery, noise is not considered as a significant nor relevant hazard.		
4.11 Significant hazards due to seismic events — Damage to equipment (see M.2, M.3, M.5); — Crushing by displacement of equipment (see M.4).	No equivalent requirements.	No equivalent requirements.
REMARK: *Only EN provides a list of the significant hazards.*		
5 Safety requirements and/or protective/risk reduction measures **5.1 General**	No equivalent requirements.	No equivalent requirements.
5.2 Supporting structure (truss) and enclosure **5.2.1 General** 5.2.1.1 Complete enclosure	**6.1.2** **6.2.2**	No equivalent requirements.
No equivalent requirement	**6.1.1** **Note:** Floor openings to be protected	No equivalent requirements.
AGREED UPON*: The truss sides and undersides are to be covered with limited combustibility material. These materials are determined by individual building or fire codes in each country.* ***FUNDAMENTAL DIFFERENCES:*** *A17.1/B44 requires that side and undersides of a truss are to be enclosed with materials defined as either non-combustible or limited combustible to protect both the escalator and the environment.*		
5.2.1.2 gaps or openings ≤ 4 mm risk of contact with moving parts. Force of 250 N for exterior panel on an area of 2 500 mm^2 without breakage. Fixing to carry twice the deadload of the enclosure.	Defined in building codes.	No equivalent requirements.
5.2.1.3 Omission of enclosure	No equivalent requirements.	No equivalent requirements.
REMARK: *The omission of enclosure is only mentioned in EN. The protection in case of fire are to be in accordance to the agreed upon point to 5.2.1.1*		
5.2.1.4 Cleaning inside of enclosure.	**8.6.8.13** **8.6.9.11**	No equivalent requirements.
5.2.1.5 Apertures for ventilation.	**6.1.2/ 6.2.2**	No equivalent requirements.
AGREED UPON: *Escalators/moving walks are to be effectively ventilated to dissipate excessive heat. Apertures are to not enable contact with moving parts.*		
5.2.1.6 Requirement for safety device	**6.1.7.3.3** **6.2.7.3.3**	No equivalent requirements.
FUNDAMENTAL DIFFERENCE*: EN requires an electrical interlock and A17.1/B44 requires mechanical lock.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.2.2 Angle of inclination Angle of inclination $\alpha \leq 30°$ $\alpha \leq 35°$, if rise ≤6 m and $v \leq 0{,}5$ m/s Moving walks: $\alpha \leq 12°$	**6.1.3** **6.1.3.1** **6.2.3.1**	**BSLJ-EO Art.129–12 1.(2)** $\alpha \leq 30°$ Moving walks: $\alpha \leq 15°$ **BSLJ-EO; Art. 129–12 EXP. 1 (2)** (1)(a) $\alpha \leq 35°$, rise: ≤ 6 m, speed: ≤ 0,5 m/s, step depth: ≤ 35 cm, number of flat steps: ≥2 **[MOC-N (No.1413–2000) 2–1]** (2)(a) $\alpha \leq 4°$, step width $1{,}1 < z_1 \leq 1{,}6$ m (3)(e) The escalator of which speed varies in halfway of travel. Position where the speed of step varies: α≤ 4° Position other than the mentioned above: α≤ 8°
REMARK: — *Escalators: A17.1/B44 specifies an angle of inclination less or equal to 30°. EN and JIS permit an angle up to 35° under special conditions (EN and Japan: Rise max. 6 m, speed max. 0,5 m/s).* — *Moving walks: Historical background: EN permits inclined moving walks in order to support the use of trolleys (see Annex I.2).*		
5.2.3 Access to the interior Requirements on authorization	**8.1.3**	No equivalent requirements.
REMARK: *EN and A17.1/B44 are defining specific requirements to access inside the truss machinery spaces and separate machinery spaces outside the escalator (separate machine rooms).*		
5.2.4 Inspection covers	No equivalent requirements.	No equivalent requirements.
i) Inspection covers for inspection and maintenance require safety device ii) Closing/Opening requirements for inspection covers iii) Multiple part inspection covers requirement iv) Inspection cover requirements according to their location v) No requirement		
REMARK: *Same intention of secure foothold requirements, but EN covered under 5.7.1 surface properties.* ***FUNDAMENTAL DIFFERENCE****: EN requires an electrical interlock and ANSI requires mechanical lock and guarding. ANSI defines a weight limitation, EN follows occupational health and safety requirements.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.2.5 Structural design the dead weight of the escalator or moving walk plus a structural rated load of 5 000 N/m2. deflection shall not exceed 1/750 of the distance l1 between the supports. Based on the structural rated load for the comb plate and floor plate the maximum deflection shall not exceed 4 mm the meshing of the combs shall be ensured. (see Figure 5)	**6.1.3.9** **6.2.3.10** **6.1.3.9.1** **6.2.3.10.1**	**BSLJ-EO (Structure of escalator)** **Article 129–12** P = 2 600 A N/m2 where: P is the carrying load for the escalator, in Newton; A is the horizontal projected area of the steps of the escalators, in square meters. **MOC-N (No.1418–2000)** 1. Load for stress calculation G1+α(G2+P) α: 1.0(Normal condition) / 1.5(Safety device is actuated) [see 2.4.2 Table 2] 2.(2) Safety factor Steel or other metal steps SF:3.0(Normal condition)/ 2.0(Safety device is actuated) Steel materials in steel construction **SF:3.0(Normal condition)/ 2.0(Safety device is actuated)** [see 2.4.2 Table 3] **JEAS-A1003 (2014)** Escalator specifications. **JEAS-1004B (2002)** Structural calculation for escalator.
5.2.5 ***FUNDAMENTAL DIFFERENCE:*** — *A specific deflection of the truss (supporting structure) is required by EN.* — *The machinery load used for the calculation of the driving machine and the power transmission components, is clearly defined in A17.1/B44; EN and JIS are using the rated load for the calculation of the power transmission components.*		
No equivalent requirements.	**6.2.3.9**	No equivalent requirements.
No equivalent requirements.	**6.1.3.7**	No equivalent requirements.
5.3 Steps, pallets, belt **5.3.1 General** i) Step tread horizontally (±1°), ii) Secure foothold defined.	**6.1.3.5.1** **6.2.3.5.5**	No equivalent requirements.
REMARK: *All steps treads are to remain horizontal in the area accessible to passengers.*		
No equivalent requirements.	**6.1.3.5.1(a) and (b)** **6.2.3.5.5 (a) and (b)**	No equivalent requirements.
No equivalent requirements.	**6.1.3.5.8** **6.2.3.5.6**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *A17.1/B44 is the only code which explicitly requires measures to prevent steps from falling into the interior in case of roller and assembly failures.*		
5.3.2 Dimensions **5.3.2.1 General** 0,58 m ≤ z_1 ≤ 1,10 m For moving walks with an angle of inclination up to 6° widths up to 1,65 m are permitted	**6.2.3.7**	**BSLJ-EO (Structure of escalator) Article 129–12** not more than 1,10 m for escalators **MOC-N (No. 1413–2000; 2 (2)(c) and 2(3)(f)** For moving walks z_1 ≤ 1,6 m for not more than 4° z_1 ≤ 1,1 m for more than 4°
REMARK: *Minor differences in dimensions of treadway* ***AGREED UPON****: 560 mm ≤ z_1 ≤ 1 100 mm* ***WORLDWIDE ACCEPTANCE:*** *580 mm ≤ z_1 ≤ 1 020 mm*		
5.3.2.2 Step treads and pallets (see Figure 5, detail X and Figure 8). **5.3.2.2.1** Step height x_1 ≤ 0,24 m. **5.3.2.2.2** Step depth y_1 ≥ 0,38 m.	**6.1.3.5.2**	**MOC-N (No.1413–2000)** Step depth (EN y_1) ≥ 0,35 m for angle of inclination more than 30°.
5.3.2.2.3 General requirement step treads.	**6.1.3.5.5** **6.2.3.5.1**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: — *Plastic inserts are permitted.* — *step height ≤ 220 mm; step depth ≥ 400 mm up to 30° inclination.*		
5.3.2.2.4 Requirements step riser.	**6.1.3.5.3**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *Plastic inserts are permitted.*		
5.3.2.2.5 Width of grooves b_7 5 mm ≤ b_7 ≤ 7 mm.	**6.1.3.5.5**	No equivalent requirements.
WORLDWIDE ACCEPTANCE*: 5 mm ≤ b_7 ≤ 6,5 mm.*		
5.3.2.2.6 Depth of grooves h_7 ≥ 10 mm.	**6.2.3.5.1**	No equivalent requirements.
WORLDWIDE ACCEPTANCE*: h_7 ≥ 10 mm.*		
5.3.2.2.7 Web width 2,5 mm ≤ b_8 ≤ 5 mm	**6.1.3.5.5** **6.2.3.5.1**	No equivalent requirements.
REMARK: *Requirements, slot centre to centre is equal to the dimension calculated as EN b_7 + EN b_8.* ***WORLDWIDE ACCEPTANCE****: 7,5 mm ≤ slot ≤ 9,5 mm.*		
5.3.2.2.8 Step/Pallets side edge.	**6.1.3.5.5** **6.2.3.5.1**	No equivalent requirements.
WORLDWIDE ACCEPTANCE*: Not to finish with the groove on their side edges.*		
5.3.2.2.9 Front edge sharpness relieved.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE*: No sharp edges exposed to passengers.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.3.2.3 Belts **(see Figure 5, detail X)** 5.3.2.3.1 The belts shall have grooves in the direction of travel with which the teeth of the comb mesh. 5.3.2.3.2 4,5 mm ≤ b_7 ≤ 7 mm. 5.3.2.3.3 h_7 ≥ 5 mm. 5.3.2.3.4 4,5 mm ≤ b_8 ≤ 8 mm.	**6.2.3.6.2**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *4,8 mm ≤ b_7 ≤ 6,4 mm; 9 mm ≤ slot ≤ 13 mm.*		
5.3.2.3.5 The belt shall not finish with a groove at the side edge of the belt. Splicing of the treadway belt shall be such as to provide a continuous unbroken treadway surface.	**6.2.3.6.2** **6.2.3.6.1**	No equivalent requirements.
WORLDWIDE ACCEPTANCE**:** *The belt is not to be finished with a groove at the side edge. Splicing of the belt is to be provided a continuous unbroken surface.*		
5.3.3 Structural design **5.3.3.1 General** Load (steps, pallets, belt) 6 000 N/m^2).	**6.1.3.9.4** **6.1.3.10.4** **6.2.3.11.4**	**MOC-N (No.1418–2000)** **2.(2)** Safety factor Steel or other metal steps **SF:3.0**(Normal condition)/ 2.0 (Safety device is actuated) **JEAS-209 (2015)** The weight of step (pallet): ≤ 30 kg **JEAS-A1003 (2014)** Escalator specifications. **JEAS-1004B (2002)** Structural calculation for escalator.
AGREED UPON**:** *The EN steps, pallets, and belt requirements demonstrate best engineering practices.*		
5.3.3.2 Static test **5.3.3.2.1 Steps** Steps, static tests 3 000 N on plate 0,2 m × 0,3 m deflection ≤ 4 mm (no permanent deformation). (See Figure 1). Force applied in the centre of the tread surface. In case of inserts/fixings on tread surface additional test requirements defined. (See Figure 2).	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.3.3.2.2 Step riser Step riser, static tests 1 500 N on plate 2 500 mm^2 deflection ≤ 4 mm (no permanent deformation). (See Figure 1). In case of inserts/fixings on riser additional test requirements defined. (See Figure 2).	No equivalent requirements.	No equivalent requirements.
AGREED UPON: *The EN step testing requirements demonstrate best engineering practice.*		
5.3.3.2.3 Pallets Load of 7 500 N for a pallet area of 1 m^2 with the plate 0,30 m × 0,45 m. Deflection ≤ 4 mm (no permanent deformation). For single pallet tread surface > 0,4 m^2, 7 500 N/m^2 x surface. For single pallet tread surface ≤ 0,4 m^2, min 3 000 N.	No equivalent requirements.	No equivalent requirements.
AGREED UPON: *The EN pallet testing requirements demonstrate best engineering practice.*		
5.3.3.2.4 Belts 750 N on plate 0,15 m × 0,25 m x 0,025 m. deflection ≤ 0,01 z3. (See Figure 11). Force applied centrally between supporting rollers.	**6.2.3.9**	No equivalent requirements.
AGREED UPON: *The EN and A.17.1/B44 belt requirements lead to similar results.*		
5.3.3.3 Dynamic tests **5.3.3.3.1 Steps** **5.3.3.3.1.1 Load test** Load 500 N – 3 000 N One frequency between 5 – 20 Hz Cycles = 5 × 10^6 Dimension of load plate 0,20 m × 0,30 m, thickness ≥ 0,025 m Deformation ≤ 4 mm load applied centrally. No indication of crack initiation. Steps or their component parts, shall be securely attached and not become loose.	**6.1.3.5.7** **8.3.11**	No equivalent requirements.
REMARK: *A17.1/B44 defines requirements for evaluation of step cracks as well.* ***AGREED UPON***: *The EN step testing requirements demonstrate best engineering practice.*		
5.3.3.3.1.2 Torsional test torsional loading equivalent to a ±2 mm displacement, wheel centre distance of 400 mm. (see Annex F). The ratio to be maintained when 400 mm varies.	No equivalent requirements.	No equivalent requirements.
AGREED UPON: *The EN step testing requirements demonstrate best engineering practices.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.3.3.3.2 Pallets **5.3.3.3.2.1 Load test** Load 500 N – 3 000 N One frequency between 5 - 20 Hz Cycles = 5×10^6 Dimension of load plate 0,20 m × 0,30 m, thickness ≥ 0,025 m Deformation ≤ 4 mm load applied centrally. No indication of crack initiation. Pallets or their component parts, shall be securely attached and not become loose.	**6.2.3.5.4** **8.3.11**	No equivalent requirements.
AGREED UPON: *The EN pallet testing requirements demonstrate best engineering practice.*		
5.3.3.3.2.2 Torsional test Only required if pallets are fitted with trailer rollers. Torsional loading equivalent to a ±2 mm displacement, wheel centre distance of 400 mm. (see Annex F). The ratio to be maintained when 400 mm varies.	No equivalent requirements.	No equivalent requirements.
AGREED UPON: *The EN pallet testing requirements demonstrate best engineering practice.*		
5.3.4 Guiding of steps, pallets and belt Lateral displacement of steps or pallets ≤4 mm each side and ≤7 mm for the sum of clearances measured at both sides. Vertical displacement ≤4 mm for steps and pallets and ≤ 6 mm for belts.	**6.1.3.5.1** **6.1.3.8** **6.2.3.9**	**MOC-N (No.1417–2000)** **JIS A 4302:2006;** The clearance between the side edge of the step and skirt guard panel ≤ 5 mm]
WORLDWIDE ACCEPTANCE: *Vertical displacement for steps ≤ 4 mm. Vertical displacement for Pallets ≤ 3 mm.*		
5.3.5 Clearance between steps or pallets Clearance between steps or pallets ≤6 mm. Figure 2, and Figure 6 (see Figure 5, details Y, Z, Figure 9, detail S and Figure 10, detail U). Demarcation to highlight rear edge of the step. In transition curves of moving walks max. 8 mm (see Figure 10, detail V).	**6.1.3.5.4** **6.2.3.5.2** **6.1.3.5.6**	**MOC-N (No.1417–2000)** **1.(2)** The clearance between the adjacent steps ≤ 5 mm. **JIS A 4302:2006;5.4.2** **k)** The safety marks on steps should be clear **JIS A 4302:2006;5.4.2.h)** Requirements demarcation lines adjacent to the balustrade
REMARK: *Demarcation requirements are different.* ***WORLDWIDE ACCEPTANCE:*** *Clearance between steps ≤ 5 mm. Clearance between pallets ≤ 5 mm.*		
5.3.6 Missing step or pallet device The operation of the escalator/moving walk is only permitted with a complete step/pallet band. Missing step/pallet shall be detected by a safety device or function in accordance with 5.12.2.7.11.	**6.1.6.5**	No equivalent requirements.
AGREED UPON: *Best practise is to provide missing step/pallet device.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.4 Drive unit **5.4.1 Driving machine** **5.4.1.1 General** A drive unit shall not operate more than one escalator or moving walk.	**6.1.5.2** **6.2.5.2**	No equivalent requirements.
AGREED UPON: *Best practise is, a drive unit not to operate more than one escalator or moving walk.*		
5.4.1.2 Speed 5.4.1.2.1 The speed of an unloaded escalator shall not deviate by more than ±5 % at nominal frequency and nominal voltage.	No equivalent requirements.	**JIS A 4302:2006;5.4.1. b)** The measured speed 110 % or less of nominal speed under no load condition]
WORLDWIDE ACCEPTANCE: *Speed deviation ±5 % for unloaded escalator.*		
5.4.1.2.2 Speed of escalators $v \leq 0{,}75$ m/s up to 30° $v \leq 0{,}5$ m/s (30° up to 35°)	**6.1.4.1.1**	**BSLJ-EO (Structure of Escalators) Article 129–12** **1.(5)** The rated speed ≤ 50 m/min **MOC-N (No.1413–2000)2.** **(1) (b)** The rated speed ≤ 30 m/min (30°< α ≤35°) **EXP. 2.(1) and (2)** The rated speed ≤ 45 m/min (8°< α ≤30°) [see 2.4.2 Table 6 and 7]
WORLDWIDE ACCEPTANCE**:** *Speed of unloaded escalator in up direction only ≤ 0,5 m/s.*		
5.4.1.2.3 $v \leq 0{,}75$ m/s (speed of moving walks) Exception: $v \leq 0{,}9$ m/s, if pallet width ≤1,1 m and horizontal pallet movement ≥1,6 m before entering the comb.	**6.1.4** **6.2.4**	**MOC-N (No.1417–2000), EXP. 2. (1) and (2)** For inclination ≤8°: $v \leq 50$ m/min (0,833 m/s) For inclination >8° and ≤15°: $v \leq 45$ m/min (0,75 m/s)
FUNDAMENTAL DIFFERENCES: — *All codes define a correlation between speed and angle of inclination of moving walks.* — *Speed limits of accelerating moving walks are outside the scope of all codes.*		
5.4.1.3 Link between operational brake and step, pallet or belt drive **5.4.1.3.1** preferably non-friction driving elements for connection between operational brake and main drive For friction driving elements an auxiliary brake is required	**6.1.5** **6.2.5** **6.1.5.1** **6.2.5.1** **6.1.5.3** **6.2.5.3** **6.1.5.3.1** **6.2.5.3.1**	No equivalent requirements.
REMARK: *EN 115-1 and A17.1/B44 are requiring a positive connection (non-friction elements) between the auxiliary brake and the step/pallet band. No requirements in JIS.* ***FUNDAMENTAL DIFFERENCES:*** — *EN permits a friction drive between operational brake and the step/pallet or belt drive with an additional auxiliary brake. A17.1/B44 does not allow a friction drive between operational brake and the step/pallet or belt drive.* — *A17.1/B44 does not require main drive shaft brake if duplicate drive machines are employed each having the capacity capable of stopping the escalator in accordance with 6.1.5.3.2.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
No equivalent requirements.	**6.2.3.14**	No equivalent requirements.
REMARK: *Only A17.1/B44 gives guidance regarding V belts drives.*		
5.4.1.3.2 Safety factor of driving elements	**6.1.3.1** **6.2.3.11**	**MOC-N (No. 1418–2000), 2 (3), 2 (4)** Safety factor at normal operation: — 7 (at installation) against breaking point — 4 (during use) against breaking point. Safety factor when safety device is actuated: — 2,5 (at installation) against breaking point — 2,5 (during use) against breaking point
REMARK: *When applying sound engineering practice, the achieved safety levels for the machine and transmission elements are practically the same from code to code.* ***FUNDAMENTAL DIFFERENCE:*** — *EN uses a passenger load of 5 000 N/m² and a safety factor of 5 for driving elements;* — *In combination with the formula used for machinery rated load, A17.1/B44 requires a safety factor of 10 for power transmission members and of eight, respectively, 10 depending on the material used.*		
5.4.1.4 Hand winding device Information about hand winding device.	No equivalent requirements.	**JEAS-209 (2015) 3.4.1** The hand winding device shall be provided with the situation of interruption of main contactor.
REMARK: *EN and JIS have requirements in case hand winding device is provided.*		
5.4.2 Braking system **5.4.2.1 Operational brake** **5.4.2.1.1General** **5.4.2.1.1.1** Escalators and moving walks shall have an operational braking system by which they a) can be brought to rest with uniform deceleration b) can be maintained stationary	**6.1.5.3** **6.2.5.3** **6.1.5.3.1** **6.2.5.3.1** **6.1.5.3.1(c)** **6.2.5.3.1(c)** **6.1.5.3.1(b)** **6.2.5.3.1(b)**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *All standards require a brake uniformly decelerate and stop the escalator/moving walk and hold stationary.*		
5.4.2.1.1.2 Operational braking by electro mechanical brake. For operational braking by electro mechanical brake the requirements of 5.4.2.1.2 apply.	**6.1.5.3.1(a)** **6.2.5.3.1(a)**	No equivalent requirements.
FUNDAMENTAL DIFFERENCE: *A17.1/B44 allow magnetically applied braking system using ceramic permanent magnet.* ***WORLDWIDE ACCEPTANCE:*** *Electro mechanical braking system.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.4.2.1.1.3 Operational braking by electrical braking. For electrical braking (e.g. electrical braking with inverter) the requirements according 5.4.2.1.1 a) shall be fulfilled. An electro-mechanical brake according to 5.4.2.1.2 is required and also to be initiated under 5.12.3.5.2	No equivalent requirements.	No equivalent requirements.
REMARK: *A17.1/B44 is introducing requirements which will allow electrical braking in the 2019 revision.* ***AGREED UPON***: *Electrical braking means for operational braking is allowed.*		
5.4.2.1.1.4 Operational braking by other means. Where the operational brake is affected by other means an auxiliary brake in accordance with 5.4.2.2 shall be provided;	No equivalent requirements.	No equivalent requirements.
FUNDAMENTAL DIFFERENCE: *EN allows other means for operational braking with the condition to have an auxiliary brake.*		
5.4.2.1.1.5 Brakes that can be released by hand shall require continuous application of manual pressure to keep them open.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *EN requirements according to 5.4.2.1.1.5.*		
5.4.2.1.2 Electro-mechanical brake The normal lifting of the electro-mechanical brake shall be by a continuous flow of electric current. The braking operation shall be effective immediately after the electric brake circuit is opened. The brake force shall be generated by guided compression spring(s). Electrically generated self-excitation of the brake releasing device shall be impossible.	**6.1.5.3.1 (a) and (b)** **6.2.5.3.1 (a) and (b)**	**BSLJ-EO (Structure of escalator)** The brake shall be applied automatically if the electrical power supply is interrupted.
FUNDAMENTAL DIFFERENCE: *EN limits the application to 'guided compression spring(s)'. A17.1/B44 and JIS do not restrict means of the implementation.* ***WORLDWIDE ACCEPTANCE:*** — *When the electrical power supply is interrupted the braking operation is to be effective immediately.* — *Brake force application by guided compression springs.*		
5.4.2.1.3 Brake load and stopping distances for operational brake **5.4.2.1.3.1 Determination of the brake load for escalators** Table 2 shall be applied for the determination of the brake load for escalators. The number of steps to be considered is determined by "rise h13 divided by maximum visible height of the step riser" (see x_1 in Figure 8). For the purpose of a test, the total brake load is permitted to be distributed over two-thirds of the number of steps thus obtained.	**6.1.3.9.3**	**JEAS-527 (2013)** The design load of the braking device, S600 65 kg/step S800 100 kg/step S1000 or more: 130 kg/step
REMARK: *All three standards define brake load per step dependant on step width.* ***FUNDAMENTAL DIFFERENCE:***		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *Brake load per step for all three standards is different.* — *Only A17.1/B44 has additional brake load requirement for holding the stopped escalator.*		
5.4.2.1.3.2 Stopping distances for the escalator The stopping distances for unloaded upwards, unloaded downwards and loaded downward moving escalators (see 5.4.2.1.3.1) shall be as given in Table 3. For intermediate nominal speeds the stopping distances shall be interpolated. The stopping distances shall be measured from the time the electric stopping device is actuated. The deceleration, measured on a downward moving escalator, in the direction of travel shall not exceed 1 m/s^2 during the operation of the braking system. For measuring purposes, the raw deceleration signal shall be band-limited using a 4,0 Hz low-pass two-pole Butterworth filter. It is recommended to achieve the shortest possible stopping distance within the given deceleration limit.	**6.1.5.3.1 (c)**	**BSLJ-EO (Structure of escalator) Article 129–12 5** Deceleration rate ≦ 1,25 m/s^2 **MOC-N (No.1424–2000)** Minimum stopping distance of the step; $S=V^2/9\ 000$ (m) where, V: the rated speed of escalators (m/min.) Stopping distance not exceeding 0,6 m for escalators.
REMARK: — *All three standards verify by measurement.* — *All three standards define minimum and maximum stopping distances: EN and JIS by specific dimensions dependent on nominal speeds. A17.1/B44 minimum (stopping distance) depends on speed, maximum (stopping distance) depends on load and position of safety device.* — *All three standards have different verification means to determine stopping distance requirements. See Table 3.*		
5.4.2.1.3.3 Determination of the brake load for moving walks Table 4 shall be applied for the determination of the brake load for moving walks. To determine the brake load for moving walks which in their length overcome several inclinations (differences in level), only the downward moving sections shall be considered	**6.2.3.10.3**	No equivalent requirements.
REMARK: *JIS has no requirements. EN and A17.1/B44 define brake load per distance dependant on pallet width.* ***FUNDAMENTAL DIFFERENCE:*** — *Brake load per distance for EN and A17.1/B44 is different.* — *A17.1/B44 has additional brake load requirement for holding the stopped moving walk.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.4.2.1.3.4 Stopping distances for moving walks The stopping distances for unloaded upwards, unloaded downwards and loaded downward moving inclined moving walks (see 5.4.2.1.3.3) shall be as given in Table 5. This applies also for unloaded and loaded horizontal moving walks in both directions. For intermediate nominal speeds the stopping distances shall be interpolated. The stopping distances shall be measured from the time the electric device for stopping is actuated. The deceleration, measured on a downward moving or horizontal moving walk, in the direction of travel shall not exceed 1 m/s2 during the operation of the braking system. For measuring purposes, the raw deceleration signal shall be band-limited using a 4,0 Hz low-pass two-pole Butterworth filter. It is recommended to achieve the shortest possible stopping distance within the given deceleration limit. For moving walks a brake test under no load will be sufficient. For loaded moving walks, the manufacturer shall prove the stopping distances by calculation (see 6.2 c).	**6.2.5.3.1 (c)**	**BSLJ-EO (Structure of escalator) Article 129–12 5** Deceleration rate ≦ 1,25 m/s^2 **MOC-N (No.1424–2000)** Minimum stopping distance of the step; S=V^2/9 000 (m) where, V: the rated speed of escalators (m/min.) Stopping distance not exceeding 0,6 m for escalators
REMARK: — *All three standards verify by measurement.* — *All three standards define minimum and maximum stopping distances: EN and JIS by specific dimensions dependent on nominal speeds. A17.1/B44 minimum (stopping distance) depends on speed, maximum (stopping distance) depends on load and position of safety device.* — *All three standards have different verification means to determine stopping distance requirements. See Table 3.*		
5.4.2.2 Auxiliary brake **5.4.2.2.1** auxiliary brake if: a) connection between operational brake and driving sprockets by single chain b) not an electro-mechanical brake c) h13 > 6 m	**6.1.5.3.2** **6.2.5.3.2**	**MOC-N (No.1424–2000), EXP. 2** required to equip the escalator with mechanical brake
REMARK*: EN recommends auxiliary brakes below 6 m for escalators or moving walks which are part of public transport system.* ***AGREED UPON****: The main drive shaft brake acc. A17.1/B44 and the EN auxiliary brake requirements can be merged in a worldwide accepted future main drive shaft brake definition.* ***FUNDAMENTAL DIFFERENCE:***		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *A17.1/B44 require main drive shaft brake, in case of single drive, when the operational brake is separated from the main drive shaft by chain compulsory for all rises.* — *EN requires auxiliary brake which does not necessarily need to be on the main drive shaft.* — *EN requires auxiliary brake in addition to the operational brake for a rise above 6 m or the connection between the operational brake and driving sprockets is by a single chain or the operational brake is not an electromechanical brake.*		
5.4.2.2.2 deceleration of 1 m/s^2 shall not be exceeded no stopping distances defined maintain stationary	No equivalent requirements.	No equivalent requirements.
REMARK: *Only EN defines deceleration rate.* ***AGREED UPON****: deceleration rate to be defined.* ***WORLDWIDE ACCEPTANCE:*** *limit on deceleration rate, no limit on stopping distances and requirement to maintain stationary.*		
5.4.2.2.3 Auxiliary brakes shall be of the mechanical (friction) type.	**6.1.5.3.2** **6.2.5.3.2**	**MOC-N (No.1424–2000), EXP. 2** required to equip the escalator with mechanical brake
FUNDAMENTAL DIFFERENCE*: A17.1/B44 permit permanent magnet brake application.*		
5.4.2.2.4 Auxiliary brakes shall stop according to 5.12.3.5.3. The activation of the auxiliary brake shall be detected	**6.1.6.3.4**	No equivalent requirements.
REMARK*: Only EN require to detect the activation of auxiliary brake.* ***WORLDWIDE ACCEPTANCE****: Detection of activation of auxiliary brake/main drive shaft brake.*		
5.4.2.2.5 Auxiliary brake(s) are permitted to operate together with the operational brake under certain requirements	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE*: EN requirements are accepted.*		
5.4.2.3 Protection against excessive speed and unintentional reversal	**6.1.6.3.2** **6.2.6.3.2** **6.1.6.3.8** **6.2.6.3.7**	No equivalent requirements.
AGREED UPON*: Overspeed and unintentional reversal is to be prevented.*		
5.4.3 Steps and pallets drive **5.4.3.1** Step and pallet chain arrangement. Safety device to detect breakage or undue elongation of step/pallet chain.	**6.1.3.11** **6.2.3.12** **6.1.6.3.3**	**BSLJ-EO (Structure of escalator) Article 129–12** Two or more step / pallet drive chain shall be provided, **MOC-N (No.1424-2000) 1.(2).(b)** **JIS A 4302:2006;** Detection of extraordinary extension
REMARK: — *All three codes are requiring safety device for detecting breakage and elongation* — *EN allows for moving walks one chain under special conditions* ***FUNDAMENTAL DIFFERENCE:*** *A17.1/B44 excludes cast iron links for all chains.* ***WORLDWIDE ACCEPTANCE:*** *two or more step/pallet chains.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.4.3.2 The step/pallet chain design shall be of nominal infinite fatigue life. The safety factor against breaking of each chain shall be at least 5 with respect to specific steel types	**6.1.3.10.3** **6.2.3.11.3** **6.1.3.9.2** **6.2.3.10.2**	**MOC-N (No. 1418-2000), 2(3),(4)** Safety factor at normal condition: — 7 (at installation) — 4 (during use) Safety factor when safety device is actuated: — 2,5 (at installation) — 2,5 (during use)
REMARK: *All three codes are using different calculation input parameters and due to that, calculation methodologies are different.* ***FUNDAMENTAL DIFFERENCE:*** — *EN requires safety factor of 5 for static load. and with respect to specific steel types.* — *A17.1/B44 require a safety factor of 10, based on machinery rated load.* — *JIS requires a safety factor of 7 for static load (at installation).*		
5.4.3.3 The chains shall be tensioned continuously. A safety device or function according to 5.12.2.7.6 shall be provided to detect movement of the return device. 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.	**6.1.6.3.3**	**MOC-N (No.1424-2000) 1.(2).(b)** **JIS A 4302:2006;** The device which can detect extraordinary extension of the step chains shall be provided.
REMARK: *A17.1/B44 additionally requires a broken step chain device to detect excessive sag, if no automatic step chain tensioning device is provided.*		
5.4.4 Belt drive **5.4.4.1** The factor of safety of the belt including splicing shall be at least 5 (see 5.4.1.3.2) for the dynamic forces according to 5.4.2.1.3.3 respectively 5.4.2.1.3.4. The calculation shall be carried out for the worst case.	**6.2.3.11.5**	**MOC-N (No. 1418-2000) 2(3),(4)** Safety factor at normal condition: — 7 (at installation) — 4 (during use) Safety factor when safety device is actuated: — 2,5 (at installation) — 2,5 (during use)
5.4.4.2 The belt shall be driven by drums and be tensioned continuously and automatically. A safety device or function according to 5.12.2.7.6 shall be provided to detect movement of the return device 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.	No equivalent requirements.	No equivalent requirements.
REMARK: *EN requires a tensioning device for belts; tensioned springs are prohibited.* ***AGREED UPON:*** *Belts shall be tensioned continuously and automatically.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.5 Balustrade **5.5.1 General** Balustrades on each side.	**6.1.3.3** **6.2.3.3**	**BSLJ-EO (Structure of escalator) Article 129–12** Same.
AGREED UPON: *The balustrade provides the passenger's safety by providing stability, protects the passenger from moving parts of the escalator, and supports the handrail.*		
5.5.2 Dimensions of balustrade 5.5.2.1 Height above steps 0,9 m ≤ h_1 ≤ 1,1 m (see Figures 5 and 6) in the inclined section.	**6.1.3.4.5** **6.2.3.2.2**	No equivalent requirements.
REMARK: — *JIS does not specify limits for handrail height above steps/pallets.* — *The balustrade including the handrail is not intended to be a barrier as requested by building codes* ***FUNDAMENTAL DIFFERENCE:*** *A17.1/B44 defines the handrail height from the step nose to the top of the handrail along the entire travel path of the escalator.* ***WORLDWIDE ACCEPTANCE****: 900 mm ≤ h_1 ≤ 1 000 mm.*		
5.5.2.2 Prevention of climbing on balustrades and anti-slide device Specific dimensions	**6.1.3.3.13** **6.2.3.3.8** **6.1.3.3.12**	**JEAS-422 (2013)** 3.1.5 Prevention of climbing on balustrades
REMARK: — JIS does not define anti-slide device — Deck barricade is a barricade to discourage climbing on the lower exterior outer deck. — An anti-slide-device is a device to discourage sliding on the high exterior decks.		
5.5.2.3 Static lateral force of 600 N and a vertical force of 730 N, both equally distributed over a length of 1 m	**6.1.3.3.2** **6.2.3.3.2**	**JEAS-525 (2009)** **EXP. 3.2** Static lateral force of 600 N and a vertical force of 730 N, both equally distributed over a length of 1 m
REMARK: *A17.1/B44 has additional requirements for seismic conditions, see A17.1 8.5.1.* ***AGREED UPON:*** *To have in the future clear and specific requirements defined including their verification. This is subject to harmonisation.* ***FUNDAMENTAL DIFFERENCE:*** *JIS and EN requires strength calculations by distribution over the length of 1 m. A17.1/B44 requires distribution over the full length of the handrail.*		
5.5.2.4 Specific requirements for Balustrade construction, mouldings, cover joints, etc. Force applied on the balustrade interior panelling 500 N over 25 cm^2 , Gap ≤ 4 mm No permanent deformation Glass panel thickness ≥ 6 mm	**6.1.3.3.1** **6.2.3.3.1** **6.1.3.3.3** **6.2.3.3.3**	**BSLJ-EO (Structure of escalator) Article 129–12** Similar **JEAS-525 (2009), 3.1** Glass panel thickness ≥ 6 mm
REMARK:		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *Under no load conditions, EN defines the limits of the gaps between panels to 4 mm. A17.1/B44 limits the gap between panels to 5 mm.* — *No requirements in JIS.* — *Only EN defines a maximum gap under load condition and does not allow permanent deformation.* — *In case of glass panels, EN and JIS require toughened glass, while A17.1/B44 defines glass types or plastic by referring to specific codes and standards.* ***AGREED UPON:*** *The gap between panels in the no-load condition are to be kept at the minimum.* ***WORLDWIDE ACCEPTANCE:*** *A gap of ≤4 mm.*		
5.5.2.5 Inner horizontal distance between balustrades	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *The distance between the interior panel lower points shall be equal or less than the points higher up.*		
5.5.2.6 Lower inner decking $\gamma \geq 25°$ see Figure 6	**6.1.3.3.4** **6.2.3.3.4**	No equivalent requirements.
***WORLDWIDE ACCEPTANCE**: $25° \leq \gamma \leq 30°$.*		
5.5.2.6.1 $b_4 < 30$ mm (see Figure 6).	**6.1.3.3.4** **6.2.3.3.4**	No equivalent requirements.
***WORLDWIDE ACCEPTANCE**: $b_4 < 30$ mm.*		
5.5.2.6.2 $b_3 < 0{,}12$ m if $\gamma \leq 45°$ (See Figure 6)	**6.1.3.3.4** **6.2.3.3.4**	**BSLJ-EO (Structure of escalator) Article 129–12** No requirement for angle Between edge of step and centre of handrail ≤ 0,25 m
REMARK: — *Subject for harmonization.* — *Only A17.1/B44 defines the load conditions for the deck and dynamic skirt panel cover see 6.1.3.3.4 (d).* ***WORLDWIDE ACCEPTANCE:*** *$b_3 < 0{,}12$ m.*		
5.5.3 Skirting		
5.5.3.1, 5.5.3.2 Skirting $h_2 \geq 25$ mm	**6.1.3.3.6** **6.2.3.3.6**	No equivalent requirements.
REMARK: — *To define the height of skirting A17.1/B44 uses the nose-line (path of the traces by the nose of the step as it moves around the escalator) as reference line. EN uses the tread surface of steps, pallets and belt as a reference.* — *Requirements are similar.* ***WORLDWIDE ACCEPTANCE:*** *$h_2 \geq 25$ mm.*		
5.5.3.3 Force applied to skirting 1 500 N over 2 500 mm^2 ≥ Deflection ≤ 4 mm No permanent deformation.	**6.1.3.3.6** **6.2.3.3.6**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: — *Comparable load conditions (position and area over which the load is applied) need to be defined in A17.1/B44. Only EN specifies the area over which the load is applied.* — *A17.1/B44 does not address the requirement of "no permanent deformation".* — *Subject for harmonization.* ***AGREED UPON:*** *EN and A17.1/B44 requirements can be considered similar.*		
5.5.3.4 Skirting requirements	**6.1.3.3.6** **6.2.3.3.6** **6.1.3.3.7** **6.1.3.3.8** **6.1.3.3.9** **6.1.3.3.10** **6.1.3.5.6**	**BSLJ-EO (Structure of escalator) Article 129–12** No trapping or obstacles under normal use **MOC-N (No.1417–2000), 1 and 1.(1) and 1.(2) and (d)** Gap smaller than 5 mm **JIS A 4302:2006;5.4.2.h)** Clearance between the edge of the step and skirt guard panel ≤ 5 mm. 5.4.2 k) The safety marks on steps should be clear
REMARK: — *All codes have the common intention to minimize the risk of trapping between skirting/skirt and steps/pallets by limiting the gap.* — *EN and A17.1/B44 specifies the requirements of a skirt deflector.*		
5.5.4 Newel **5.5.4.1** Newel $l_2 \geq 0{,}6$ m (see L_2 and l_2 in Figure 5 and detail X).	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: $l_2 \geq 0{,}6$ *m.*		
5.5.4.2 Dimension $l_3 \geq 0{,}3$ m	**6.1.3.4.2/6.2.3.4.2**	**MOC-N (No.1417–2000), EXP. 2** Extension beyond comb plates ≥ 300 mm related to a speed of more than 0,5 m/s
REMARK: — *A17.1/B44 defines only the extension beyond the line of points of the comb plate teeth. EN at the comb intersection line.* — *JIS defines same requirements only for speed above 0,5 m/s. Subject for harmonisation.* ***WORLDWIDE ACCEPTANCE:*** $l_3 \geq 0{,}3$ *m.*		
5.5.5 Clearance between steps, pallets or belt and skirting **5.5.5.1** Clearance between steps and skirting ≤4 mm at either side, but max 7 mm for sum	**6.1.3.3.5**	**MOC-N (No.1417–2000), 1 and 1.(1) and EXP 1.(1)** ≤5 mm **JIS A 4302:2006; 5.4.2. h)** ≤5 mm at each side
FUNDAMENTAL DIFFERENCE: — *A17.1/B44 requires the application of a load and therefore not directly comparable.* — *JIS permits a larger maximum distance than EN.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.5.5.2 Skirting above tread surface (moving walks) Clearance between tread surface and underside of the skirting ≤ 4 mm	**6.2.3.3.5**	No equivalent requirements.
REMARK: *EN specifically prohibits any horizontal gap. Subject for harmonisation.* ***WORLDWIDE ACCEPTANCE:*** *≤ 4 mm.*		
5.6 Handrail system **5.6.1 General** Handrail moving in the same direction and speed tolerance -0 % to +2 % of the speed of the steps A handrail speed monitoring device or function shall be provided according to 5.12.2.7.13	**6.1.3.4** **6.2.3.4** **6.1.3.4.1** **6.2.3.4.1**	**BSLJ-EO (Structure of escalator)** Article 129–12, 1.**(3)** Handrail moving in the same direction and same speed of the steps **JIS A 4302:2006; 5.4.2. d)** Handrail speed monitoring device
REMARK: — *EN defines the handrail speed with a tolerance of 0 % to +2 %;* — *A17.1/B44 defines handrail angular speed requirements for curved escalators.* — *All three codes require a handrail speed monitoring device and movement of the handrail in the same direction as steps/pallets.* ***AGREED UPON:*** *handrail speed tolerance 0 % to 2 %.*		
No equivalent requirements.	**6.1.3.4.1** **6.2.3.4.1**	**JIS A 4302:2006** Check of retarding force (150 N) for downward operation
REMARK: — *The intention of this requirement (A17.1/B44 and JIS) is to ensure the handrail system provides continuous traction.* — *Subject for harmonisation.* ***FUNDAMENTAL DIFFERENCE:*** *EN does not specify any retarding forces, however A17.1/B44 defines a retarding force of 450 N without speed change. JIS requires, for escalators, a retarding force applied to the handrail in the down-running direction. The handrail is to not stop (escalators).*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.6.2 Profile and position **5.6.2.1** 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 handrail shall be a minimum of 80 mm horizontally (b_{10}) and 25 mm vertically (b_{12}) away from adjacent surfaces. The reduction of this area is permitted as long as b18 is not less than 8 mm as shown in detail W of Figure 6 (Point A on the handrail profile – Point B vertically minimum 25 mm below the lower edge of the handrail and horizontally maximum to the outer edge of the handrail). No point of the balustrade shall be above the direct line from A to B. The distance between the handrail profile and guide or cover profiles shall under no circumstances be wider than 8 mm (see b_6' and b_6" in Figure 6, detail W).	**6.1.3.4.6** **6.2.3.4.5**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *EN requirements according to 5.6.2.1.*		
No equivalent requirements.	**6.1.3.4.4/6.2.3.4.4**	No equivalent requirements.
REMARK: *A17.1/B44 6.1.3.4.4/6.2.3.4.4 is considered 'sound engineering practice'.*		
5.6.2.2 The width b_2 of the handrail shall be between 70 mm and 100 mm (see Figure 6, detail W).	**Annex I**, Fig. I-1 and Fig. I-9	No equivalent requirements.
AGREED UPON: *Subject for harmonisation.* ***WORLDWIDE ACCEPTANCE:*** *70 mm ≤ handrail width ≤ 100 mm.*		
5.6.2.3 The distance b_5 between the handrail and the edge of the balustrade shall not exceed 50 mm (see Figure 6).	**Annex I**, Fig. I-1 and Fig. I-9	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *b_5 ≤ 50 mm.*		
5.6.3 Distance between the handrail centre lines The distance b_1 between the centre line of the handrails shall not exceed the distance between the skirting by more than 0,45 m (see b_1 and z_2 in Figure 6).	**6.1.3.2.2** **6.2.3.2.3**	**BSLJ-EO (Structure of escalator) Article 129–12** **MOC-N (No.1413–2000)** Distance between the edge of the step and centre of the handrail ≤ 0,25 m.
WORLDWIDE ACCEPTANCE: *EN requirements according to 5.6.3.*		
5.6.4 Handrail entry **5.6.4.1** The lowest point of entry of the handrail into the newel shall be at a distance h_3 from the finished floor level which shall be not less than 0,10 m and not exceed 0,25 m (see Figures 5 and 6).	**6.2.3.4.2**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *A17.1/B44 only has requirements for moving walks.* ***WORLDWIDE ACCEPTANCE:*** *100 mm ≤ h_3 ≤ 250 mm.*		
5.6.4.2 The horizontal distance l4 between the furthest point reached by the handrail and the point of entry into the newel shall be at least 0,30 m (see Figure 5). If l_4 is greater than (l_2 - l_3 + 50 mm) the handrail shall enter into the balustrade at an angle α of at least 20° measured to the horizontal.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *EN requirements according to 5.6.4.2.*		
5.6.4.3 At the point of entry of the handrail into the newel a guard shall be installed to protect against pinching of fingers and hands. A safety device or function according to 5.12.2.7.9 shall be provided.	**6.1.3.4.3** **6.2.3.4.3**	**MOC-N (No.1424–2000)** **JIS A 4302:2006** **1.(2) (e)** Handrail entry guard required, inlet switch shall be certain.
REMARK: *All three codes require a handrail entry guards and safety devices.*		
5.6.5 Guiding The handrail shall be guided and tensioned in such a way that it will not leave its guides during normal use.	No equivalent requirements.	No equivalent requirements.
REMARK: *The intention of this requirement is that under normal operational conditions the handrails remain in their intended position.*		
5.7 Landings **5.7.1 Surface properties** 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 (see L1 in Figure 5 and detail X). NOTE: For definition of materials and test methods, see Annex J. Exempt from this are the combs mentioned in 5.7.3.	**6.1.7.3.1**	**JEAS-209 (2015)** The weight of the floor plate: ≤ 30 kg
REMARK: *Only EN defines a minimum distance in the travel direction.* ***WORLDWIDE ACCEPTANCE:*** *Surface providing secure foothold.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.7.2 Configuration of steps, pallets and belts **5.7.2.1** At the upper and lower landing, the steps of the escalator shall be guided in such a way that the front edges of the steps leaving the comb and the rear edges of the steps entering the comb are moving horizontally for a length of at least 0,80 m measured from point L_1 (see Figure 5 and detail X). At nominal speeds above 0,50 m/s and not more than 0,65 m/s or rises h13 above 6 m this length shall be at least 1,20 m, measured from point L1 (see Figure 5 and detail X). At nominal speeds above 0,65 m/s this length shall be at least 1,60 m measured from point L1 (see Figure 5 and detail X). A vertical difference in level between two consecutive steps of 4 mm is permitted.	**6.1.3.6.5**	**MOC-N (No.1413–2000)** **2.(1) (e)** 2 flat steps with max 4 mm difference in level for more than 30 degree.
REMARK: — *Minimum step depth in JIS 350 mm, in EN 380 mm, in A17.1/B44 400 mm.* — *Only EN has dependency between speed, hight rise, and "flat steps", only A17.1/B44 has a maximum "flat step" limit.* ***FUNDAMENTAL DIFFERENCE:*** *The definition of "flat step" in EN and JIS permits a vertical difference of two consecutive steps of ≤ 4 mm, in A17.1/B44 no vertical difference is allowed.*		
5.7.2.2 For escalators, the radius of curvature in the upper transition from incline to horizontal shall be: — at least 1,00 m for nominal speeds v ≤ 0,5 m/s (inclination of max. 35°); — at least 1,50 m for nominal speeds 0,5 m/s < v ≤ 0,65 m/s (inclination of max 30°); — at least 2,60 m for nominal speeds v > 0,65 m/s (inclination of max 30°). The radius of curvature in the lower transition from incline to horizontal of the escalator shall be at least 1,00 m up to 0,65 m/s the nominal speed and at least 2,00 m above 0,65 m/s.	No equivalent requirements.	No equivalent requirements.
REMARK: *Only EN defines requirement for curvature in transition dependant on speed and inclination.*		
5.7.2.3 For belt moving walks, the radius of curvature in the transition from incline to horizontal shall be at least 0,40 m. For pallet moving walks, it is not necessary to determine the radius of curvature because, on account of the maximum permissible distance between two consecutive pallets (see 5.3.5), it will always be sufficiently large.	No equivalent requirements.	No equivalent requirements.
REMARK: *Only EN has a requirement for curvature in transition for belt moving walks.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.7.2.4 At the upper landings of moving walks with an inclination of more than 6°, the pallets or belt shall move for a length of at least 0,40 m at a maximum angle of 6° before entering or after leaving the comb. Analogous to 5.7.2.1, for pallet moving walks the movement is specified as follows: The front edge of the pallet leaving the comb and the rear edge of the pallet entering the comb shall move without changing the degree of angle over at least 0,40 m.	**6.2.3** **6.2.3.1** **6.2.3.5.3**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *An inclination ≤ 3^0 for a distance of 900 mm measured from the comb/pallet intersection.*		
5.7.2.5 Provisions shall be made in the area of the combs to ensure the correct meshing (see 5.7.3.3) of the comb teeth with the grooves of the tread surface. A safety device or function according to 5.12.2.7.10 shall be provided. Belts shall be supported in this area in a suitable manner, e.g. by drums, rollers, sliding plates.	**6.1.3.6.1** **6.2.3.8.1**	**JIS A 4302:2006;** **5.4.2 g)** Enough engagement between steps and combs. There is no risk of easy jamming of things.
WORLDWIDE ACCEPTANCE: *Adequate meshing between comb and grooves of the tread surface and a requirement for a safety device to detect sagging of step/pallet.*		
5.7.3 Combs **5.7.3.1 General** Combs shall be fitted at both landings to facilitate the transition of users. The combs shall be easily replaceable.	**6.1.3.6** **6.2.3.8** **6.1.3.6.1** **6.2.3.8.1**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *Combs are required at each entry/exit and are to be easily replaceable.*		
5.7.3.2 Design **5.7.3.2.1** The teeth of the combs shall mesh with the grooves of the steps, pallets or belt (see 5.7.3.3). The width of the comb teeth shall be not less than 2,5 mm, measured at the tread surface (see Figure 5, detail X).	**6.1.3.6.1** **6.2.3.8.1**	**JIS A 4302:2006;** **5.4.2 g)** Enough engagement between steps and combs. There is no risk of easy jamming of things.
REMARK: *EN defines a minimum thickness of the comb teeth.* ***WORLDWIDE ACCEPTANCE:*** *See 5.7.2.5.*		
5.7.3.2.2 The ends of the combs shall be rounded off and so shaped as to minimize the risk of trapping between combs and steps, pallets or belt. The radius of the teeth end shall be not greater than 2 mm.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *Radius of the teeth end is to be ≤ 2 mm.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.7.3.2.3 The teeth of the comb shall have a form and inclination so that the feet of users, leaving the escalator or moving walk, should not stub against them. The design angle ß shown in Figure 5, detail X shall not exceed 35°.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *ß ≤ 35°.*		
5.7.3.2.4 The combs or their supporting structure shall be adjustable, to ensure correct meshing (see Figure 5, detail X).	**6.1.3.6** **6.2.3.8.1**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *Combs and/or their supporting structure are to be adjustable to ensure correct meshing.*		
5.7.3.2.5 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.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *Combs must remain in mesh or break in case of trapping of object/s.*		
5.7.3.2.6 A safety device or function according to 5.12.2.7.7 shall be provided.	**6.1.6.3.13** **6.2.6.3.11**	No equivalent requirements.
REMARK: *Only A17.1/B44 defines force requirements.* ***FUNDAMENTAL DIFFERENCE:*** *Only A17.1/B44 requires manual-reset of the safety device/s.* ***WORLDWIDE ACCEPTANCE:*** *A safety device for detection of an object at the comb.*		
No equivalent requirements.	**6.1.3.6.2** **6.2.3.8.2**	No equivalent requirements.
FUNDAMENTAL DIFFERENCE: *Only A17.1/B44 requires a visual contrast applied to the combs against the step/pallet/s.*		
5.7.3.3 Mesh depth of the combs into the grooves **5.7.3.3.1** The mesh depth h_8 of the combs into the grooves of the tread (see Figure 5, detail X) shall be at least 4 mm.	**6.1.3.6.1** **6.2.3.8.1**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: $h_8 \geq 4$ *mm.*		
5.7.3.3.2 The clearance h_6 (see Figure 5, detail X) shall not exceed 4 mm	**6.1.3.6** **6.2.3.8** **6.1.3.6.1** **6.2.3.8.1**	No equivalent requirements.
REMARK: — *EN ensures the meshing requirement by limiting h_6, where A17.1/B44 prevents under load conditions contact between comb and step/pallet.* — *EN addresses meshing under load conditions in chapter 5.2.5.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.8 Machinery spaces, driving station and return stations **5.8.1 General** 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. Fire alarm systems, equipment for direct fire abatement and sprinkler heads, provided they are sufficiently protected against incidental damage, are permitted in these rooms provided they do not generate additional risks for maintenance operation. NOTE See 7.4.1 d), 7.4.1 e) and 7.4.1 f) for maintenance requirements and inspection activities. According to Clause 5 of EN ISO 12100:2010, 6.3, effective protection and guards shall be provided for moving and rotating parts if they are accessible and dangerous, in particular for: a) keys and screws in shafts; b) chains, belts; c) projecting motor shafts; d) speed governors not enclosed; e) step and pallet reversal in driving stations and/or return stations if these shall be entered for maintenance purposes; f) keys and screws in shafts; g) chains, belts; h) projecting motor shafts; i) speed governors not enclosed; j) step and pallet reversal in driving stations and/or return stations if these shall be entered for maintenance purposes; k) hand wheels and brake drums.	**6.1.7.3.4** **6.2.7.3.4**	**JEAS-209 (2015)** **3.6.1** The guard, yellow sign or etc. shall be provided for rotating parts. **3.6.2** Mechanical locking feature shall be provided, if there is a possibility that steps will move by its own weight especially for the drive unit in the intermediate truss. **3.6.4** Communication means shall be provided for high rise escalators and long-distance moving walks.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
l) gears, gear wheels, sprockets; m) projecting motor shafts; n) speed governors not enclosed; o) step and pallet reversal in driving stations and/or return stations if these shall be entered for maintenance purposes; p) hand wheels and brake drums.		
REMARK: — *EN and JIS have additional requirements for machine room outside of the truss.* — *Protection and guard/s: EN refers to EN ISO 12100. A17.1/B44 and JIS define specific requirements. Subject for harmonisation.* — *Only JIS requires communication system between the machinery spaces.* ***WORLDWIDE ACCEPTANCE:*** *Protection against moving parts.*		
5.8.2 Dimensions and equipment **5.8.2.1** In machinery spaces, especially in driving and return stations inside the truss, space with a sufficiently large standing area shall be kept free from permanently installed parts of any kind. The size of the standing area shall be at least 0,30 m^2 and the smaller side shall be at least 0,50 m long. It is permitted to occupy this standing area by permanently installed parts, provided that the permanently installed parts are placed behind rounded corners of max. 0,25 m radius (see Figure 4) and at a height of at least 0,12 m above the free-standing area.	No equivalent requirements.	**JEAS-209 (2015)** **3.3.3 COMMENT** Standing area is at least 0,30 m^2 and the smaller side is at least 0,50 m long in machinery space.
REMARK: *EN and JIS defines specific minimum standing area requirements. A17.1/B44 local codes and standards apply. Subject for harmonisation.*		
5.8.2.2 If the controller cabinet shall be moved or lifted for maintenance purposes, then suitable attachments for lifting shall be provided, e.g. eyebolts, handle.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *EN requirements according to 5.8.2.2.*		
5.8.2.3 Where the main drive or brake is arranged between the user side of the step, pallet or belt and the return line, a level standing area in the working zone of not less than 0,12 m^2 shall be provided. The minimum dimension shall be not less than 0,30 m. This standing area is permitted to be fixed or removable. NOTE: For machinery spaces, see also A.3.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
WORLDWIDE ACCEPTANCE: *EN requirements according to 5.8.2.3.*		
No equivalent requirements.	No equivalent requirements.	**JEAS-209 (2015)** **3.3.2** The safety access measure shall be provided for the machinery space depth > 1.5 m
AGREED UPON: *Safe access requirements are required.*		
5.8.3 Lighting and socket outlets 5.8.3.1 The electric lighting and the socket outlets shall be independent of the power supply to the machine being fed either by a separate cable or a branch cable which is connected before the main switch of the escalator or moving walk. It shall be possible to break the supply of all phases by means of a separate switch (see 5.11.3.1).	No equivalent requirements.	**JEAS-209 (2015)** **3.2.3** The socket outlet shall be independent from the power supply. It shall be branched on and supplied from the primary side of the main switch.
WORLDWIDE ACCEPTANCE: *Electrical supply to socket outlets is to be independent from the escalator/moving walk electrical power supply.*		
5.8.3.2 Electric lighting installations in driving and return stations and machinery spaces inside the truss shall be by means of a portable lamp permanently available in one of these places. One or more socket outlets shall be provided in each of these places. The light intensity shall be at least 200 lx in working areas.	**6.1.7.1** **6.2.7.1** **6.1.7.1.1** **6.2.7.1.1** **6.1.7.1.2** **6.2.7.1.2**	**JEAS-209 (2015)** **3.2.1, 3.2.2** The socket outlet for maintenance shall be installed at the driving and return stations.
REMARK: *Lighting intensity requirements are defined differently in EN and A17.1/B44. No requirements in JIS.* ***WORLDWIDE ACCEPTANCE:*** *Available electric lighting and socket outlet/s.*		
5.8.3.3 Socket outlets shall be: a) either of type 2 P+PE (2 poles + earth conductor), 250 V, directly supplied by the mains, or b) of a type that is supplied at a safety extra low voltage in accordance with HD 60364-4-41:2007.	No equivalent requirements.	No equivalent requirements.
REMARK: *Only EN specifies socket outlet/s.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.9 Fire protection Fire protection and building requirements differ from country to country and so far, neither have been harmonized. Therefore, this standard cannot include specific requirements for fire protection and building requirements. However, it is recommended that as far as possible, escalators and moving walks are made of materials that do not create an additional hazard in case of fire. To avoid any risk of fire, see also 5.2.1.4. Outer and inner decking, truss, pallets/steps, track system shall be at least class C according to EN 13501 1:2007+A1:2009, 11.5. For materials that are not generally classified a compliance test shall be undertaken according to EN 13501 1:2007+A1:2009 (SBI Test according EN 13823:2010+A1:2014 [2]). For steps and pallets with plastic parts either on the tread surface or on the riser, this test shall be carried out with the step or pallet being in vertical position where the area with the plastic part are forming the test surface. In a configuration where a continuous arrangement of plastic inserts/parts exists in the direction of travel, a test according to EN 13501 1:2007+A1:2009 (SBI Test according to EN 13823:2010+A1:2014) shall be done solely with plastic insert material forming the whole test surface. NOTE A continuous arrangement is given for steps equipped with plastic inserts on the tread and on the riser and for pallets with plastic inserts in the direction of travel. Gaps between steps and pallets are not considered as an interruption of the continuous arrangement. If sprinklers or water mist systems are used their integration and fixation into the escalator and moving walk shall be done by taking into consideration the special needs of the machine.	**6.1.1** **6.2.1** **6.1.1.1** **6.2.1.1.1** **6.1.2** **6.2.2** **6.1.2.1** **6.2.2.1** **6.1.3.5.1** **6.2.3.5.5**	**BSLJ (Elevator, escalator, and dumbwaiter)** **Article 34** **MOC-N (No.1418–2000)** <Material restriction> (a) Step shall be made by steel or other metals; (b) Truss shall be made by steel.
FUNDAMENTAL DIFFERENCES: *Material requirements differ significantly, due to local standard/code and regulation references.*		
5.10 Transportation Complete escalators/moving walks or sub-assemblies or components of escalators/moving walks which cannot be handled by hand shall:	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
a) either be equipped with fittings for movement by a lifting device or transportation means, or b) be designed in a way that such fittings can be attached (e.g. threaded holes), or c) be shaped in a way that the lifting device or transportation means can be attached easily.		
WORLDWIDE ACCEPTANCE: *EN requirements according to 5.10.*		
5.11 Electric installations and appliances **5.11.1 General** **5.11.1.1 Introduction** The electric installation of escalators or moving walks shall be so designed and manufactured as to ensure protection against hazards arising from the electric equipment or which may be caused by external influences on it, provided the equipment is used in applications for which it was made and is adequately maintained. Therefore, the electric equipment shall: a) comply with the requirements stated in the CENELEC harmonized standards; b) where no harmonized standards as referred to in a) exist, comply with the requirements of the International Electrotechnical Commission (IEC) and which are stated in the CENELEC harmonized documents. Whenever one of these standards is used, its references are given, together with the limits within which it is used.	**6.1.7.4/6.2.7.4** **6.1.7.4.1/6.2.7.4.1** **6.1.7.4.2/6.2.7.4.2** **6.1.8**	No equivalent requirements.
REMARK: — *The electric installation of escalators or moving walks is to be designed and manufactured as to ensure protection against hazards arising from the electric equipment or which is to be caused by external influences on it, provided the equipment is used in applications for which it was made and is adequately maintained.* *There for, the electric equipment is to:* — *comply with the requirements stated in NFPA 70 or CSA C22.1 or CENELEC harmonized standards, whichever is applicable.* — *where any standard referred in a) is applicable, comply with the requirements of the International Electrotechnical Commission (IEC) and which are stated in the CENELEC harmonized documents.* Whenever one of these standards is used, its references are given, together with the limits within which it is used. **FUNDAMENTAL DIFFERENCE:** — EN consider to be operated under special conditions is to satisfy the particular conditions requirements. — A17.1/B44.1 define solution for outdoor Escalator/Moving walks installation.		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.11.1.2 Limits of application **5.11.1.2.1** The requirements of this standard relating to the installation and to the constituent components of the electric equipment apply: a) to the main switch of each independent power circuit (e.g. machine, heating system) of the escalator or moving walk and dependent circuits; b) to the switch for the lighting circuit of the escalator or moving walk and dependent circuits. The escalator or moving walk shall be considered as a whole, in the same way as a machine with its incorporated apparatus.	No equivalent requirements.	No equivalent requirements.
5.11.1.2.2 The electricity supply to the input terminals of the switches referred to in 5.11.1.2.1 and the electricity supply to the lighting of the machinery spaces, driving and return stations are not laid down by this standard.	No equivalent requirements.	No equivalent requirements.
REMARK: *The escalator or moving walk is to be considered in it's whole entirety. The electricity supply to the input terminals of the switches and the electricity supply to the lighting of the machinery spaces, driving and return stations are not laid down by this standard.*		
5.11.1.2.3 The electromagnetic compatibility shall comply with the requirements of EN 12015:2014 and EN 12016:2013.	**6.1.7.4.3**	No equivalent requirements.
REMARK: *Reference to the year of release of the international standard is to be take in account.* ***FUNDAMENTAL DIFFERENCE:*** *EN115 immunity and emission; A17.1/B44 only immunity.* ***WORLDWIDE ACCEPTANCE:*** *The electromagnetic compatibility is to comply and to be tested with the requirements of international standards.*		
5.11.1.3 Protection against direct contact. For protection against direct contact the requirements of EN 60204 1:2006, 6.2 shall apply	**6.1.7.4.1**	No equivalent requirements.
REMARK: *A17.1/B44 special attention due to 600 V.* ***FUNDAMENTAL DIFFERENCE*** *The electric equipment is to comply with the requirements stated in "country" standards.* — *EN: EN and CEN/CENELEC.* — *A17.1/B44: NFPA/NFPA 70.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.11.1.4 Insulation resistance tests For resistance of the insulation between conductors and between conductors and the earth, EN 60204 1:2006, 18.3, shall apply.	**6.1.7.4.1**	**JIS A 4302:2006;** **5.4.1** The insulation resistance shall be inspected in each whole circuit. However, the insulation resistance can be inspected in the unit circuit which can be separable by switches or overcurrent circuit breakers
REMARK: — *EN115-1:2017, A17.5/B44 (section 19), and JIS require minimum an Insolation RESISTANCE TEST.* *For A17.5/B44 the link for the resistance test is in chapter 6.1.7.4.2, while the link to the insolation test is in chapter 8.3.3.4.6* **FUNDAMENTAL DIFFERENCE:** — *The EN and A17.5/B44 requirements refers to power circuits conductors.* — *The JIS requirements refers to power circuit conductors and control conductors.*		
5.11.1.5 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.	**6.1.7.4.1**	No equivalent requirements.
FUNDAMENTAL DIFFERENCE: — *In EN the Voltage for control and safety circuits is limited and not exceed 250 V (r.m.s).* — *ASME and JIS do not define for control and safety circuits the limit between conductors or between conductors and earth.*		
5.11.1.6 Conductor for neutral and earth-continuity The conductor for neutral and earth continuity shall be in accordance with EN 60204 1:2006, Clause 8.	**NFPA 70 620–84**	**TSEE-MO-1997;** **Article 10: Ground of electrical equipment** **Article 11: Method of grounding electrical equipment** **JEAC 8001-2016** **Rule 1350-3: Requirements for method of grounding work** **Rule 1350-15: Green indicator of ground line**
REMARK: — *EN defines neutral and earth conductor requirements (EN 60204-1); A17.1/B44.1 according to NFPA 70 620-84 and JIS according to JEAC 8001.* — *For socket, a RCD device is to be installed in case NFPA and installed in EN (see 5.8.3.1 and 5.11.1.2.2) if the feeder line if not protected.* **WORLDWIDE ACCEPTANCE:** *The escalator must have an electrical grounding installation according to applicable standards. A ground-fault protection for persons shall be provide for the socket receptacle if it is not provided by the main supply of the building.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.11.2 Contactors, relay contactors, components of failsafe circuits **5.11.2.1 Contactors and relay contactors** **5.11.2.1.1** To stop the driving machine (see 5.12.3.5) the main contactors shall belong to the following categories as defined in EN 60947-4-1:2010): a) AC-3 for contactors of alternating current motors; b) DC-3 for contactors of direct current machines.	**6.1.6.15** **6.2.6.15**	**JIS C 8201-1:2007** **Low-voltage switchgear and control gear-Part 1: General rules** **JIS C 8201 = IEC 60947 (mod)**
5.11.2.1.2 Relay contactors (see 5.12.3.5) shall belong to the following categories as defined in EN 60947 5 1),: a) AC-15 for contactors in alternating current control circuits; b) DC-13 for contactors in direct current control circuits.	No equivalent requirements.	No equivalent requirements.
5.11.2.1.3 For main contactors (see 5.11.2.1.1) it is permissible to assume, in the measures taken to comply with 5.12.1.2.2, that: — if one of the main contacts (normally open) is closed, all the normally closed mirror contacts (EN 60947-4-1:2010, Annex F) are open	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.
5.11.2.1.4 For the relay contactors (see 5.11.2.1.2) and safety relays (see EN 50205), i. e. relays with forcibly guided (mechanically linked) contacts, it is permissible to assume, in the measures taken to comply with 5.12.1.2.2, that: a) if one of the normally closed contact is closed, all the normally open contacts are open (EN 60947-5-1); b) if one of the normally open contact is closed, all the normally closed contacts are open (EN 60947-5-1). NOTE: Auxiliary contacts used as separate block added to a main contactor or relay contactor are permitted only when fulfilling the requirements of EN 60947-5-1.	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.
5.11.2.2 Components of failsafe circuits **5.11.2.2.1** When devices according to 5.11.2.1.2 are used as relays in a failsafe circuit, the assumptions of 5.11.2.1.3 also apply.	No equivalent requirements.	No equivalent requirements.
5.11.2.2.2 If the relays used are such that the break and make contacts are never closed simultaneously for any position of the armature, the possibility of partial attraction of the armature is permitted to be disregarded (see 5.12.1.2.2 f).	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.11.2.2.3 Devices connected after safety devices shall meet the requirements of 5.12.2.6.1.3 with regard to the creep distances and air gaps (not with regard to the separation distances). This requirement does not apply to the devices mentioned in 5.11.2.1.	No equivalent requirements.	**JIS C 8201-1:2007** **Low-voltage switchgear and control gear-Part 1: General rules** **JIS C 8201 = IEC 60947 (mod)**
(5.11.2, 5.11.2.1 / 5.11.2.2) ***FUNDAMENTAL DIFFERENCE:*** *EN use as standard reference EN 60947 but ASME required certified equipment.* ***WORLDWIDE ACCEPTANCE:*** *Contactors, relay contactors, components of failsafe circuits devices are to comply with the requirements defined in EN60947, UL 60947 , NFPA 70 , CSA C22.1 , CENELEC harmonized standards, whichever is applicable taking account of the National Differences explained in their standards or other local regulations.*		
5.11.3 Main switches **5.11.3.1** 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, to 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 5.8.3). 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.	**6.1.7.4.1** **6.2.7.4.1**	**JIS A 4302:2006;** 5.1.1 b) 1) The incoming panel and main switch shall be located near the machinery room entrance to be capable of being safely and easily operated. **JEAS-209 (2015)** 3.1.1 The main switch shall be capable of breaking the supply to the motor, to the brake releasing device and to the control circuit in the live conductors. 3.1.2 The main switch shall be (1) in the vicinity of the machine station, return stations or control devices. (2) easy to operate after opening the inspection hatch. (3) additionally provided when the main movable part is installed in a place different from (1).
5.11.3.2 The main switches as defined in 5.11.3.1 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.	**6.1.7.4.1** **6.2.7.4.1**	**JEAS-209 (2015)** 3.1.3 The main switchgear position of on/off shall be easy to be distinguished and avoid the unintentional operation. JIS B 9960-1=IEC 60204-1 (mod.)
5.11.3.3 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.	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.11.3.4 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.	No equivalent requirements.	No equivalent requirements.
(5.11.3, 5.11.3.1 / 5.11.3.2/5.11.3.3/5.11.3.4) ***REMARK:*** — *The EN requirements are similar/comparable to the ASME 17.5/B44.1.* — *Main switches, disconnecting means devices are to comply with the requirements defined in EN60204-1, NFPA 70 (620.51), CSA C22.1, CENELEC harmonized standards, whichever is applicable taking account of the National Differences explained in the standards.*		
5.11.4 Electric wiring **5.11.4.1 Conductors and cables** Conductors and cables shall be selected according to EN 60204 1:2006, Clause 12.	**6.1.7.4.1** **6.2.7.4.1**	**JIS A 4302:2006;** 5.4.1 The insulation resistance shall be inspected in each whole circuit. However, the insulation resistance can be inspected in the unit circuit which can be separable by switches or overcurrent circuit breakers. Remarks: The service voltage of the circuit for the instantaneous- start fluorescent lamp, etc. shall be the primary voltage (low voltage side). **JIS C 3301:2000;** Rubber insulated flexible cords **JIS C 3306:2000;** Polyvinyl chloride insulated flexible cords **JIS C 3307:2000;** 600V polyvinyl chloride insulated wires **JIS C 3316:2008;** Electric polyvinyl chloride insulated wires for electrical apparatus **JIS C 3317:2000;** 600V Grade heat-resistant polyvinyl chloride insulated wires **JIS C 3327:2000;** 600V Rubber insulated flexible cables

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
		JIS C 3342:2012; 600V Polyvinyl chloride insulated and sheathed cables **JIS C 3401:2002**; Control cables **JIS C 3408:2014;** Travelling cables for elevators **TSEE-MO-1997; Article 57** Interpretation-TSEE-MO:2016 Article 172 For indoor wiring of escalators whose working voltage is not exceeding 300 V shall conform to JIS C 3408.
5.11.4.2 Cross-sectional area of conductors To ensure adequate mechanical strength the cross-sectional area of conductors shall not be less than as shown in EN 60204 1:2006, Table 5	**6.1.7.4.1** **6.1.7.4.2** **6.2.7.4.1** **6.2.7.4.2**	**JEAC 8001-2016** Rule 3220–8: Wiring of lighting circuits in escalators Rule 3305-14: Escalators **TSEE-MO-1997; Article 57** Interpretation-TSEE-MO:2016 Article 172For indoor wiring of escalators whose working voltage is not exceeding 300 V shall conform to JIS C 3408.
Remark: *The JIS requirements were updated after publication of ISO TR 14799-1. The requirements will be incorporated in the next revision ISO TR 14799-1.* ***FUNDAMENTAL DIFFERENCE:*** *The electrical cable installation requirements are different in each standard and in addition, the cable cross sections are not fully equivalent since it is use AWS or mm².* ***WORLDWIDE ACCEPTANCE:*** *The escalator is to use conductors that provides the ampere rating necessary accordance the installation and device requirements and is to comply with the requirements defined in IEC/EN60204-1, NFPA 70, CSA C22.1, CENELEC harmonized standards, whichever is applicable taking account of the National Differences explained in their standards or other local regulations.* ***REMARK:*** *NFPA 70 define in 620.12 Minimum Size of Conductors.* *The minimum size of conductors, other than conductors that form an integral part of control equipment, are to be in accordance with 620.12* *(A) travelling cables and* *(B).Other wiring : 24 AWG copper. Smaller size listed conductors are to be permitted.* *Although NFPA Committee is working towards harmonising the Standard with IEC/EN 60204-1 and whilst this process is ongoing, Manufacturers are to continue to check the requirements.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.11.4.3 Wiring practices **5.11.4.3.1** The general requirements of EN 60204-1:2006, 13.1.1, 13.1.2 and 13.1.3, apply. **5.11.4.3.2** Conductors and cables shall be installed in conduits or trunkings or equivalent mechanical protection. Double insulated conductors and cables can be installed without conduits or trunkings if they are located as to avoid accidental damage, e.g. by moving parts	**6.1.7.4.1** **6.2.7.4.1**	**JIS C 3652:1993;** Installation methods of power flat conductor cables **TSEE-MO-1997; Article 10, 11, 56, and 57** Interpretation-TSEE-MO:2016 Article 185 **MOC-N (No.1424–2000)** **1.(2).(c)** The escalators shall detect the state when the fire shutter enclosing escalator landings is about to close. **JEAS-B 407(2012)** **3.2** The contact for interlocking with fire shutter shall be normally closed contact and number of the contacts shall be same as the number of interlocking escalators. **JEAC 8001-2016** Rule 3220–8: Wiring of lighting circuits in escalators Rule 3305-14: Escalators
Remark: *The JIS requirements were updated after publication of ISO TR 14799-1. The requirements will be incorporated in the next revision of ISO TR 14799-1.*		
5.11.4.3.3 The requirement 5.11.4.3.2 needs not apply to: a) conductors or cables not connected to safety devices provided that: 1) they are not subject to a rated output of more than 100 VA, and; 2) they are part of SELV or PELV circuits; b) The wiring of operating or distribution devices in cabinets or on panels between: 1) different pieces of electric equipment, or 2) these pieces of equipment and the connection terminals.	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.
5.11.4.3.4 If connections, connection terminals and connectors are not located in protective enclosure, their IP2X (EN 60529:1991) protection shall be maintained when connected and disconnected and they shall be properly fixed to prevent unintended disconnection.	**6.1.8.1.2** **6.2.8.1.2**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.11.4.3.5 If, after opening of the main switch or switches of an escalator/moving walk, some connection terminals remain live and if the voltage exceeds 25 VAC or 60 VDC, a permanent warning label according to EN 60204-1:2006, Clause 16, shall be appropriately placed in proximity to the main switch or switches and a corresponding statement shall be included in the maintenance manual.	**6.1.7.4.1** **6.2.7.4.1**	**JEAS-209 (2015)** 3.5.1 The connection terminal shall be protecting with the cover or clearly indicating the danger with red mark/label.
5.11.4.3.6 Connection terminals whose accidental interconnection could lead to a dangerous malfunction of the escalator/moving walk shall be clearly separated unless their method of construction obviates this risk.	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.
5.11.4.3.7 In order to ensure continuity of mechanical protection, the protective sheathing of conductors and cables shall fully enter the casings of switches and appliances, or shall terminate in a suitably constructed gland. However, if there is a risk of mechanical damage due to movement of parts or sharp edges of the frame itself, the conductors connected to the safety device shall be protected mechanically	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.
5.11.4.4 Connectors Plug socket combinations shall comply with the requirements of EN 60204 1:2006, 13.4.5 except c), d) and i). Connectors and devices of the plug-in type placed in the circuits of electrical safety devices shall be so designed that it shall not be possible to insert them in a position which leads to a dangerous situation.	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.
(*5.11.4, 5.11.4.1 / 5.11.4.2/5.11.4.3/5.11.4.4*) ***REMARK:*** — *The EN115-1 requirements are similar/comparable to the ASME 17.5/B44.1.* — *All the wirings, conductors according the device they are connecting (feeder, branch circuits, motor conductors, ...) are to comply with the requirements defined in EN 60204-1. NFPA 70 (620.13, 620.51), CSA C22.1, CENELEC harmonized standards, whichever is applicable taking account of the National Differences explained in the standards.* ***AGREED UPON:*** *Special protection according National Standards are to be provided under special conditions in the installation place.* *For special conditions the equipments are to comply with the requirements defined in EN60529. NEMA 250, whichever* is *applicable taking of account the National Differences explained in the standards.*		
5.12 Electric control system **5.12.1 Protective devices and functions**	**6.1.6** **6.2.6** **6.1.6.1** **6.2.6.1**	See **JEAC 8001-2016 and JIS A 4302:2006**.
REMARK:		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *When more than one driving machine per escalator/moving walk is utilized, actuation of devices covered by this section are to simultaneously control all driving machines.* — *Only A.17/B.44 explicitly refer to it.*		
5.12.1.1 Overview Table 6 provides an overview of protective devices and functions to be regarded with reference to the corresponding clauses.		
5.12.1.2 Protection against electric faults **5.12.1.2.1** Any single fault listed in 5.12.1.2.2 in the electric equipment of an escalator or moving walk, if it cannot be excluded under conditions described in 5.12.1.2.3 and/or Annex B, shall not, on its own, be the cause of a dangerous situation of the escalator or moving walk.	**6.1.6.10.1** **6.2.6.10.1**	No equivalent requirements.
No equivalent requirements.	**6.1.6.12** **6.2.6.12**	No equivalent requirements.
No equivalent requirements.	**6.1.7.4.3** **6.2.7.4.3**	No equivalent requirements.
5.12.1.2.2 The following faults shall be envisaged: a) absence of voltage; b) voltage drop; c) loss of continuity of a conductor; d) fault to earth of a circuit; e) short circuit or open circuit, change of value or function in an electric component such as resistor, capacitor, transistor, lamp; f) non-attraction or incomplete attraction of the moving armature of a contactor or relay; g) non-separation of the moving armature of a contactor or relay; h) non-opening of a contact; i) non-closing of a contact; j) phase reversal.	**6.1.6.10.1/6.2.6.10.1** **6.1.6.10.3/6.2.6.10.3** **6.1.6.11** **6.1.6.13/6.2.6.13**	No equivalent requirements.
REMARK: *Special attention due to A17.1/B44 includes in the electrical failures list the SW system failures. Please observe the definition of software system failure in A17.1/B44:* — *software system failure: a behaviour of the software, including its support (host) hardware, that is not in accordance with the intended function.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
This is equivalent to EN 115-1:2017, 5.12.2.6.3 Safety related electrical, electronic, and programmable electronic devices (E/E/PE) Safety related electrical, electronic and programmable electronic devices (E/E/PE) are to be designed in accordance with the requirements of EN 62061:200511), if a E/E/PE and a non-safety related system share the same hardware, the requirements for E/E/PE are to be met. ***FUNDAMENTAL DIFFERENCE:*** *The electrical "listed" failure list and the meaning of dangerous situation are different in each code.* *Failure list:* — *EN: list 5.12.1.2.2* — *A17.1/B44: 6.1.6.10.1, 6.2.6.10.1* — *JIS: Not electrical specific definition for failure list. Is to follow the general electrical JIS standards.* *Dangerous situation:* — *EN: no definition* — *ASME A17.1/B44 point a) to e)* — *JIS: no definition* *The occurrence of a single electrical failure type:* — *EN: is not to be the cause of a dangerous situation* — *A.17/B44: is to prevent a list of 5 effects point a) to e)*		
5.12.1.2.3 The non-opening of a contact need not be considered in the case of safety switches conforming to 5.12.2.6.1.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *It 's admitted that a safety switches according EN 115-1:2017, 5.12.2.6.1 provide maximum safety solution and intrinsically by design and construction and certification it is not need to consider the fault of non-opening of a contact.*		
5.12.1.3 Protection of motors **5.12.1.3.1** Motors directly connected to the mains shall be protected against short-circuiting. **5.12.1.3.2** Motors directly connected to the mains shall be protected against overload by means of automatic circuit breakers with manual reset (except as provided for in 5.12.1.3.3) which shall cut off the supply to the motor in all live conductors (see EN 60947-4-1:2010)).	No equivalent requirements.	**TSEE-MO-1997; Article 65** Interpretation-TSEE-MO:2016 Article 153The device which automatically obstructs an over-current or an alarm device shall be provided. The Article shall not be applicable to any of the following cases. 1. The person in charge can always watch the motor during operation. 2. The motor that has no risk to carry an over- current. 3. The motor is single-phase and the rated current of the over current breaker is not exceeding 15 A.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.1.3.3 When the detection of overload operates on the basis of temperature increase in the windings of the motor, the protection device is permitted to close its contact automatically after sufficient cooling down has taken place. However, it shall only be possible to restart the escalator or moving walk under the conditions of 5.12.3.2. **5.12.1.3.4** The provisions of 5.12.1.3.2 and 5.12.1.3.3 apply to each winding if the motor has windings supplied by different circuits. **5.12.1.3.5** When the escalator or moving walk driving motors are supplied by DC generators driven by motors, the generator driving motors shall also be protected against overload		**JEAC 8001-2016** **Rule 3705-5**1. An overload protection device for a motor or an overload alarming device shall be provided. It shall not be applicable to any of the following cases. 1) The motor itself has an effective preventive device against overload burning. 2) No risk of burning the motor due to a high impedance of a motor winding. 3) The person in charge always operates the motor. 4) There is no risk of overloading the motor. 5) A single-phase motor is supplied from the branched circuits of 15A. 6) An output of the motor is 0,2 kW or less. 2. A protection device against the phase failure shall be provided.
(5.12.1.3, 5.12.1.3.1/5.12.1.3.2/5.12.1.3.3/5.12.1.3.4/5.12.1.3.5) ***Remark:*** *A17.1/B44 6.1.7.4.1 references to NFPA 70 §620.61 (D).* ***WORLDWIDE ACCEPTANCE:*** *It's admitted that any motor connected to the electrical feeder is to have electrical short circuit and overload protection.* *NOTE: Protection short circuit, overload components for motor circuits devices (short circuit, overload) is to comply with the requirements EN 60947 or UL 60947 or NFPA 70 or CSA C22.1 or CENELEC harmonized standards, whichever is applicable taking account of the National Differences explained in the standards.*		
5.12.1.4 Protection of safety devices The fault to earth of a circuit in which there is a safety device shall cause the immediate stopping of the driving machine.		No equivalent requirements.
WORLDWIDE ACCEPTANCE: *It's admitted that any fault to earth (single ground) of a circuit in which there is a safety is to cause the immediate stopping of the escalator/moving walk.*		
5.12.1.5 Protection against electrostatic loading Means to discharge electrostatic loading shall be provided (e.g. anti-static-brushes).		No equivalent requirements.
REMARK: — *It's admitted that electrostatic discharge is to be avoided, so in case it happens, means to discharge electrostatic loading is to be provided (e.g. anti-static-brushes).* — *Only A17.1/B44 does not explicitly refer to it.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.2 Safety devices and functions **5.12.2.1 Overview** Table 7 provides an overview of requirements for the implementation of the safety circuit. NOTE The term device in the context with 5.12.2 represents both device and function.		**BSLJ-EO (Structure of escalator)** **Article 129–12** 5. Emergency stopping device shall operate when power supply fail, breakdown of driving devices, person or articles are caught, and in case of those persons are liable to be injured or articles are damaged.
REMARK: *The term "protective device" in A17.1/B44-10 (chapter 6.1.6) is equivalent to safety device and functions in EN.* ***FUNDAMENTAL DIFFERENCE:*** *Each of the three codes have different functions and quantities of safety devices.* ***WORLDWIDE ACCEPTANCE:*** *Every escalator/moving walk is to be provided with a listed of safety devices to protect the users according the requirements in the National standard whichever is applicable.*		
5.12.2.2 Function of safety devices The safety devices listed in Table 8 shall initiate a stop and prevent restarting according to 5.12.3.9. They shall consist of: a) either one or more safety switches satisfying 5.12.2.6.1, and/or b) failsafe circuits satisfying 5.12.2.6.2 considering failure exclusion of electronic components according to Annex B, and/or c) safety related electrical, electronic and programmable electronic devices (E/E/PE) in accordance with 5.12.2.6.3.	No equivalent requirements.	No equivalent requirements.
REMARK: — *A17.1/B44 have not the Safety Integrity Level (SIL) defined per each safety function.* — *A17.1/B44 define the safety device as an electrical protective device (see chapter 6.1.6 and 6.1.6.3)* *EN option c) E/E/PE is enough for definition of the requirements to comply with the safety integrity level (SIL) of the safety functions.* ***WORLDWIDE ACCEPTANCE:*** *The function of the safety devices is to initiate a stop and prevent restarting, once an event of the function is detected. These safety devices are to follow a special requirement according to the safety integrity level, that it is necessary and it is defined per each safety function.*		
5.12.2.3 Monitoring of safety devices No electric equipment shall be connected in parallel with a safety device with the exception of: a) safety devices in case of inspection control (5.12.3.13); b) connections to different points of the safety circuit for information about the status of safety devices; the devices used for that purpose shall fulfil the requirements of Annex B.	**6.1.6.12**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK *The requirements in all three codes for monitoring are similar.* *Chapter 6.1.6.12 is to be considered as equivalent reference.* *Chapters 6.1.6.10/6.1.6.10 are to be considered as equivalent reference to the chapter 5.12.1.2.2 (EN 115).* ***WORLDWIDE ACCEPTANCE*** *Electrical equipment is not to be connected in parallel with a safety device, such that it is to cause unsafe operation of escalator/moving walk.* ***REMARK*** *In case of specific exception like defined in EN 115-15.12.2.3, it is to comply with the requirements specified in the standard.* *In addition, specific requirements are to be considered like defined in ASME 17.1/CSA C22.16.1.6.12.*		
5.12.2.4 Power supply of safety devices The construction and arrangement of the internal power supply units shall be such as to prevent the appearance of false signals at the outputs of safety devices due to the effects of switching. In particular, voltage peaks arising from the operation of the escalator or moving walk or other equipment on the network shall not create inadmissible disturbances in electronic components (noise, immunity) in compliance with EN 12015:2014 and EN 12016:2013.	**6.1.6.11** **6.2.6.11**	No equivalent requirements.
WORLDWIDE ACCEPTANCE *If power supply units for safety devices are necessary, they are to:* a) *prevent the appearance of false signals at the outputs of safety devices.* b) *comply with electromagnetic compatibility requirements.* c) *tested according to the requirements of international standards.* d) *be protected against electric faults (EN 115-1:2017, 5.12.1.2).*		
5.12.2.5 Actuation of safety devices The components actuating the safety devices shall be selected and assembled so that they are able to function properly even under the mechanical stresses resulting from its continuous operation. Fixing elements for safety devices shall ensure the operation of the function by mechanical or geometric arrangements. In the case of redundancy type failsafe circuit, it shall be ensured by mechanical or geometric arrangements of the detecting elements that a mechanical fault cannot cause unnoticed loss of redundancy. Detecting elements of failsafe circuits shall fulfil the requirements of D.4.2 and D.4.3 if its malfunction is not detected.	No equivalent requirements.	No equivalent requirements.
REMARK: *A17.1/B44 and JIS do not explicitly refer to it.* ***WORLDWIDE ACCEPTANCE:*** *EN requirement which is reflection the state of the art.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.2.6 Means of safety devices **5.12.2.6.1** Safety switches **5.12.2.6.1.1** The operation of a safety switch shall be by positive mechanical separation of the contacts. This positive mechanical separation shall even occur if the contacts are welded together. Positive mechanical separation is achieved, when all contacts are brought to their open position in such a way that for a significant part of the travel there are no resilient elements (e.g. springs) between the moving contacts and the part of the actuator to which the actuating force is applied. The design shall be such as to minimize the risk of a short-circuit resulting from a faulty component. **5.12.2.6.1.2** The safety switch shall be provided for a rated insulation voltage of 250 V if the enclosure provides a degree of protection of at least IP 4X (in accordance with EN 60529:1991), or 500 V if the degree of protection of the enclosure is less than IP 4X. Safety switches shall belong to the following categories as defined in EN 60947-5-1:2004,: a) AC-15 for safety switches in alternating current circuits; b) DC-13 for safety switches in direct current circuits. If the protective enclosure is not at least of type IP 4X the air gaps shall be at least 3 mm and creep distances at least 4 mm. After separation the distance for contacts shall be at least 4 mm. **5.12.2.6.1.4** In the case of multiple breaks, the individual distances for breaking contacts shall be at least 2 mm after separation. **5.12.2.6.1.5** Debris from the conductive material shall not lead to short-circuiting of contacts.	**6.1.6.13** **6.2.6.12**	No equivalent requirements.
REMARK: *A17.1/B44 and JIS do not explicitly refer to it.* ***WORLDWIDE ACCEPTANCE:*** *EN requirement which is reflection the state of the art.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.2.6.2 Failsafe circuits 5.12.2.6.2.1 Anyone of the faults envisaged in 5.12.1.2 shall not be on its own the cause of a dangerous situation. **5.12.2.6.2.2** Furthermore, the following conditions apply for the faults envisaged in 5.12.1.2.2: If one fault combined with a second fault can lead to a dangerous situation, the escalator or moving walk shall be stopped by the time the next operating sequence takes place in which the faulty element should participate. The possibility of the second fault leading to a dangerous situation before the escalator or moving walk has been stopped by the sequence mentioned, is not considered. If the malfunction of the component which has caused the first fault cannot be detected by a change of state, appropriate measures shall ensure that the fault is detected and movement prevented at the latest when the escalator or moving walk is restarted according to 5.12.3.2. The MTBF (mean time between failures) of the failsafe circuit shall be at least 2,5 years. This time was determined under the assumption that within a period of three months each escalator or each moving walk is restarted according to 5.12.3.2 at least once and, thus, is subject to a change of state. **5.12.2.6.2.3** If two faults combined with a third fault can lead to a dangerous situation, the escalator or moving walk shall be stopped by the time the next operating sequence takes place in which one of the faulty elements should participate. The possibility of the third fault leading to a dangerous situation before the escalator or moving walk has been stopped by the sequence mentioned, is not considered.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
If the malfunction of the components which have caused the two faults cannot be detected by a change of state, appropriate measures shall ensure that the faults are detected and movement is prevented at the latest when the escalator or moving walk is restarted according to 5.12.3.2. The MTBF (mean time between failures) of the failsafe circuit shall be at least 2,5 years. This time was determined under the assumption that within a period of three months each escalator or each moving walk is restarted according to 5.12.3.2 at least once and, thus, is subject to a change of state. **5.12.2.6.2.4** A combination of more than three faults can be disregarded if: a) the failsafe circuit is built up of at least two channels, and their equal status is monitored by a control circuit. The control circuit shall be checked prior to a restart of the escalator or moving walk according to 5.12.3.2 (see also Annex C), or b) the failsafe circuit is built-up of at least three channels, and their equal status is monitored by a control circuit. If the requirements of a) or b) are not fulfilled, it is not permitted to interrupt the failure analysis but it shall be continued analogous to 5.12.2.6.2.3. For the implementation 5.11.2.2 shall be applied. **5.12.2.6.2.5** Drafting and assessing failsafe circuits shall be as shown in Figure C.1.		
REMARK: — *EN requirement which is reflection the state of the art.* — *A17.1/B44 and JIS do not explicitly refer to it.*		
5.12.2.6.3 Safety related electrical, electronic and programmable electronic devices (E/E/PE) Safety related electrical, electronic and programmable electronic devices (E/E/PE) shall be designed in accordance with the requirements of EN 62061:2005. If a E/E/PE and a non-safety related system share the same hardware, the requirements for E/E/PE shall be met.	No equivalent requirements.	No equivalent requirements.
REMARK: *Subject for harmonization.* *(The use of electrical, electronic and programmable electronic devices where a safety switch(electrical contact) or electro-mechanical relay or contactor is required to detect (perform) functions according National standard whichever is applicable, instance of the contact or contactor/relay if it is designed in accordance of the ISO (IEC 61508 / IEC 62061)).*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.2.7 Events to be detected by safety devices **5.12.2.7.1 Overview** Table 8 provides an overview of events to be detected by safety devices.	**8.6.1.6.1**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *As general rule the escalator/ moving-walk when is manage from the inspection control device, the safeties defined for normal users and machine also are to be valid for the technician when they are working in inspection mode.* *There are exception allows which are defined in each standard* ***REMARK:*** *In special cases defined according* to *EN 115-1table 8 chapter 5.12.2.7.1 or any safety devices in ASME /CSA and under specific circumstances according the maintenance procedure and rules defined for each situation by the manufacturer , the safeties that block the possibility of operate in order to solve the faulty situation or execute the labour maintenance could be disable. The evaluate of the safeties that were disables during the inspection, are to be tested prior to returning the equipment to service* *EN 115-1 allows to execute the disable of the safeties defined in EN115-1table 8 chapter 5.12.2.7.1 automatically, when the inspection mode procedure is activated. ASME allows to do it with any safeties, but manually one by one according to chapter 8.6.1.6.1* *ASME Enable means that the safety related is to be operative all the time also when the esc/mw is in inspection mode.* ***AGREED UPON:*** *Enable in inspection mode = "NO " means requirements depends on inspection procedure, so a value of "YES" could be valid as well.*		
No equivalent requirements.	**6.1.6.3.4** **6.2.6.3.4**	No equivalent requirements.
REMARK: *EN define the design requirements of the driving elements in EN 115-1:2017 (5.4.1.3).* ***FUNDAMENTAL DIFFERENCE:*** — *A17.1/B44: When the driving machine is connected to the main draft shaft by a chain a safety device is required to detect a failure of the chain connection.*		
No equivalent requirements.	**6.1.6.8/6.2.6.7Escalator/moving walk smoke detectors.**	No equivalent requirements.
REMARK: — *EN and JIS do not prohibit the installation of smoke detectors. Fire detection/prevention in buildings are defined in local regulations.* — *EN: Fire protection, see EN 115-1:2017, 5.9.* ***FUNDAMENTAL DIFFERENCE:*** — *A17.1/B44: smoke detectors are permitted with specific requirements.*		
No equivalent requirements.	**6.1.6.3.14 Step lateral displacement device.**	No equivalent requirements.
REMARK: *A17.1/B44 Requires for curved escalators special safety devices, where EN and JIS standard do not address curved escalators.*		
No equivalent requirements.	**6.1.6.3.10/6.2.6.3.8 Disconnected motor safety device.**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *EN define the design requirements of the driving elements in EN 115-1:2017 (5.4.1.3).* ***AGREED UPON:*** *A device is to be provided to detect if the motor becomes disconnected from the gear reducer.* *It is permissible to disregard this requirement if the drive motor is attached to a gear reducer with a design such as continuous shaft, or mechanical coupling, or toothed gearing.*		
No equivalent requirements.	**6.1.6.3.9 Step upthrust device.**	No equivalent requirements.
AGREED UPON: — *In escalators a device is to be provided to detect a step forced upward in the lower transition curve at or prior to the point of tangency of the horizontal and curved track.* — *The device is to be located at a point when the riser end of the step is displaced upward more than 5 mm (0,20 in.) at the lower landing.* ***REMARK:*** — *It is to be permissible to disregard this requirement if the design prevents this movement* — *This device is also considered at the upper landing, since the same situations is to be detected. The same requirements would apply.*		
No equivalent requirements.	**6.1.6.3.16 Dynamic skirt panel obstruction device.**	No equivalent requirements.
REMARK: *Only A17.1/B44 defines dynamic skirt panel. EN and JIS do not address this design.*		
No equivalent requirements.	**6.1.6.3.6**	**MOC-N (No.1424–2000)** **1.(2)(d)** The escalators shall be provided with devices to detect a person or article caught between a side of the step and skirt guard panels in the vicinity of landings.
REMARK: — *A.17.1/B.44 and JIS require a safety device which is to detect an object becomes caught between the step and the skirt as the step approaches the upper or lower transition zone (only escalator). The escalator is to be stopped before that object reaches the comb plate.* — *EN defines requirements for skirt deflectors in EN 115-1:2017, 5.5.3.4 and does not address skirt obstruction device.*		
5.12.2.7.2 Detection of excessive speed A device shall be provided to detect excessive speed before the speed exceeds a value of 1,2 times the nominal speed. It is permissible to disregard this requirement if the design prevents excessive speed.	**6.1.6.3.2/6.2.6.3.2**	No equivalent requirements.
REMARK: The detection of speed limits is difference therefore this difference has implication in the braking process and design. **FUNDAMENTAL DIFFERENCE** — *EN detect before the speed exceeds a value.* — *A17.1/B44 detect the speed exceed the rated speed by more than value (value =20 % or 1,2x).*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
AGREED UPON: *The value of 1,2 times the nominal speed is accepted, as overspeed.* ***WORLDWIDE ACCEPTANCE:*** *A device is to be provided to detect excessive speed before the speed exceeds a value.* A device to detect overspeed is to be provided and is to cause of stopping the escalator/moving walk.		
5.12.2.7.3 Detection of unintentional reversal of the direction of travel A device shall be provided for escalators and inclined (α ≥ 6°) moving walks to detect immediately the unintentional reversal of direction of travel.	**6.1.6.3.8/6.2.6.3.7**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: — *A device is to be provided to detect unintentional reversal of travel of escalators.* — *A device is to be provided to detect unintentional reversal of travel of moving walks with inclination ≥ 6°.* — *For moving walks it is permissible to disregard this requirement if the design prevents this movement.*		
5.12.2.7.4 Detection of closing of the auxiliary brake A device shall be provided to detect the non-lifting of the auxiliary brake after starting the escalator/moving walk (see 5.4.2.2).		No equivalent requirements.
REMARK: — *A17.1/B44 and JIS do not have any equivalent requirements.* — *"Non-lifting" means the brake torque remains applied i.e. the action of braking is active.* ***AGREED UPON:*** *Each electromechanical brakes installed in the escalator/moving walk is to be equipped with a device to detect the non-lifting of the brakes after starting the escalator/moving walk.*		
5.12.2.7.5 Detection of breakage or undue elongation of the step/pallet chains A device shall be provided to detect the breakage or undue elongation of parts immediately driving the steps, pallets or the belt, e.g. chains or racks.	**6.2.6.3.3** **6.1.6.3.3**	**MOC-N (No.1424–2000)** **1.(2)(a)** The escalators shall be provided with devices to detect the extraordinary extension of the step chains.
REMARK: *A17.1/B44 only requires a chain Break detection and if in case no automatic chain tension device is provided for detection of an excessive sags in either step chain is to be provided.* *EN is requiring a breakage or undue elongation detection.* ***WORLDWIDE ACCEPTANCE:*** *A device is to be provided to detect the breakage or undue elongation of parts immediately driving the steps, pallets or the belt, e.g. chains or racks.*		
5.12.2.7.6 Detection of movement of tensioning device A device shall be provided to detect an unintended extension or reduction of the distance between the driving and tensioning devices of more than 20 mm (see 5.4.3.3 and 5.4.4.2).	**6.1.6.3.3**	**MOC-N (No.1424–2000)** **1.(2)(a)** The escalators shall be provided with devices to detect the extraordinary extension of the step chains.
REMARK:		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *A17.1/B44 does not address this item.* — *EN requires the belt to be tensioned continuously and automatically.* ***AGREED UPON:*** *A device is to be provided to detect an unintended extension or reduction of the distance between the driving and tensioning devices of more than 20 mm (see EN 115-1:2017, 5.4.3.3 and 5.4.4.2).*		
5.12.2.7.7 Detection of entrapment at comb A device shall be provided to detect objects being trapped which are not dealt with by the means described in 5.7.3.2.5.	**6.1.6.3.13** **6.2.6.3.11**	No equivalent requirements.
FUNDAMENTAL DIFFERENCE: *A17.1/B44 define force in horizontal direction and vertical direction:* a) *a horizontal force lbf in the direction of travel is applied at either side or not greater than 3 560 N (800 lbf) at the centre of the front edge of the comb-plate; or* b) *a resultant vertical force not greater than 670 N (150 lbf) in the upward direction is applied at the centre of the front of the comb plate.* *EN define set performance:* a) *Detection of being trapped if does not occur (happens/ dealt /complaint) with: The combs are to 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.* ***WORLDWIDE ACCEPTANCE:*** *A device is to be provided to detect objects being trapped and generating a dangerous situation.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.2.7.8 Detection of the stopping of a succeeding escalator or moving walk or detection of structural measures blocking the exit of the escalator or moving walk Stopping of a succeeding escalator or moving walk where an intermediate exit does not exist (see A.2.6) or the exit of the escalator or moving walk by structural measures is blocked (e.g. shutters, fire protection gates). See A.2.5 for additional stop device for emergency situation and definition of the exit area.	**6.1.6.3.7** **6.2.6.3.6** **6.1.6.6** **6.2.6.6**	**MOC-N (No.1424–2000)** **1.(2).(c)** The escalators shall detect the state when the fire shutter enclosing escalator landings is about to close. **JEAS-B407 (2012)** **3.1** (1) The escalator is required to be stopped before the lower end of the fire shutter reaches 1.8 m from the floor level. This requirement shall be applied to the fire shutter installed within 2 m for V ≤ 30 m/min (2.5 m for V > 30 m/min) from the end of newel. (2)The escalator shall detect that the fire door has started to close and shall stop automatically. **3.2** The contact for interlocking with fire shutter shall be normally closed contact and number of the contacts shall be same as the number of interlocking escalators. **3.3** Lead-in wiring shall run outside of the truss, and shall use wiring directly from fire shutter or fire door. **3.4** (1) The fire shutter and fire door facing the landing of the escalator shall be located 1,2 m or more from the end of newel.
FUNDAMENTAL DIFFERENCE: *EN requires an additional stop device for emergency situation.* ***WORLDWIDE ACCEPTANCE:*** *Detection of the stopping of a succeeding escalator or moving walk where an intermediate exit does not exist and the escalator/ Moving walks have the same capacity and run in the same direction, and/or* *Detection the exit of the escalator or moving walk is blocked by structural measures (e.g. shutters, fire protection gates, mobile barrier, traffic barrier).*		
5.12.2.7.9 Detection of entrapment at hand rail entry A device shall be provided to detect foreign bodies being trapped in the handrail entry (see 5.6.4.3).	**6.1.6.3.12** **6.2.6.3.10**	**MOC-N (No.1424–2000)** **1.(2) (e)** The escalators shall detect the state when the person or the articles are caught in the inlet of the handrail.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
AGREED UPON: *All handrail entry devices are to be operative whenever the handrails are operating.* ***WORLDWIDE ACCEPTANCE:*** *A device is to be provided to detect foreign bodies being trapped in the handrail entry and at the point of entry of the handrail into the newel a guard is to be installed to protect against pinching of fingers and hands.*		
5.12.2.7.10 Detection of sagging of step or pallet 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. 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 (see stopping distances defined in 5.4.2.1.3.2 and 5.4.2.1.3.4). The safety device may be applied at any point of the step or pallet (see 5.7.2.5). This does not apply to belt moving walks.	**6.2.6.3.9** **6.1.6.3.11**	No equivalent requirements.
REMARK: *These devices are to detect downward displacement of 3 mm (0,125 in) or greater at the riser end at either side of the step / pallets.* ***FUNDAMENTAL DIFFERENCE:*** — *A17.1/B44 defines a displacement of 3 mm (0,125 in).* — *EN do not define a value. Provisions are to be made in the area of the combs to ensure the correct meshing of the comb teeth with the grooves of the tread surface.* ***WORLDWIDE ACCEPTANCE:*** — *A device is to be provided to detect that any part of the step or pallet is sagging so that meshing of the combs is no longer ensured.* — *This safety device is to 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 (see stopping distances defined).* — *The safety device is to be applied at any point of the step or pallet.* — *This requirement does not apply to belt moving walks.*		
5.12.2.7.11 Detection of missing of step or pallet 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 safety device or function provided at each driving and return station in the return run of the steps/pallets. The installation of the detection means for this device is not permitted in the straight part between the transition curves as this is not part of driving or return station.	**6.1.6.5** **6.2.6.5**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *Only A17.1/B44 defines dynamic skirt panel. EN and JIS do not address this design.* ***WORLDWIDE ACCEPTANCE:*** *A device is to be provided to detect a missing step/pallet:* — *The escalator/moving walk is to be stopped before the gap (resulting from the missing step/pallet) emerges from the comb.* — *This safety device is to be arranged at each driving and return station in the return run of the steps/pallets. The installation of the detection means for this device is not permitted in the straight part between the transition curves as this is not part of driving or return station.* *This requirement does not apply to belt moving walks.*		
5.12.2.7.12 Detection of non-lifting of the operational brake A device shall be provided to detect the non-lifting of the operational brake after starting the escalator/moving walk (see 5.4.2.1).		No equivalent requirements.
REMARK: — *A17.1/B44 and JIS do not have any equivalent requirements.* — *"Non-lifting" means the brake torque remains applied i.e. the action of braking is active.* ***AGREED UPON:*** *Each electromechanical brakes installed in the escalator/moving walk is to be equipped with a device to detect the non-lifting of the brakes after starting the escalator/moving walk.*		
5.12.2.7.13 Detection of speed deviation of the handrail A handrail speed monitoring device shall be provided and shall initiate the stopping of the escalator or moving walk in the event of a hand rail speed deviation of more than + 15 %/-15 % to the step/pallet speed within a time frame of 5 s to 15 s (see 5.6.1). It is permissible to disregard the requirement of + 15 % if the design prevents this situation condition.	**6.1.6.4** **6.2.6.4**	**BSLJ-EO (Structure of escalator)** Article 129–12 1.(3) [Notice of designing] Handrail-speed monitoring device should be equipped. (When both or one of the hand rails are stopped or abnormally delayed from the step, the escalator shall be stopped automatically. [Cannot restart automatically])
WORLDWIDE ACCEPTANCE: *A monitoring device is to be provided to detect handrail speed deviation of more than ±15 % to the step/pallet speed within a time frame.* ***FUNDAMENTAL DIFFERENCE:*** — *The time frame for activation is different for A17.1/B44 and EN, see Table 4.* — *JIS does not specify any values.* — *A17.1/B44 Require alarm during time whenever the speed of either handrail deviates during time frame.*		
5.12.2.7.14 Detection of opened inspection cover A device is to be provided to detect opened inspection cover (see 5.2.4).	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *A device to be provided to detect opened inspection cover.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.2.7.15 Detection of the actuation of the stop device for emergency situations A device is to be provided to detect the actuation of a stop device for emergency. NOTE Devices according to EN ISO 13850:2015 do not support the functional requirement for stop devices according to 5.12.2.7.15. For the specific purpose of safety for escalators and moving walks the stop device for emergency situations is defined different to EN ISO 13850:2015	**6.1.6.3.1** **6.2.6.3.1** (c)	No equivalent requirements.
FUNDAMENTAL DIFFERENCE: — *A17.1/B44 defines additional requirements a) and b).* — *EN defines the requirements in EN 115-1:2017, 5.12.3.8.* ***WORLDWIDE ACCEPTANCE:*** *A device to be provided to detect the actuation of a stop device for emergency situation.*		
5.12.2.7.16 Detection of installed hand winding device A device is to be provided to detect the installation of a removable hand winding device (see 5.4.1.4).	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *A device is to be provided to detect the installation of a removable hand winding device.*		
5.12.2.7.17 Detection of the maintenance and repair stop device There shall be a stop device 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 devices in the area of the driving unit. The stop devices shall be functionally in accordance with EN ISO 13850:2015. The position of the actuator of the stop device shall be marked clearly and permanently or the status of the safety contact shall be displayed clearly on the safety device SPECIFIC CASE: A stop device need not be provided in a machinery space if a main switch according to 5.11.3 is located therein. NOTE A stop device in accordance with emergency stop device defined in EN ISO 13850:2015 will comply to the requirement above.	**6.1.6.3.5** **6.2.6.3.5**	**JEAS-209 (2015)** **3.1.2** The main switch shall be provided in the vicinity of; (1) the machine, return station or the control devices. (3) the main movable part installed in a place different from 3.1.2 (1). **3.4.3 COMMENT (1)** The stop switch shall be installed in the machine room.
WORLDWIDE ACCEPTANCE:		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *A device to be provided to detect the actuation of a stop device 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, are to have additional stop devices in the area of the driving unit.* — *The stop devices are to be functionally in accordance with EN ISO 13850:2015. The position of the actuator of the stop device is to be marked clearly and permanently or the status of the safety contact is to be displayed clearly on the safety device.*		
5.12.2.7.18 Detection of the actuation of the stop device on the inspection control device A device shall be provided to detect the actuation of the stop device on the inspection control device. The stop device shall: a) be operated manually; b) be in accordance with emergency stop device defined in EN ISO 13850:2015; This device is only active when the inspection control device is plugged in.	**6.1.6.3.15** **6.2.6.3.12**	No equivalent requirements.
WORLDWIDE ACCEPTANCE: — *A device is to be provided to detect the actuation of the stop device on the inspection control device. The stop device is to:* a) *be operated manually* b) *have the switching positions marked clearly and permanently* — *A stop device in accordance with emergency stop device defined in EN ISO 13850:2015 will comply with the requirements.* — *This device is only active when the inspection control is active.*		
5.12.2.7.19 Detection of the absence/presence of a removable barrier intended to prevent access of shopping trolleys and baggage carts If the escalator/moving walk is required to operate in both directions and has facility for removable barriers in unrestricted area the absence/presence of these barriers shall be detected to prevent wrong positioning of the barrier resulting in operation towards the barrier (see also A.4). A device shall be provided to detect the removal of the barrier when the escalator/moving walk is running and the absence/presence of a removable barrier intended to prevent access of shopping trolleys and baggage carts and shall permit starting away from the inserted barrier. See A.2.5 for additional stop device for emergency situation and definition of the exit area.	No equivalent requirements.	No equivalent requirements.
AGREED UPON: *A device for detection of the absence/presence of a removable barrier intended to prevent access of shopping trolleys and baggage carts is to be provided (as defined EN 115-1:2017).*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.2.8 Function of failure lock When a failure is locked, starting shall be prevented for the electric control devices and functions mentioned in Table 8 and Table 9. NOTE Failure lock prevents from starting. Manual reset releases the failure lock. Safety devices (see Table 8 and Table 9), protective devices (see Table 6) and control devices (see Table 10) shall be provided with a failure lock where mentioned. Making available according Table 10, item A, shall be possible only after manual reset of the failure lock. It is not permitted to carry out a manual reset of the failure lock remotely. The manual reset of the failure lock shall be performed only by an authorized person. Before manual reset of the failure lock, the root cause for stopping shall be investigated, the stopping device shall be checked and corrective action shall be taken if necessary. The failure lock shall remain active in case of: a) even another following event of Table 6, Table 8 or Table 9 occurs; b) the reinstatement of the power supply or c) the change to or the return from inspection control. In inspection control it is permissible to enable/disable the safety devices according Table 8 and Table 9.	**6.1.6.14** **6.2.6.14**	No equivalent requirements.
REMARK: *The differences in the Failure LOCK definition for the safety function are listed in Table 7.* ***FUNDAMENTAL DIFFERENCE:*** *According to all three codes, control and safety functions might have different definition of the Failure LOCK (this includes the different definition according to the number of events detected in a period of time).*		
5.12.2.9 Function for detecting deviations of the electrical braking sequence See Table 9 — Requirements for detecting deviations of the electrical braking sequence **5.12.2.9.1 Detection of time deviations for the braking sequence for electrical braking** A device shall be provided to detect the exceeding of the requirements of 5.12.3.5.2.2.2.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *A17.1/B44 has introduced requirements which will allow electrical braking in the 2019 revision.* ***AGREED UPON:*** *Electrical braking means for operational braking is allowed.*		
5.12.3 Control devices and functions **5.12.3.1 Overview** Table 10 provides an overview of control devices and functions.	**6.1.6** **6.2.6** **6.1.6.1** **6.2.6.1.1** **6.1.6.2** **6.2.6.2** **6.1.6.2.1** **6.2.6.2.1**	No equivalent requirements.
5.12.3.2 Making available for use and starting – manually operated Making available for use and starting of the escalator/moving walk shall only be possible without users and be effected by one or more switches available to authorized persons only (e.g. key-operated switches, switches with detachable lever, switches under lockable protective caps, remote start devices) and be reachable from an area outside the comb intersection line. Such switches shall not function concurrently as main switches described in 5.11.3. The person who operates the switch shall be able to verify the step/pallet band is free of users and objects by visual or other means before making this operation. The direction of travel shall be distinctly recognizable from the indication on the switch. The starting switch(es) shall be located within reach of the stop device according to 5.12.3.8. For remote starting devices the requirements above shall apply. NOTE See 7.4.1 d) for manual starting and 7.4.1 e) for the obligation to observe a complete revolution of the step/pallet band before making the escalator/moving walk available to the public after maintenance.	**6.1.6.2**	**BSLJ-EO (Structure of escalator) Article 129–12, EXP. 4** [Notice of designing] Starting of the escalator shall be effected by key switches available to authorized persons only.
REMARK: — *All three codes require that the switches are to be the type of key-operated.* — *In addition, EN allows other type of switches (i.e. detachable levers, switches under lockable protective covers / caps).* — *Chapter 6.1.6.2 is to be considered as equivalent reference* ***AGREED UPON:***		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *Making available for use and starting of the escalator/moving walk is only to be possible without users and be effected by one or more switches available to authorized persons only and be reachable from an area outside the comb intersection line. Such switches are not function concurrently as main switches. The person who operates the switch is to be able to verify the step/pallet band is free of users and objects by visual or other means before making this operation. The direction of travel is to be distinctly recognizable from the indication on the switch* — *The starting switch is to be located within reach of the stop device.* ***FUNDAMENTAL DIFFERENCE:*** — *EN and JIS allows remote operation with the same requirements as manually operated.* — *A17.1/B44 does not allow remote operation. Start an escalator is to be done using the escalator/moving walk devices.* — *In addition, A17.1/B44 requires:* — *that key switches are to be operated by a cylinder type lock having not less than a five-pin or five-disk combination. clearly and permanently marked in the order "DOWN", "RUN" and "UP", with the key removable only in the "RUN" position.*		
5.12.3.3 Automatic operation – Starting in predetermined direction **5.12.3.3.1** Automatic operation shall only be possible after 5.12.3.2 applied. Escalators or moving walks which start or accelerate automatically by detecting the entering of a user shall move with at least 0,2 times the nominal speed when the user reaches the comb intersection line and then accelerate less than 0,5 m/s^2. The means for detecting the entering of a user shall take into account an average walking speed of 1 m/s. Constructional measures may be necessary to prevent circumvention of the detecting means. For the implementation of starting automatically (5.12.1.2 applies), the consequence of failures of the detection means actuating the automatic start at the entries (e.g. no or partly no detection of users) shall be prevented. The intention of the above requirements is to detect a user entering the landings. Depending on the location of the detecting means the area to be regarded for detection may extend the landings (e.g. provision of traffic columns) or is smaller than the landings.	**6.1.6.1.1** **6.2.6.1.2**	**JEAS-410B (2006)** **3.1 Automatic operation** **3.2** The detecting point shall be located at both the landings and at a distance of ; ≥ 1,0 m from the turning end of the handrail ≥ 1,7 m from the edge of the combs **3.3** Prevention against the entering from the exit side **3.4 (1), (2), (3)** The indications should be located at the both landings, and at the position where it can be seen easily.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.3.3.2 On escalators/ moving walks which start automatically by the entering of a user, the direction of travel shall be predetermined, clearly visible to the user and marked distinctly on the escalator/moving walk (see 7.2.2). In such cases where escalators or moving walks which start automatically by the entering of a user can be entered in the direction opposite its predetermined direction of travel, they shall start in the predetermined direction and conform to the requirements of 5.12.3.3.1. The moving time shall be not less than 10 s. 5.12.3.3.3 Following control requirements for users waiting on any of the landings apply — for the moving step/pallet band; or — in case the step/pallet band is stopped according to 5.12.3.7; 5.12.3.3.3.1 Requirement where the step/pallet band is moving Means shall be provided to detect any user on the landing. It shall provide a signal to the control system to keep the escalator/moving walk moving until the last user has left the landing or entered the moving step/pallet band. For stopping the requirements of 5.12.3.7 apply. 5.12.3.3.3.2 Requirements where the step/pallet band is stopped according to 5.12.3.7: When a user is about to enter the step/pallet band, detecting means shall be provided not more than 0,3 m before the comb intersection line providing control signal to the control system causing a) the termination of the automatic operation (5.12.3.3) and making the escalator/moving walk unavailable. Starting shall only apply according to 5.12.3.2; or b) the reactivation for automatic start according to 5.12.3.12; or c) to initiate the start of the step band/pallets with an acceleration of not more than 0,3 m/s2. NOTE The intention of the above requirements is to detect a user entering the landings. Depending on the location of the detecting means the area to be regarded for detection may extend the landings (e.g. provision of traffic columns) or is smaller than the landings.		
Variation of the escalator speed after the start ***REMARK:***		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *The values of the parameters are different in each standard* — *Acceleration:* — *EN: 0,5 m/s2* — *A17.1/B44: 0,3 m/s2 (valid also for deceleration)* — *Time at nominal speed - time necessary to transfer a passenger between landings (t):* — *EN: t +10 sec.* — *A17.1/B44: 3 x t* — *Minimum speed with user:* — *EN: 0,2 x $v_{nominal}$* — *A17.1/B44: Nominal speed (ASME)* — *Minimum speed without user:* — *EN: not defined* — *A17.1/B44: not less than 0,05 m/s (10 ft/min) (ASME)* — *Passenger speed:* — *EN: 1 m/s (data from scientific studies)* — *A17.1/B44: 1,35 m/s (270 ft/min)* — *Speed of escalator by the entering of a user when the user reaches the comb intersection line:* — *EN: is to move with at least 0,2 times the nominal speed* — *A17.1/B44: the escalator to attain full operating speed* — *Detection passenger against direction:* — *A17.1/B44: is to cause the escalator to accelerate to full rated speed and sound the alarm (see 6.1.6.3.1) at the approaching landing before the passenger reaches the comb plate* — *The time that the alarm is activate, is the same as a person is detected in the normal direction (3 x time necessary to transfer a passenger between)* ***FUNDAMENTAL DIFFERENCE:*** — *In case passenger travel against direction of moving:* — *A17.1/B44 requires an alarm.* — *EN requires an indicator for direction of travel.* — *A17.1/B44 require, that the speed of escalator is not allowed to change when a passenger is on the escalator.*		
Automatic start: stop after start ***FUNDAMENTAL DIFFERENCE:***		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *A17.1/B44: not allow* — *Passenger detection point:* — *JIS define minimum distance* — *EN specifies passenger speed with 1 m/s for the determination* — *In case passenger travel against direction of moving:* — *JIS requires a warning and to start the escalator and remain running for a fixed time* — *EN requires an indicator for direction of travel and start and remain running during a time not less than 10 s.*		
5.12.3.4 Automatic operation - Starting in 2-Direction-Mode **5.12.3.4.1** Automatic operation shall only be possible after 5.12.3.2 applied. Escalators which start automatically by detecting the entering of a user shall move with at least 0,2 times the nominal speed when the user reaches the comb intersection line and then accelerate less than 0,5 m/s^2. The means for detecting the entering of a user shall take into account an average walking speed for a walking person of 1 m/s. Constructional measures may be necessary to prevent circumvention of the detecting means. For the implementation of starting automatically (5.12.1.2 applies), the consequence of failures of the detection means actuating the automatic start at the entries (e.g. no or partly no detection of users) shall be prevented. 2-Direction-Mode is not permitted on moving walks.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
Note 1: The intention of above requirements is to detect a user is entering the landings. Depending on the location of the detecting means the area to be regarded for detection may extend the landings (e.g. provision of traffic columns) or is smaller than the landings. Note 2: For escalators a traffic flow analysis has to be undertaken by the owner to establish this functionality can accommodate passenger volumes in both directions 5.12.3.4.2 On escalators which can start automatically in either direction (2-Direction-Mode) by the entering of a user, the operating mode shall be clearly visible to the user and marked distinctly on the escalator (see also 7.2.2). They shall start in the direction determined by the user entering first. When the escalator was started by a user from either direction, the indicator opposite from the initiated starting side shall automatically indicate “no entry” (see 7.2.1.2.3). 5.12.3.4.3 Following control requirements for users waiting on any of the landings apply: — For the moving step/pallet band; or — In case the step/pallet band is stopped according to 5.12.3.7. 5.12.3.4.3.1 Requirement where the step/pallet band is moving Means shall be provided to detect any user on the landing. It shall provide a signal to the control system to keep the escalator/moving walk moving until the last user has left the landing or entered the moving step/pallet band. For stopping the requirements of 5.12.3.7 apply. 5.12.3.4.3.2 Requirements where the step/pallet band is stopped according to 5.12.3.7. When a user is about to enter the step/pallet band, detecting means shall be provided not more than 0,3 m before the comb intersection line providing control signal to the control system causing a) the termination of the automatic operation (5.12.3.3) and making the escalator/moving walk unavailable. Starting shall only apply according to 5.12.3.2; or b) the reactivation for automatic start according to 5.12.3.12; or c) the start of the step/pallet band with an acceleration of not more than 0,3 m/s.		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
For the implementation of starting automatically (5.12.1.2 applies), the consequence of failures of the detection means actuating the automatic start at the entries (e.g. no or partly no detection of users) shall be prevented. 2-Direction-Mode is not permitted on moving walks. NOTE 1 The intention of above requirements is to detect a user is entering the landings. Depending on the location of the detecting means the area to be regarded for detection may extend the landings (e.g. provision of traffic columns) or is smaller than the landings. NOTE 2 For escalators a traffic flow analysis has to be undertaken by the owner to establish this functionality can accommodate passenger volumes in both directions. 5.12.3.4. On escalators which can start automatically in either direction (2-Direction-Mode) by the entering of a user, the operating mode shall be clearly visible to the user and marked distinctly on the escalator (see also 7.2.2). They shall start in the direction determined by the user entering first. When the escalator was started by a user from either direction, the indicator opposite from the initiated starting side shall automatically indicate “no entry” (see 7.2.1.2.3). 5.12.3.4.3 Following control requirements for users waiting on any of the landings apply: — for the moving step/pallet band; or — in case the step/pallet band is stopped according to 5.12.3.7. 5.12.3.4.3.1 Requirement where the step/pallet band is moving Means shall be provided to detect any user on the landing. It shall provide a signal to the control system to keep the escalator/moving walk moving until the last user has left the landing or entered the moving step/pallet band. For stopping the requirements of 5.12.3.7 apply.		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.3.4.3.2 Requirements where the step/pallet band is stopped according to 5.12.3.7: When a user is about to enter the step/pallet band, detecting means shall be provided not more than 0,3 m before the comb intersection line providing control signal to the control system causing a) the termination of the automatic operation (5.12.3.3) and making the escalator/moving walk unavailable. Starting shall only apply according to 5.12.3.2; or b) the reactivation for automatic start according to 5.12.3.12; or c) the start of the step/pallet band with an acceleration of not more than 0,3 m/ s^2.		
FUNDAMENTAL DIFFERENCE: *Only EN allows automatic start in two direction mode.*		
5.12.3.5 Stopping the escalator or moving walk **5.12.3.5.1 General** Stopping is regarded as the initiation of a braking sequence caused by protective, safety and control devices and functions. The stopping shall operate automatically: a) in the event of loss of the voltage supply; b) in the event of loss of the voltage supply to the control circuits. NOTE The interruption of a safety circuit is not considered as loss of voltage supply. The supply to the motor(s) shall be interrupted by at least two independent contactors, the contacts of which shall be in series in the supply circuit of the motor(s). If, when the escalator or moving walk is stopped, one of the main contacts of one of the contactors has not opened, restarting shall be prevented. The interruption of the electricity supply to the operational brake shall be effected by at least two independent electric devices. They can be those which break the supply to the motor(s). If after the stop of the escalator or moving walk one of these electric devices has not opened, restarting shall be prevented.	**6.1.6.10.4/6.2.6.10.4** **a) 1) 2)** **b)** **c)** **d)** **6.1.6.15**	**MOC-N (No.1424–2000)** **1.(2).(b)** The escalators shall detect the loss of the power supply.
REMARK: — *A17.1/B44 in addition consider escalator/moving walks with driving machine motors employing static control.* *a) Remove the supply to the motor: requires two devices. At least one device is to be an electromechanical contactor.* *Remove the supply to the brake: requires two devices and at least one of these devices is to be one of the contactor that interrupt the supply to the motor.* ***AGREED UPON:***		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *Stopping is regarded as the initiation of a braking sequence caused by protective, safety and control devices and functions.* — *The stopping is to operate automatically:* a) *in the event of loss of the voltage supply;* b) *in the event of loss of the voltage supply to the control circuits.* — *The supply to the motor(s) is to be interrupted by at least two independent contactors, the contacts of which is to be in series in the supply circuit of the motor(s). If, when the escalator or moving walk is stopped, one of the main contacts of one of the contactors has not opened, restarting is to be prevented.* — *The interruption of the electricity supply to the operational brake is to be effected by at least two independent electric devices. And at least one of this device is to be one of the contactor that interrupt supply to the motor. If after the stop of the escalator or moving walk one of these electric devices has not opened, restarting is to be prevented.*		
5.12.3.5.2 Initiation of the braking sequence of the operational brake **5.12.3.5.2.1 General** There shall be no intentional delay in the application of the operational braking system. If the control system starts a braking sequence immediately to bring the escalator/moving walk to a stop, this is not considered as an intentional delay.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE *There is to be no intentional delay in the application of the operational braking system. If the control system starts a braking sequence immediately to bring the escalator/moving walk to a stop, this is not considered as an intentional delay.*		
5.12.3.5.2.2 Electrical braking **5.12.3.5.2.2.1** Where electrical braking according to 5.4.2.1.1.2 is provided the interruption of the electricity supply of the electro-mechanical brake shall occur no later than 1 s after the specified electrical braking time is achieved after the initiation of the electrical braking sequence. 5.12.3.5.2.2.2 The total time for the defined electrical braking sequence until the actuation of the electro-mechanical brake shall not exceed 4 s. In case of the events 5.12.2.7.2, 5.12.2.7.3 and 5.12.2.9.2 the electrical braking sequence shall be terminated and the electro-mechanical brake shall be applied immediately.	No equivalent requirements.	No equivalent requirements.
REMARK: *A17.1/B44 is introducing requirements which will allow electrical braking in the 2019 revision.* ***AGREED UPON:*** *Electrical braking means for operational braking is allowed.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.3.5.3 Initiation of the braking sequence by the auxiliary brake Auxiliary brakes shall become effective in either of the following conditions (See also 5.4.2.2.5): a) before the speed exceeds a value of 1,4 times the nominal speed; b) by the time the steps and pallets or the belt change from the present direction of motion.	No equivalent requirements.	No equivalent requirements.
Auxiliary brakes ***REMARK:*** *Auxiliary brakes acc. EN definition is to become effective in either of the following conditions:* a) *before the speed exceeds a value of 1,4 times the nominal speed;* b) *by the time the steps and pallets or the belt change from the present direction of motion.* ***FUNDAMENTAL DIFFERENCE:*** *Definition of auxiliary brake exist only in EN.* ***Main shaft brake*** ***REMARK:*** *Main shaft brake acc. A17.1/B44 definition is to become effective in either of the following conditions:* *a) before the speed exceeds a value of 1,4 times the nominal speed;* *b) by the time the steps and pallets or the belt change from the present direction of motion.* *c) by the chain connects the main drive shaft to the driving machine becomes broken or disengaged from the sprocket* ***FUNDAMENTAL DIFFERENCE:*** *Definition of main shaft brakes exists only in A17.1/B44.*		
5.12.3.6 Stopping and making unavailable by operator - manually operated Before stopping, the person shall have means of ensuring that nobody is using the escalator or moving walk, before making this operation. For remote stopping devices the same requirements apply.		**BSLJ-EO (Structure of escalator) Article 129–12, 4. EXP.** [Notice of designing] For remote stopping devices, the means of ensuring that nobody is using the escalator or moving walk before stopping should be provided.
REMARK: *A17.1/B44 has no equivalent requirements.* ***WORLDWIDE ACCEPTANCE:*** *Before stopping, the operator is to have means of ensuring that nobody is using the escalator or moving walk, before making this operation. For remote stopping devices the same requirements apply (where not prohibit).*		
5.12.3.7 Stopping - automatically operated It is permitted to design the control in such a way that the escalator or moving walk is stopped automatically after a sufficient time (at least the anticipated user transfer time plus 10 s) after the user has actuated a detection means described in 5.12.3.3 and 5.12.3.4.	**6.1.6.1.1**	**JEAS-410B (2006) 3.1 (1)** Operation shall continue until the last passenger reaches the exit.
REMARK: *Stopping automatically after the user is detected:*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *EN: user transfer time plus 10 seconds* — *JIS: until the last user reaches the exit* ***FUNDAMENTAL DIFFERENCE:*** *A17.1/B44 does not allow automatic stopping.*		
5.12.3.8 Stopping by stop device for emergency situations, manually operated **5.12.3.8.1** Stop device for emergency situations shall be provided to stop the escalator or moving walks in the event of an emergency according to 5.12.2.7.15 when the actuator of the stop device has been activated. The actuator of the stop device shall be placed in conspicuous and easily reachable positions at least at or near each landing of the escalator or moving walk (see 7.2.1.2.2 for optical design). At the landings, the stop switches shall be reachable from an area outside the step/pallet band. If the stop switch is located below half the balustrade height h_1, in addition an indicator according to Figure 12 shall be placed on the inner side of the balustrade with the following characteristics: — a minimum diameter of 80 mm; — coloured red; — marked with “STOP” in white letters; — located above half the balustrade height h_1; — an arrow - which also may be located below half the balustrade height h_1.- pointing from the sign towards the stop device. The distances between stop devices 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 trolleys and baggage carts, see I.2. See Figure 12 for the illustration of the stop device indicator. NOTE Devices according to EN ISO 13850:2015 do not support the functional requirement for stop devices according to 5.12.3.8. For the specific purpose of safety for escalators and moving walks the stop switch for emergency situations is defined different to EN ISO 13850:2015	**6.1.6.3.1** **6.2.6.3.1**	**BSLJ-EO (Structure of escalator) Article 129-12, 4** Emergency stopping buttons shall be provided at the both landings. **JIS B 9703:2011 = ISO 13850:2006 (idt.)** The actuator of the emergency stop button shall be red.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *EN defines the maximum distance between stop devices for emergency situations.* ***FUNDAMENTAL DIFFERENCE:*** — *The requirement of the device is not equally defined.* — *A17.1/B44 has specific requirements regarding:* — *Cover, alarm, marking* — *distinct location for the device* ***WORLDWIDE ACCEPTANCE:*** *The actuator of the stop device is to be placed in a conspicuous and easily reachable positions at least at or near each landing (upper and lower) of the escalator or moving walk.* *This device is to be red (colour).*		
5.12.3.9 Stopping initiated by protective and safety devices and functions All protection means in Table 6, items A, B, C and all detections means in Table 8 and Table 9 shall cause the stopping by operational brake according to 5.12.3.5.		No equivalent requirements.
WORLDWIDE ACCEPTANCE: *All protective and all safety devices and functions are to cause the stopping of the escalator/moving walk.*		
5.12.3.10 Preventing from starting when permitted stopping distance exceeded A device shall be provided to prevent from starting in case the maximum permitted stopping distances (5.4.2.1.3.2 and 5.4.2.1.3.4) are exceeded by more than 20 %. Failure lock function according to 5.12.2.8 shall be provided.	**6.1.6.7** **6.2.6.7**	No equivalent requirements.
FUNDAMENTAL DIFFERENCE: *The minimum and maximum stopping distances allowed are differently defined in all three codes:* — *A17.1/B44 are determined by calculation* — *EN are defined the stopping distance by a table* — *JIS are defined by calculation* *The permitted stopping distance, minimum and maximum, values to be used for monitored proposal are for each code:*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *For the minimum stopping distance:* — *A17.1/B.44 define the minimum allowed distance* — *EN no define requirements* — *JIS defines according to the allowed maximum deceleration (1,25 m/s²)* — *For the maximum stopping distance* — *A17.1/B.44 define the maximum allowed distance* — *EN define 20 % over the maximum allowed distance* — *JIS defines the maximum allowed distance* — *The performance monitoring of braking system is to execute* — *A17.1/B.44 define whenever the braking system is applied,* — *EN no direct definition: whenever the braking sequence is applied* — *JIS only manually (periodic) evaluation during periodic (annual) inspection* ***WORLDWIDE ACCEPTANCE:*** *The performance of the braking system is to be monitored and preventing from restart, if the permitted stopping distance are not archived.*		
5.12.3.11 Intended reversal of direction of travel An intended reversal of the direction of travel shall be possible only if the escalator or moving walk stands still and 5.12.3.2 applies.	No equivalent requirements.	No equivalent requirements.
AGREED UPON: *An intended reversal of the direction of travel is to be possible only if the escalator or moving walk stands still and the requirements for making available for starting as fulfilled.* ***FUNDAMENTAL DIFFERENCE:*** *Only EN define this procedure.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.3.12 Reactivation for automatic restart Where stopping is effected by a stop switch for emergency situation according to 5.12.3.8, reactivation of the escalator or moving walk for automatic restart without the switches mentioned in 5.12.3.2 is permitted under the following conditions: a) The steps, pallets or the belt shall be supervised between the comb intersection lines and additional 0,30 m beyond each comb so that reactivation for automatic restart is effected only when there is no person or object within this zone. The device shall be able to detect an opaque upright standing cylinder with a diameter of 0,30 m and a height of 0,30 m at any place within this zone. b) The escalator or moving walk shall start by the entering of a user according to 5.12.3.3 and 5.12.3.4. Starting shall be effected only if, for a period of at least 10 s, the control device has not detected any persons or objects within the defined zone. c) The reactivation control initiated by the control device for automatic restart shall be a safety device according to 5.12.2. Self-controlling transmitter elements are permitted in single-channel design.		No equivalent requirements.
FUNDAMENTAL DIFFERENCE: *Only EN allows the automatic restart and define this procedure.* ***REMARK:*** *Since automatic start is not allowed in A17.1/ B44 this automatic restart procedure is not valid.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.12.3.13 Inspection control 5.12.3.13.1 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. At least one portable control device shall be provided for each escalator or moving walk. This device shall require at least continuous simultaneous actuation by the use of both hands, one hand on the direction-control-device and the other hand on the RUN-control-device, in order to activate and to maintain any operation of the escalator/moving walk. NOTE Simultaneous actuation is independent of any time lag between the initiation of each of the two control devices. 5.12.3.13.2 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 3,00 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. 5.12.3.13.3 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 recognizable from the indication on the switch. Each control device shall have a stop device according to 5.12.2.7.18. 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. 5.12.3.13.4 When in inspection control, the inspection control device shall be the only means for starting the escalator or moving walk. All other starting devices shall be rendered inoperative. All inspection outlets shall be arranged in such a way that when more than one control device is connected, they all become inoperative for the starting of the escalator/moving walks (see Table 8 and Table 9 for safety devices remaining active in inspection control).	**6.1.6.3.15** **6.2.6.3.** **6.1.6.2.2** **6.2.6.2.2**	**JEAS-209 (2015)** 3.4.2 COMMENT (1), (2), (3), (4) The escalator shall be operable by Connecting a dedicated operating device below at the maintenance. The device shall operate escalator by — Separating the self- holding circuit, — Continuing to press the button (*) of the dedicated operation device. * The button shall be protected against accidental operation and indicates the direction of travel.
FUNDAMENTAL DIFFERENCE:		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— *Two hands control device procedure requirement* — *EN requires use two hands for simultaneous actuation of the direction and the run control devices.* — *A17.1/B 44 and JIS only requires the actuation of the direction push button.* — *Length cable and location of outlets:* — *EN requires that the length of the cable is to be at least 3 meters; and the inspection outlets are to be located in such a way that any point of the escalator or moving walk can be reached with the cable.* — *A 17.1/B 44 require a maximum 3 meters length of the cable, or that the inspection control device is fixed. The outlets plug connections is to be located so that the escalator steps are/moving walk treadway surface is within sight.* — *Inspection mode switch function* — *A 17.1/ B44 and JIS: inspection mode is activate when* — *portable control device is plugged in, and/or* — *activate a specific inspection switch* — *EN inspection mode is activate when* — *portable control device is plugged in* ***WORLDWIDE ACCEPTANCE:*** — *Escalators or moving walks are to be equipped with inspection controls to permit operation during maintenance or repair or inspection by means of manually operated control devices. At least one portable control device are to be provided for each escalator or moving walk.* — *The operating elements of this control device are to 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 is to be distinctly recognizable from the indication on the switch. Each control device is to have a stop device* — *When the inspection control device is plugged in, the operation of the stop switch is to cause the disconnection of the power supply from the driving machine and the operational brake is to be activated.* — *This device is to require at continuous actuation, in order to activate and to maintain any operation of the escalator/ moving walk.* — *The operating elements of this control device is to be protected against accidental operation.*		
6 Verification of the safety requirements and/or protective measures **6.1 General** Table 11 indicates the methods by which the safety requirements and measures described in Clause 5 shall be verified by the manufacturer for each new model of escalator/moving walk, together with a reference to the corresponding sub-clauses in this standard. Secondary sub-clauses, which are not listed in the table, are verified as part of the quoted sub-clause. All verification records shall be kept by the manufacturer. Where mechanical testing is required in accordance with this standard, setting tolerances are permitted.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
6.2 Specific data, test reports and certificates The following documentation should be held by the manufacturer: a) stress analysis of the truss or equivalent certificate by a stress analyst; b) proof by calculation of sufficient breakage resistance of the parts directly driving the steps, pallets or the belt, e.g. step chains, racks; c) calculation of the stopping distances for loaded moving walks (see 5.4.2.1.3.4) together with adjustment data; d) proof testing of steps or pallets; e) proof of the breaking strength of the step chain/pallet chain/belt; f) proof of sliding coefficients for skirting; g) proof of anti-slip properties of tread surfaces (steps, pallets, floor and comb plates without combs); h) proof of stopping distances and deceleration values; i) proof of electromagnetic compatibility.	**8.3.6** **8.3.6.1** **8.3.6.2** **8.3.6.3** **8.3.6.4**	No equivalent requirements.
REMARK: — *All three standards and the associated references have different verification means to determine the set requirements.* — *Some of the requirements for A17.1/B44 is to be verified by a third party and others can be done by the manufacturer.* ***AGREED UPON:*** *Requirements set by the standards have to be verified.*		
7 Information for use **7.1 General** All escalators and moving walks are required to be provided with documentation that shall include an instruction handbook relating to use, maintenance, inspection, periodic checks and rescue operations. All information for use shall be in accordance with EN ISO 12100:2010, 6.4, and also contain additional provisions for the use of machines within the scope of the standard. Information for use shall cover, separately or in combination, transport, assembly and installation, commissioning, use (setting, teaching/programming, operation, cleaning, fault finding and maintenance) of the escalator and moving walk, and, if necessary, de-commissioning, dismantling and disposal.	**8.6**	**JEAS-2007(2017)** **I. 1 (1),(2),(3),(4)** Contents of instruction manual shall be useful information for operating the escalator safely and describe important matters and prohibitions. **2. (1),(2),(3)** The manufacturer surely provides the instruction manual to the owner. The owner keeps the instruction manual securely
AGREED UPON: Adequate documentation is to be provided along with the escalator/moving walk.		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
7.2 Signals and warning devices **7.2.1 Plates, inscriptions and notices for use** **7.2.1.1 General** All signs, inscriptions and notices for use shall be of durable material, placed in a conspicuous position and written in clearly legible characters in the language of the country where the escalator or moving walk is in operation. **7.2.1.2 Safety signs near the entrances of escalators or moving walks** **7.2.1.2.1** The following mandatory action signs and prohibition signs for the user shall be fixed in the vicinity of the entrances: a) "Small children shall be held firmly" (see Figure G.1); b) "Dogs shall be carried" (see Figure G.2); c) "Use the handrail" (see Figure G.3, Reg. Nr. ISO 7010 M012); d) "Push chairs not permitted" (see Figure G.4). When required by local conditions, prohibition signs, e.g. "Transportation of bulky and heavy loads not permitted" and mandatory action signs like "use permitted only with footwear" or "for safety reasons, wheelchair users are advised to use the lift" will possibly be necessary.	**6.1.6.9** **6.1.6.9.1** **6.2.6.9.1** **6.1.6.9.2** **6.2.6.9.2**	**JEAS-2007 (2017)** **IV.1** 2.Warning signs and cautions Sticker for attention (a) Prohibition of hang out of handrail (b) Prohibition to put a stroller (c) Prohibition of playing around the escalator (d) Prohibition of walking on the escalator (e) Be careful not to get caught clothes or boots etc. (f) Stand within the yellow lines
AGREED UPON: Signs are required to inform the passengers of safe conduct and they are to be legible and durable. ***REMARK:*** All three codes require different sets of safety signage.		
7.2.1.2.2 Stop devices referred to in 5.12.3.8 shall be coloured red and either on the device itself or in its immediate vicinity be marked with the inscription "STOP". The indicator mentioned in 5.12.3.8.1 is not considered to fulfill this requirement.	**6.1.6.3.1** **6.2.6.3.1**	**BSLJ-EO (Structure of escalator)** Article 129–12, 4. Emergency stopping buttons shall be provided at the both landings. EXP. [Notice of designing] Need to cover for abuse protection guard
REMARK: *Stop buttons are to be coloured red.* ***FUNDAMENTAL DIFFERENCE:*** *EN does not require a cover and require the word "STOP" either on the device itself or in the immediate vicinity of the stop device. A17.1/B44 and Japan require the word "STOP" or "EMERGENCY STOP" on the cover of the device.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
7.2.1.2.3 During maintenance, repair, inspection or similar work, the access to the escalator or moving walk shall be barred to unauthorized persons by devices: — which shall bear the notice "No Access", or — the "No Entry" indicator (prohibition sign C,1a as described in the "Convention on Road Signs and Signals" and be available in immediate area.	No equivalent requirements.	No equivalent requirements.
REMARK: *This issue is not covered by A17.1/B44, this is covered by OSHA (Occupational Safety and Health Administration —Department of the USA government).* ***WORLDWIDE ACCEPTANCE:*** — *Access to the escalator/moving walk is to be barred during maintenance and/or repair activities.* — *Any floor openings are to be suitably guarded.* — *Any guarding used is to bear a sign "NO ACCESS" or equivalent.*		
7.2.1.3 Instructions for hand winding devices If a hand winding device is provided, operating instructions for use shall be available in the vicinity. The direction of travel of the escalator or moving walk shall be indicated clearly.	No equivalent requirements.	**JEAS-209 (2015)** **3.6.3** **Indication of appropriate instructions on use**
WORLDWIDE ACCEPTANCE: *Where hand winding devices are provided, instructions for use are to be provided and the direction of travel be clearly marked.*		
7.2.1.4 Notices on the access doors to machinery spaces outside the truss, driving and return stations On access doors to machinery spaces outside the truss, driving and return stations, a notice shall be fixed with the inscription: "Machinery space - danger, access prohibited to unauthorized persons".	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: *Notices on access doors to machinery spaces as "Machinery space - danger, access prohibited to unauthorized persons".*		
7.2.2 Special indicators for escalators and moving walks starting automatically In the case of escalators or moving walks starting automatically (see 5.12.3.3 and 5.12.3.4), a clearly visible signal system, e.g. road traffic signals, shall be provided indicating to the user whether the escalator or moving walk is available for use, and its direction of travel. The automatic operation in 2-Direction-Mode (5.12.3.4) requires an additional indication for this operation (e.g. sign for two-way-traffic).	No equivalent requirements.	**JEAS-410B (2006)** **3.4.(1), (2), (3)** The indications should be located at the both landings, and at the position where it can be seen easily.
WORLDWIDE ACCEPTANCE: *A suitable signal system is to be provided to indicate whether the system is available for use (e.g. traffic signals).*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
7.3 Inspection and test **7.3.1 General** Escalators and moving walks shall be inspected before their first use.	**8.10.4**	**BSLJ (Inspection on completion of buildings) Article 7-1** BSLJ (Completion of inspection by officials designated by the minister of land, infrastructure, and transport) Article 7–2 BSLJ (Intermediate inspection on buildings) Article 7–3 BSLJ (Intermediate inspection by the official designated by minister of land, infrastructure, and transport or others) Article 7–4 BSLJ (Special issue no inspection of buildings) Article 7–5 BSLJ (Restriction on use of building up to obtaining the certificate of inspection) Article 7–6 The Building Standard Law Enforcement Regulation, Article 6
REMARK: *The description of the person that have access for this task is different in all three codes.* ***WORLDWIDE ACCEPTANCE:*** — *Escalators and moving walks are to be tested and inspected prior to first use and at regular intervals and after major modifications.* *The intent is to restrict access except for authorized personnel.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
7.3.2 Constructional inspection and acceptance inspection and test The constructional inspection and acceptance inspection and test shall be carried out at the job-site on completion of the escalator or moving walk. For the constructional inspection and acceptance inspection and test, the data specified in 6.2 should form part of a pre-completed test sheet. Furthermore, layout drawings, description of the equipment and wiring diagrams (current flow chart with legend or explanations, and a terminal connection chart) which permit a check of compliance with the safety requirements specified in this standard, shall be provided. The constructional inspection comprises the examination of the completed installation for conformity with the required data and with regard to proper workmanship as specified in this standard. The acceptance inspection and test comprises: a) overall visual inspection; b) functional test; c) test of electric safety devices with regard to their effective operation; d) test of the brake(s) of the escalator or moving walk under no load, for compliance with the prescribed stopping distances (see 5.4.2.1.3.2 and 5.4.2.1.3.4). An examination of the brake adjustment according to the calculation required in 6.2 c) is also necessary. Additionally, for escalators, a test of the stopping distances under brake load (see 5.4.2.1.3.2) is required unless the stopping distances can be verified by other methods; e) measurement of the insulation resistance of the different circuits between conductors and earth (see 5.11.1.4). For this measurement, the electronic components shall be disconnected. This needs to include a test of the electric continuity of the connection between the earth terminal(s) in the driving station and the different parts of the escalator or moving walk liable to be live accidentally.	**8.10**	**JIS A 4302:2006; 3.1** Completion inspection **JEAS-A1003 (2014)** Escalator specifications **JEAS-1004B (2002)** Structural calculation for escalators **JEAS-A1021B (2015)** Report of escalator conditions form after work completion
REMARK: *The content of the evidence/documentation between the three codes differs.* ***WORLDWIDE ACCEPTANCE:*** *All three codes require evidence/documentation of the acceptance inspections and tests of new or major modifications.*		
No equivalent requirements.	**8.11**	**JIS A 4302:2006:** 3.2 Periodic inspection

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *A17.1/B44 and JIS explicitly mention periodic inspection whereas EN 115-1, Annex L gives only recommendation*		
7.4 Accompanying documents (in particular, instruction handbook) **7.4.1 Contents** The instruction handbook (e.g. in accordance with EN 13015:2001+A1:2008) or other written instructions shall contain among others: a) information relating to transport, handling and storage of the escalator or moving walk, e.g.: — storage conditions; — dimensions, mass value(s), position of the centre(s) of gravity; — indications for handling (e.g. drawings indicating application points for lifting equipment); b) information relating to installation and commissioning of the escalator or moving walk, e.g.: — building interfaces (see Annex A); — fixing / anchoring and vibration dampening requirements; — assembly and mounting conditions; — space needed for use and maintenance; — permissible environmental conditions (e.g. temperature, moisture, vibration, electromagnetic radiation, earthquake and civil defence); — instructions for connecting to the power supply (particularly about protection against electric overloading); — advice about waste removal/disposal; — if necessary, recommendations about protective measures which shall be taken by the owner, e.g. additional safeguards (see EN ISO 12100:2010, Figure 2, Footnote d)), safety distances, safety signs and signals; c) information relating to the escalator or moving walk itself, e.g.:	**8.6.1.2** **8.6.1.2.1** **8.6.1.2.2** **8.6.1.3** **8.6.1.4** **8.6.1.4.1** **8.6.11.6.1 (e)**	**JEAS-2007 (2017)** Standard for creation of escalator instruction manual

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— detailed description of the escalator or moving walk, its fittings, its guards and/or protective devices; — comprehensive range of applications for which the escalator or moving walk is intended, including prohibited usages, if any, taking into account variations of the original machine if appropriate; — diagrams (especially schematic representation of safety functions and layout details); — technical documentation about electric equipment (see EN 60204 series [4]); — documents attesting that the escalator or moving walk complies with the relevant directives; — documents specifying the grade of the slip resistance; d) information relating to the use of the escalator or moving walk, e.g. about: — manual starting (e.g. necessity to check of step, pallet, landings for absence of persons and goods); — intended use; — preventing arrangements in the vicinity of the escalator/moving walk which encourages misuse; — keeping free of unrestricted areas (see A.2.5); — particular risks which may be generated by certain applications (including the use of shopping trolleys and/or baggage carts on escalators and moving walks, see Annex I), and about specific safe measures which are necessary for such applications; — reasonably foreseeable misuse and prohibited usages; — recommendation to not use escalators as regular staircases or emergency exits; — recommendation that, for escalators and moving walks which otherwise would be exposed to weather conditions, the customer provides a roof or enclosure;		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— fault identification and location, repair, and restarting after an intervention; — investigations and necessary corrective actions in case of faults requiring manual reset, to be taken before reset and restart; e) information for maintenance, e.g.: — necessity to follow the maintenance instructions given in the instruction handbook; — personal protective equipment which need to be used and training required; — nature and frequency of inspections; — instructions relating to maintenance operations which require a definite technical knowledge or particular skills and hence should be carried out exclusively by skilled persons (e.g. maintenance staff, specialists); — instructions relating to maintenance actions (e.g. replacement of parts) which do not require specific skills and hence may be carried out by the owner; — drawings and diagrams (e.g. wiring and schematic diagrams) enabling maintenance personnel to carry out their task rationally (especially fault-finding tasks); — instructions relating to cleaning and refurbishment; — necessity to observe a complete revolution of the step/pallet band before making the escalator/moving walk available to the public after maintenance; — instructions on the necessary use of inspection controls during maintenance and repair work; f) information about periodic inspection and tests to ascertain whether the escalator or moving walk is safe in operation, including:		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— electric safety devices with regard to their effective operation; — brake(s) according to 7.3.2 d); — driving elements for visible signs of wear and tear and for insufficient tension of belts and chains; — steps, pallets or the belt for defects, true run and guidance; — dimensions and tolerances specified in this standard; — combs for proper condition and adjustment; — interior panel and the skirting; — handrails; — test of the electric continuity of the connection between the earth terminal(s) in the driving station and the different parts of the escalator or moving walk liable to be live accidentally; g) information for emergency situations, e.g.: — the operating method to be followed in the event of accident or breakdown; — use of hand winding device, if any (see 5.4.1.4 and 7.2.1.3); — warning about possible emission or leakage of harmful substance(s), and if possible indication of means to fight their effects; — for escalators and moving walks subject to seismic conditions, instructions describing the behaviour of the unit in the event of earthquake and the need to maintain and to periodically test that the seismic equipment is in working order, and instructions that after seismic event the safe operating ability of the escalator or moving walk shall be checked; h) a declaration that the emission sound pressure level measured under free field conditions at a distance of 1,00 m from the surface of the machinery and at a height of 1,60 m from the floor plate is expected not to exceed 70 dB(A).		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— description of manual controls (actuators); — setting and adjustment; — risks which could not be eliminated by the protective measures taken by the designer; — interdiction to place merchandise between adjacent balustrades or between a balustrade and adjacent building structures; — preventing arrangements in the vicinity of the escalator/moving walk which encourages misuse; — keeping free of unrestricted areas (see A.2.5); — particular risks which may be generated by certain applications (including the use of shopping trolleys and/or baggage carts on escalators and moving walks, see Annex I), and about specific safe measures which are necessary for such applications; — reasonably foreseeable misuse and prohibited usages; — recommendation to not use escalators as regular staircases or emergency exits; — recommendation that, for escalators and moving walks which otherwise would be exposed to weather conditions, the customer provides a roof or enclosure; — fault identification and location, repair, and restarting after an intervention; — investigations and necessary corrective actions in case of faults requiring manual reset, to be taken before reset and restart; e) information for maintenance, e.g.: — necessity to follow the maintenance instructions given in the instruction handbook;	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— personal protective equipment which need to be used and training required; — nature and frequency of inspections; — instructions relating to maintenance operations which require a definite technical knowledge or particular skills and hence should be carried out exclusively by skilled persons (e.g. maintenance staff, specialists); — instructions relating to maintenance actions (e.g. replacement of parts) which do not require specific skills and hence may be carried out by the owner; — drawings and diagrams (e.g. wiring and schematic diagrams) enabling maintenance personnel to carry out their task rationally (especially fault-finding tasks); — instructions relating to cleaning and refurbishment; — necessity to observe a complete revolution of the step/pallet band before making the escalator/moving walk available to the public after maintenance; — instructions on the necessary use of inspection controls during maintenance and repair work; f) information about periodic inspection and tests to ascertain whether the escalator or moving walk is safe in operation, including: — electric safety and control devices with regard to their effective operation; — brake(s) according to 7.3.2 d); — driving elements for visible signs of wear and tear and for insufficient tension of belts and chains;		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— steps, pallets or the belt for defects, true run and guidance; — dimensions and tolerances specified in this standard; — combs for proper condition and adjustment; — interior panel and the skirting; — handrails; — test of the electric continuity of the connection between the earth terminal(s) in the driving station and the different parts of the escalator or moving walk liable to be live accidentally; g) information for emergency situations, e.g.: — the operating method to be followed in the event of accident or breakdown; — use of hand winding device, if any (see 5.4.1.4 and 7.2.1.3); — warning about possible emission or leakage of harmful substance(s), and if possible indication of means to fight their effects; — for escalators and moving walks subject to seismic conditions, instructions describing the behaviour of the unit in the event of earthquake and the need to maintain and to periodically test that the seismic equipment is in working order, and instructions that after seismic event the safe operating ability of the escalator or moving walk shall be checked; h) a declaration that the emission sound pressure level measured under free field conditions at a distance of 1,00 m from the surface of the machinery and at a height of 1,60 m from the floor plate is expected not to exceed 70 dB(A).		
REMARK: — *All three codes require instruction documentation which includes maintenance and testing requirements.* — *EN and JIS covers information related to the use. EN in addition covers information of installation and transport.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
7.4.2 Presentation of the instruction handbook a) Type and size of print shall ensure the best possible legibility. Warning signs and/or cautions should be emphasized by the use of colours, symbols and/or large print. b) Informa tion for use shall be given in the language(s) of the country in which the escalator or moving walk will be used for the first time and in the original version. If more than one language shall be used, each language should be readily distinguished from the other(s), and efforts should be made to keep the translated text and the relevant illustration together. c) Whenever helpful to the understanding, text should be supported by illustrations. Illustrations should be supplemented with written details enabling, for instance, manual controls (actuators) to be located and identified; they should not be separated from the accompanying text and should follow sequential operations. d) Consideration should be given to presenting information in tabular form where this will aid understanding. Tables should be adjacent to the relevant text. e) The use of colours should be considered, particularly in relation to components requiring quick identification. f) When information for use is lengthy, a table of contents and/or an index should be given. g) Safety-relevant instructions which involve immediate action should be provided in a form readily available to the operator.	No equivalent requirements.	No equivalent requirements.
REMARK: *EN defines in more detail the format of the instruction handbook.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
7.4.3 Advice for drafting and editing information for use a) The information shall clearly relate to the specific model of escalator or moving walk. b) When information for use is being prepared, the communication process "see – think – use" should be followed in order to achieve the maximum effect and should follow sequential operations. The questions "how?" and "why?" should be anticipated and the answers provided. c) Information for use shall be as simple and as brief as possible and should be expressed in consistent terms and units with a clear explanation of unusual technical terms. d) Documents giving instructions for use should be produced in durable form (i.e. they should be able to survive frequent handling). It may be useful to mark them "keep for future reference". Where information for use is kept in electronic form (e.g. CD, DVD, tape) information on safety-related issues that need immediate action shall always be backed up with a hard copy that is readily available.	No equivalent requirements.	No equivalent requirements.
REMARK: EN defines in more detail the format of the information for use.		
7.5 Marking At least at one landing, the — name and full address of the manufacturer and, where applicable, his authorized representative; — designation of series or type of the machinery; — serial number; — year of construction (year in which the manufacturing process is completed) shall be indicated, visible from the outside.	**8.6.1.5** **8.6.1.5.1** **8.6.1.5.2** **8.9.1** **8.9.2** **8.9.3**	No equivalent requirements.
REMARK: *The information of the data plate differs slightly between EN and A17.1/B44.* ***WORLDWIDE ACCEPTANCE:*** *A data plate with key equipment information clearly displayed externally.*		
Annex A **(normative)**		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
Building interfaces **A.1 General** The requirements in in the following chapters are important for the safety of users and maintenance personal. If it is not possible for the manufacturers of the escalator or moving walk to fulfill these requirements (or some of them) due to the fact that e.g. they are not installing the escalator or moving walk, those requirements that are not fulfilled shall be part of the instruction handbook as an obligation for the owner (see 7.4).	No equivalent requirements.	No equivalent requirements.
REMARK: *EN consolidates requirements for the building interfaces in Annex A. A17.1/B44 and JIS codes have these requirements in the main body of their codes.*		
A.2 Free space for users		
A.2.1 Minimum headroom h4 ≥ 2,30 m (see h4 in Figures 5 and A.1).	**6.1.3.12** **6.2.3.15**	**JIS A 4302:2006; 5.4.2 n)** **JEAS -422 (2013) 3.1.2** Necessary Free space Vertical: h4 ≥ 2,1 m Horizontal: 0,5 m or more from the outer face of the handrail
WORLDWIDE ACCEPTANCE: *The minimum headroom h_4 ≥ 2,30 m which is to be measured vertically from the step nose-line on the incline, landing plates and finished floor level at the landings.*		
A.2.2 To prevent collision, a minimum free area around the escalator or moving walk is defined as per Figure A.1. The clear height h4 can be reduced outside of the handrail to the height h12, which measured from the steps of the escalator or the pallets or the belt of the moving walk shall be at least 2,10 m. The distance between the outer edge of the handrail and walls or other obstacles (see b10 in Figure A.1) shall under no circumstances be less than 80 mm horizontally and 25 mm vertically below the lower edge of the handrail (see b_{12} in Figure 6). The area is permitted to be smaller, if by appropriate measures, the risk of injury is minimized.	**6.1.3.2.2** **6.2.3.2.3**	No equivalent requirements.
A.2.3 For escalators and moving walks arranged adjacent to one another either parallel or criss-cross, the distance between the handrails shall be not less than 160 mm (see b_{11} in Figure A.1).	No equivalent requirements.	No equivalent requirements.
(A.2.2 + A.2.3) ***REMARK:*** *Every code has handrail clearance requirements to prevent pinching or trapping.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
A.2.4 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 mounted rigidly above the handrail level and extend at least 25 mm below the lower edge of the handrail, e.g. as an imperforate triangle (see h5 in Figures 5 and 7). It is not necessary to comply with these requirements when the distance b9 between the outer edge of the handrail and any obstacle is equal to or greater than 400 mm (see Figure A.1).	**6.1.3.3.11** **6.2.3.3.7**	**MOC-N (No.1417–2000), 1.(3) and EXP. [Notice of designing] 2.** The wedge guard shall be installed against any obstacle within 50 cm from outer side of handrail. The wedge guard thickness ≥ 6 mm. The wedge guard reaches at 20 cm or more, vertically lower than upper surface of the handrail. **EXP. [Notice of designing], 2.** The wedge guard height over the handrail should not be less than 30 cm. It is recommended that a movable wedge guard is installed in front of the fixed wedge guard.
REMARK: *All three codes have similar requirements for these guards. This is subject for harmonization.* *The need of a guard/(s) where building obstacles cause injuries.*		
No equivalent requirements.	No equivalent requirements.	**JEAS -422 (2013), 3.1.4** Falling prevention net and falling object prevention board should be provided when the adjacent clearance from the escalator/moving walk is 200 mm or more. Falling prevention net does not allow the 50 mm diameter ball to pass through.
REMARK: *JIS code stipulates the device for preventing the falling of objects.*		
A.2.5 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. These are the minimum permitted dimensions that shall be applied in all conditions assuming that this unrestricted area is not affected by e.g. other passenger flows within the building.	**6.1.3.6.4** **6.2.3.8.4**	**MOC-N (No. 1417–2000)** **EXP. 2 [Notice of designing]** (3) Distance from the edge of handrail return section to the obstacle along the step direction shall be 2.5 m or more. Guide fence should be equipped, in case of landing is in the vicinity of platform edge.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
NOTE For guiding barriers and traffic columns, see A.5. An overlapping of unrestricted areas is not permitted. A lateral shift of the unrestricted area is permitted. The floor of the unrestricted area shall be flat. A maximum inclination of 6° is permissible. Fixed stairs inside the unrestricted areas are not permitted. Where the exit of the escalator or moving walk is blocked by structural measures (e.g. shutters, fire protection gates, removable barriers) or in the case that there is no sufficient exit between succeeding escalators/moving walks, an additional stop switch for emergency situations shall be provided: a) within reach from inside the escalator/moving walk. b) within a distance between 2,00 m and 3,00 m before the step/pallet/belt reaches the comb intersection line; c) within a vertical range of 200 mm below and 400 mm above the handrails measured from the top of the handrail to the middle of the actuator (e.g. push button or handle). Assemblies in the inside or outside of the balustrade are permitted when they are arranged and formed in such a manner as to eliminate any risk of harm caused by trapping (taking into account 5.5.2.4, A.2.2 and A.5).		
REMARK: *The requirements for the free space (unrestricted area) around the escalators have the same intention in all three codes.* ***FUNDAMENTAL DIFFERENCES:*** *Whereas all codes recognize a minimum safety zone the dimensional requirements are different.* ***WORLDWIDE ACCEPTANCE:*** *No obstacles allowed inside the unrestricted area. The dimension which is defined in EN also fulfil requirements of A17.1/B44 and JIS.*		
A.2.6 In the case of successive escalators and moving walks without intermediate exits, they shall have the same capacity. A safety device according to 5.12.2.7.8 shall be provided.	**6.1.6.6**	No equivalent requirements.
REMARK: — *EN and A17.1/B44 requires safety devices in case of having no intermediate exits.* — *Additionally, EN requires the same maximum capacity for succeeding escalators and moving walks.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
A.2.7 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 (for an example, see Figure A.2). 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.	Defined by applicable building code.	**JEAS-422 (2013)** **3.1.3** The fences and barriers shall be provided, if there is clearance or space between the escalator/moving walk and the opening of the building floor. The partition plate shall be provided at place facing the landings of escalator/moving walk.
REMARK: — *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, appropriate preventative measures is to be taken.* — *Dimensional requirement differs between EN and JIS. No requirements in A.17/B.44 but in the relevant building code.*		
A.2.8 The surrounds of the escalator or moving walk shall be illuminated, especially in the vicinity of the combs. Information should be exchanged between the manufacturer and the customer.	**6.1.7.2** **6.2.7.2**	No equivalent requirements.
A.2.9 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 lx at the comb intersection line measured at floor level.	**6.1.7.2** **6.2.7.2**	No equivalent requirements.
(A.2.8/A.2.9) ***REMARK:*** — *EN and A17.1/B44 require lighting on escalator surrounds and landings. The Japanese code does not specify lighting levels.* — *A.17/B44 requires from entry to exit 50 lx, whereas EN requires 50 lx at the comb intersection line.* ***WORLDWIDE ACCEPTANCE:*** *The intensity of illumination at the landings including the combs are to be related to the intensity of illumination of the general lighting in the area.*		
A.3 Machinery spaces outside the truss **A.3.1** A safe access for persons to machinery spaces shall be provided.	No equivalent requirements.	No equivalent requirements.
REMARK: *Only EN addresses a requirement for safe access for persons to machinery spaces outside the truss.*		
A.3.2 Machinery spaces shall be lockable and only accessible to authorized persons	**6.1.7.3.2**	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *EN and A17.1/B44 restrict access to "authorized personnel" only.*		
A.3.3 Machinery spaces shall be provided with permanently installed electric lighting on the following basis: a) a minimum of 200 lx at floor level in working areas; b) a minimum of 50 lx at floor level in access routes leading to these working areas.	**6.1.7.1.1** **6.2.7.1.1**	No equivalent requirements.
REMARK: *EN and A.17/B44 address the requirement of light intensity in machinery space outside truss.*		
A.3.4 Emergency lighting shall be installed to allow the safe evacuation of all personnel working in any machinery space. NOTE Emergency lighting is not intended for continuation of maintenance or other activities.	This is defined in building codes and NFPA.	No equivalent requirements.
REMARK: *EN and A.17/B44 require Emergency lighting, Illumination requirements are defined in national building codes.*		
A.3.5 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 x 0,60 m for maintenance and inspection of moving parts at points where this is necessary.	**Rules from 1996 Edition ANSI/ ASME 17.5/B44.1 and NFPA 70:**	**JEAS-209 (2015)** 4.2.1 Appropriate working space shall be provided. For the place which does not involve inspection of the equipment and replacement of parts, the working space is not required. 4.2.2 The clear height ≥ 2 m. 4.2.3 The ventilation equipment shall be provided to keep room temperature below 40 degrees. 4.2.4 The access way to the machinery spaces outside the truss shall have lockable door. The access way width ≥ 0,7 m and height ≥ 1,8 m. 4.2.5 Indoor electric lightning shall be provided. The lighting switch shall be located near the entrance. 4.2.6 Outlet shall be provided. 4.2.7 Machinery space outside the truss shall be lockable. It shall be able to unlock from the inside without a key.
REMARK: — *A.17/B.44 addresses the requirement for the protection against electric shock.* — *EN and JIS require at least a clear height of 2 m at working area.* — *EN describes the headroom in separate machine rooms, in front of control*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
panels and in driving/return stations explicitly. ***WORLDWIDE ACCEPTANCE:*** *All three codes require the working space for safety at work.*		
A.3.6 The clear height for movement shall not be less than 1,80 m. The access ways to the clear spaces mentioned in A.3.6 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.	No equivalent requirements.	**JEAS-209 (2015)** 4.3 The structure of access way to the machinery spaces outside the truss. 4.3.1 The access way width ≥ 0,7 m and height ≥ 1,8 m, if passing through machine room of other equipment. 4.3.2 Suitable electric lighting shall be provided. 4.3.3 For the stairs leading to the machinery space; Height ≤ 230 mm, a tread surface ≥ 150 mm, and with handrail. Handrail height ≥ 950 mm (with side wall), ≥ 1100 mm (without side wall).
REMARK: *EN and JIS address the dimensional requirement for the access ways of authorized personnel and require a minimum clear height of 1,8 m for movement.* ***FUNDAMENTAL DIFFERENCES:*** *A maximum permissible handling force for opening the access plates is required by* *A17.1/B44.*		
A.3.7 In machinery spaces the clear height shall under no circumstances be less than 2,00 m.	No equivalent requirements.	**JEAS-209 (2015)** 4.2.2 The clear height from floor level to the ceiling or to the lower end of the beam shall be at least 2 m.
WORLDWIDE ACCEPTANCE: *At least 2,0 m clear height require in a machinery space outside the truss.*		
No equivalent requirements.	**6.1.3.15**	No equivalent requirements.
REMARK: *A.17/B.44 requires a pit drain for outdoor equipment.*		
No equivalent requirements.	No equivalent requirements.	**JEAS-209 (2015)** 4.1.1 The power supply shall be pulled in to the main machine room. The main circuit breaker which opens the power circuit shall be provided in the main machine room. 4.1.2 The functions for inspection operation by electric power shall not be installed in the machinery spaces outside the truss. 4.1.3 Communication means between the machinery spaces outside the truss and the escalator side shall be provided.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: *JIS requires the measure against unintentional power-on especially related to the machinery space outside and injury caused by it.*		
A.4 Measures to prevent access of shopping trolleys and baggage carts **A.4.1 General** If there is a reasonable foreseeable risk that shopping trolleys and/or baggage carts can be taken onto escalators or moving walks, adequate measures shall be taken to eliminate risks and access shall be prevented if the following conditions are given: a) for escalators: where shopping trolleys or baggage carts are available in the area around. b) for escalators: where shopping trolleys or baggage carts are in an area not close to the escalator where it is reasonably foreseeable that they are taken onto the escalator. c) for moving walks: where shopping trolleys or baggage carts are not intended to be used on a moving walk NOTE It´s in the responsibility of the owner to define the width of the trolleys, that it´s ensured that the trolleys can´t fit through between balustrade and barrier.	No equivalent requirements.	No equivalent requirements.
A.4.2 Barriers If barriers are used, the following requirements shall be fulfilled: a) The barrier shall be installed at the entrance only. An installation at the exit is not permitted in the unrestricted area. b) The design of the barrier shall not create another risk. c) The free entrance width between ends of the newels and barriers - and between barriers itself - shall be at least 500 mm and less than the width of the type of shopping trolley or baggage cart which will be used. d) The height of the barrier shall be between 900 mm and 1 100 mm.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
e) The barrier and its fixation shall withstand the following load: At a height of 200 mm a horizontal force of 3 000 N applies. NOTE: This force results from an impact of a chassis of a shopping trolley (according to EN 1929 1 [5]) /baggage cart loaded with 160 kg moving with a speed of 1,00 m/s. f) The barrier shall be fixed preferably at the building structures. It is also permitted to fix it at the floor plate. In that case, when the defined forces apply, there shall be no permanent deformation and increased/additional gaps.		
WORLDWIDE ACCEPTANCE: *Access of baggage carts and trolleys is to be prevented and at the same time requirements of unrestricted areas and safety zones to be fulfilled.*		
A.5 Fixed guiding barriers and traffic columns Where fixed guiding barriers and/or traffic columns (including e.g. control devices and stop devices for emergency situations) are necessary in the unrestricted area, their design shall not create another risk. The following requirements shall be met: a) The guiding barriers or traffic columns shall have a minimum horizontal distance (radius) of 500 mm to any point of the handrail and shall be positioned outside of the centre line of the handrail (see placement A in Figure A.3). b) The minimum horizontal distance (radius) to any point of the handrail may be reduced to 300 mm, provided that the guiding barriers or traffic columns are positioned outside of the centre lines of the handrails and an additional barrier is installed between the guiding barriers or traffic columns and the vertical centre line of the balustrade newel (see placement B in Figure A.3). The additional barrier shall have a lateral distance between 80 mm to 120 mm of the handrail outer edge and shall close at least the area between the actual lowest point of the handrail entry into the newel and the balustrade decking profile and shall have filled inlets with gaps < 25 mm (see Figure A.3).	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
c) The minimum horizontal distance (radius) to any point of the handrail may be reduced to 180 mm, provided that the guiding barrier or traffic column is positioned outside of the outer edge of the handrail and an additional barrier is installed between the guiding barrier or traffic column and the vertical centre line of the balustrade newel (see placement C in Figure A.3). The additional barrier shall have a lateral distance between 80 mm to 120 mm of the handrail outer edge and shall close at least the area between the actual lowest point of the handrail entry into the newel and the balustrade decking profile and shall have filled inlets with gaps < 25 mm (see Figure A.3). d) The minimum horizontal distance (radius) to any point of the handrail may be reduced to 100 mm, provided that the guiding barrier or traffic column is of a round shape and is positioned outside of the outer edge of the handrail and an additional barrier is installed between the guiding barrier or traffic column and the vertical centre line of the balustrade newel (see placement D in Figure A.3). The additional barrier shall have a lateral distance between 80 mm to 120 mm of the handrail outer edge and shall close at least the area between the actual lowest point of the handrail entry into the newel and the balustrade decking profile and shall have filled inlets with gaps < 25 mm (see Figure A.3) In addition, the following specific requirements apply: a) The guiding barriers and traffic columns and their fixation shall withstand a horizontal force of 1 kN/m applied to the top of the device. b) The guiding barriers and traffic columns shall be fixed preferably at the building structures. It is also permitted to fix it at the floor plate. In that case, when the defined forces apply, there shall be no permanent deformation and increased/additional gaps. c) The height of traffic columns shall be at least the height of the handrail level. d) The height of guiding barriers shall be at least the height of the balustrade decking.		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
e) If guiding barriers and traffic columns are placed inside the unrestricted area, the size of the unrestricted area shall remain the same and in this case be extended in the length. f) Guiding barriers and traffic columns are not considered as structural measures that block the exit. For guiding barriers and traffic columns in the immediate environment of the unrestricted area these requirements also apply. For other devices/installations outside the unrestricted area in the immediate environment requirements a), b), c) and d) apply.		
REMARK: *Only EN has specific requirements for barriers and traffic columns where installed.*		
A.6 Electric power supply Agreements shall be made between the owner and the manufacturer about electric supply and electric protection requirements (e.g. electric shock, short circuit; overload). The installation shall comply with a) EN 60204 1:2006, or b) with the requirements of the national rules of the country where it is installed.	**6.1.7.4.1** **6.2.7.4.1**	No equivalent requirements.
REMARK: *All three codes have electrical safety requirements regarding incoming mains, however national electrical safety codes have to be applied.*		
Annex B – Electronic components – failure exclusion **(normative)** **B.1 Scope** 5.12.1 envisages a number of faults of the electric equipment of the escalator and moving walk. During the failure analysis, some faults can be excluded under certain conditions. This annex describes these conditions and gives the requirements for fulfilling them.	No equivalent requirements.	No equivalent requirements.
B.2 Failure exclusions – conditions Table B.1 shows:	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
a) a list of the major and most usual components used in present electronic technology; the components have been grouped by "families": 1) passive components 1; 2) semiconductors 2; 3) miscellaneous 3; 4) assembled printed circuits 4; b) a number of identified failures: 5) interruption I; 6) short-circuit II; 7) change value to higher value III; 8) change value to lower value IV; 9) change of function V; c) the possibility and conditions of failure exclusion: The first condition for failure exclusion is that components shall always be used within their own worst case limits, even in the worst case conditions specified by the standards, in the field of temperature, humidity, voltage and vibrations. d) some remarks. In the table: — the "NO" in the cell means: failure not excluded, i.e. shall be considered; — the unmarked cell means: the identified fault type is not relevant. A design guide line for safety circuits is given in Annex E.		
REMARK: *Only EN defines specific conditions for failure exclusion on electrical components.*		
Annex C **(normative)** **Drafting and assessing failsafe circuits** See Figure C.1	No equivalent requirements.	No equivalent requirements.
REMARK: *Only EN defines the methodology for drafting and assessing failsafe circuits.*		

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
Annex D **(normative)** **Testing of failsafe circuits containing electronic components and/or safety related electrical, electronic and programmable electronic devices (E/E/PE)** **D.1 General** D.2.1 Failsafe circuits containing electronic components The applicant shall indicate to the laboratory: a) the identification on the board; b) working conditions; c) listing of used components; d) layout of the printed circuit board; e) layout of the hybrids and marks of the tracks used in failsafe circuits; f) function description; g) electric data inclusive wiring diagram, if applicable, including input and output definitions of the board	No equivalent requirements.	No equivalent requirements.
D.2.2 Safety related electrical, electronic and programmable electronic devices (E/E/PE) In addition to D.2.1 the following documentation shall be provided: documents and descriptions relating to the common measures for the design and implementation process; general description of the software used (e.g. programming rules, language, compiler, modules); function description including software architecture and hardware/software interaction; description of blocks, modules, data, variables and interfaces; software listings.	No equivalent requirements.	No equivalent requirements.
D.3 Test sample There shall be submitted to the laboratory: b) one printed circuit board and c) one printed circuit board bare (without components).	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
D.4 Mechanical test **D.4.1 General** During the tests, the tested object (printed circuit) shall be kept under operation. During and after the tests, no unsafe operation and condition shall appear within the failsafe circuit. **D.4.2 Vibrations** Transmitter elements of failsafe circuits shall withstand the requirements of: a) EN 60068-2-6:2008, A.6.1, Table C.2 (Endurance by sweeping): 20 sweep cycles in each axis: 1) at amplitude 0,35 mm or 5 gn ; and 2) in the frequency range 10 Hz to 55 Hz; and also of: b) EN 60068-2-27:2009, 4.1, Table 1 (acceleration and duration of pulse) in the combination of: 3) 1 pulse in each axis with a peak acceleration 294 m/s^2 or 30 g_n; 4) corresponding duration of pulse 11 ms; and 5) corresponding velocity change 2,1 m/s half sine. NOTE Where shock absorbers for transmitter elements are fitted, they are considered as part of the transmitter elements. After tests, clearances and creeping distances shall not become smaller than the minimum accepted. **D.4.3 Bumping** **D.4.3.1 General** Bumping tests shall simulate the cases when printed circuits fail, introducing the risk of rupture of components and unsafe situation. These tests shall be carried out according to EN 60068-2-27:2009. Tests are divided into the partial test shocking, and continuous shocking. During the tests, the operation of the circuit is not required.	No equivalent requirements.	No equivalent requirements.
D.4.3.2 Partial test shocking The test object shall satisfy the following minimum requirements: a) Shocking shapes 1 pulse in each axis (half-sinus); b) Amplitude of acceleration 15 g_n; c) Duration of shock 11 ms.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
D.4.3.3 Continous shocking The test object shall satisfy the following minimum requirements: a) Amplitude of acceleration 10 g_n; b) Duration of shock 16 ms; c) 1) **Number of shocks 1 000 ± 10;** 2) Shock frequency 2/s.	No equivalent requirements.	No equivalent requirements.
D.5 Climatic stress testing **D.5.1 Temperature tests** Temperature tests shall be carried out according to EN 60068-2-14:2009 as follows: a) Operating ambient limits: 0 °C, + 65 °C (ambient temperature of the electric safety device in the control panel); b) Test conditions: 1) **The printed circuit board shall be in operational position.** 2) The printed circuit board shall be supplied with normally rated voltage. 3) The electric safety device shall operate during and after the test. If the printed circuit board includes components other than failsafe circuits, they also shall operate during the test (their failure is not considered). 4) Tests will be carried out for minimum and maximum temperature (0 °C, + 65 °C); tests will last a minimum of 4 h. 5) If the printed circuit board shall be used to operate within wider temperature limits, it shall be tested for these values.	No equivalent requirements.	No equivalent requirements.
D.5.2 Hunidity test Humidity tests are not necessary for fail-safe circuits as the pollution degree for escalators/moving walks is supposed to be class 3 according to EN 60664-1:2007, and the relative creeping distances and clearances are specified in this standard.	No equivalent requirements.	No equivalent requirements.
D.6 Functional and safety test of E/E/PE Functional and safety tests for E/E/PE shall be performed according to EN 62061:2005.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
REMARK: — *EN defines the tests, necessary for fail safe circuits and E/E/PE.* — *Electrical equipment requirements are defined in A 17.5.*		
Annex E **(informative)** **Design guideline for safety circuits** This design guideline gives recommendations to avoid dangerous situations in the case when information is collected from the safety circuit for control purposes, for remote control, alarm control, etc. Some dangerous situations are recognized coming from the possibility of bridging one or several electric safety devices by short circuiting or by local interruption of common lead (earth) combined with one or several other failures. It is good practice to follow the recommendations given below: — Design the board and circuits with distances in accordance with specifications 3.1 and 3.6 of Table B.1. — Organize common lead so that the common lead for the control of the escalator/moving walk comes behind the electronic components. Any rupture will cause a non-operation of the control (danger exists that changes in wiring occur during the life of the escalator/moving walk). — Make always calculations about the "worst case" condition. — Always use outside (out of element) resistors as protective devices of input elements; internal resistor of the device should not be considered as safe. — Use only components according to listed specifications. — Consider backwards voltage coming from electronics. Using galvanically separated circuits can solve the problems in some cases.	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
— Design electric installations in accordance with HD 60364-5-54:2011 [6]. — The "worst case" calculation cannot be avoided, whatever the design. If modifications or add-ons are made after the installation of the escalator/moving walk, the "worst case" calculation, involving new and existing equipment, shall be carried out again — Some failure exclusions can be accepted, according to Table B.1. — Failures outside the environment of the escalator/moving walk need not be taken into consideration. — "An interruption of the earth from the main supply of the building to the controller collection earth bar (rail) can be excluded, providing the installation is made in accordance with HD 60364-5-54:2011."		
REMARK: — *Only EN provides design guidelines for safety circuits.* — *Electrical equipment requirements are defined in A 17.5.*		
Annex F **(informative)** **Examples of possible dynamic torsional tests for steps and pallets** **F.1 General** The following examples illustrate practical methods for carrying out dynamic torsional tests as required by 5.3.3.3.1.2 and 5.3.2.3.2.	No equivalent requirements.	No equivalent requirements.
F.2 Torsional test 1 The step/pallet is tested at the maximum inclination (inclined support) for which it shall be applied, together with rollers (not rotating), axles or stub shafts (if existing). It is supported and fixed via the step/pallet chains. In order to minimize the influence of the rollers on the deformation, all rollers supporting the step are replaced by steel rollers with the same main dimensions. Furthermore the supporting trailer roller is able to move with low friction on the supporting plane to allow also transverse movement. To avoid the lift off of the step/pallet roller opposite to the unsupported free trailer roller mentioned below, it has a locking clamp parallel to the supporting area with a clearance less than 0,2 mm (see Figure F.1, for test equipment).	No equivalent requirements.	No equivalent requirements.

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Table 2 *(continued)*

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
In order to enable the torsioning of the step/pallet, one trailer roller is not supported or is left out. In addition the centre of this trailer roller is able to move downward from 0 to – 4 mm, moving in an arc whose centre is the step/pallet chain roller centre. This 4 mm displacement is related to a trailer roller to step/pallet chain roller centre distance of 400 mm. This ratio is also maintained, when the 400 mm dimension is varied. A dynamic load is applied perpendicular to the tread surface on a steel plate arranged as specified in 5.3.3.2.1 and 5.3.3.2.3 respectively, in the centre of the tread surface, which leads to the deflection at the unsupported or left out trailer roller. **F.3 Torsional test 2** The step/pallet assembly is mounted by its chain axle and by one end of the trailer wheel axle, as shown in Figure F.2, below (no wheels are fitted for this test). The chain axle is supported at the position normally occupied by the step/pallet chain. The step/pallet is free to rotate about, but not to slide along, the chain axle. The 'fixed' end of the trailer wheel axle is held at the journal by a ball-jointed arm, to allow free movement in all directions. The lower end of the arm is ball-jointed to a fixed support. The 'free' end of the trailer wheel axle is connected by a ball joint to the actuating device. The lower end of the actuating device is ball-jointed to a fixed support so that the 'free' end of the trailer wheel axle is able to move in any direction. The axis of the actuating device is perpendicular to the plane encompassing the axes of both trailer and chain wheel axles. The restraining and actuating linkages make use of a ball bearing of identical design to the bearing fitted to the trailer wheels. The normal trailer wheel fixings are used, and the prescribed torque values applied, for the test assembly. The actuating device is applied and released in each direction so as to cause a cyclic linear displacement. The peak displacement is 2 mm, above and below the nominal 'zero' position of the step/pallet (i.e. from the point with the axles chain and trailer wheel axles in the same plane). This ±2 mm displacement is related to a trailer roller to step/pallet chain roller centre distance of 400 mm. This ratio is also maintained, when the 400 mm dimension is varied.		

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