



BSI Standards Publication

Comparison of worldwide escalator and moving walk safety standards

Part 2: Abbreviated comparison and comments

National foreword

This Published Document is the UK implementation of ISO/TR 14799-2:2023. It supersedes PD ISO/TR 14799-2:2015, which is withdrawn.

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

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

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

This publication is not to be regarded as a British Standard.

© The British Standards Institution 2023
Published by BSI Standards Limited 2023

ISBN 978 0 539 13889 4

ICS 91.140.90

Compliance with a Published Document cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 May 2023.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

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



Reference number
ISO/TR 14799-2:2023(E)

AVA Documents
Document Sharing Hub
© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms and list of terms used in the codes	1
4.1 Abbreviated terms.....	1
4.2 List of terms used in the codes.....	2
5 Basis for escalator and moving walk safety standards	3
5.1 Historical origin and development of standards.....	3
5.1.1 European Standard EN 115-1.....	3
5.1.2 North American Standard A17.1/B44.....	4
5.1.3 Japanese codes.....	4
5.2 General — Technical basis and structure of standards.....	5
5.3 Abbreviated comparison and comments.....	5
6 Overview of comparable events of detection	132

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.

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 these 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.

Comparison of worldwide escalator and moving walk safety standards —

Part 2: Abbreviated comparison and comments

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

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.		

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.

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.

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.

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.

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-E0 (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.

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

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.

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.

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.

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 5.12.3, 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.

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.

Table 2 (continued)

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 combustibility 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.		

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 $\alpha \leq 30^\circ$ $\alpha \leq 35^\circ$, if rise ≤ 6 m and $v \leq 0,5$ m/s Moving walks: $\alpha \leq 12^\circ$	6.1.3 6.1.3.1 6.2.3.1	BSLJ-EO Art.129-12 1.(2) $\alpha \leq 30^\circ$ Moving walks: $\alpha \leq 15^\circ$ BSLJ-EO; Art. 129-12 EXP. 1 (2) (1)(a) $\alpha \leq 35^\circ$, rise: ≤ 6 m, speed: $\leq 0,5$ m/s, step depth: ≤ 35 cm, number of flat steps: ≥ 2 [MOC-N (No.1413-2000) 2-1] (2)(a) $\alpha \leq 4^\circ$, 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: $\alpha \leq 4^\circ$ Position other than the mentioned above: $\alpha \leq 8^\circ$
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.		

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/m ² . deflection shall not exceed 1/750 of the distance l ₁ 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-E0 (Structure of escalator) Article 129-12 $P = 2\,600\,A\,N/m^2$ 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 $G1 + \alpha(G2 + P)$ 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 ($\pm 1^\circ$), 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.

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 $0,58 \text{ m} \leq z_1 \leq 1,10 \text{ m}$ For moving walks with an angle of inclination up to 6° widths up to 1,65 m are permitted	6.2.3.7	BSLJ-E0 (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 $z_1 \leq 1,6 \text{ m}$ for not more than 4° $z_1 \leq 1,1 \text{ m}$ for more than 4°
REMARK: Minor differences in dimensions of treadway AGREED UPON: $560 \text{ mm} \leq z_1 \leq 1\,100 \text{ mm}$ WORLDWIDE ACCEPTANCE: $580 \text{ mm} \leq z_1 \leq 1\,020 \text{ mm}$		
5.3.2.2 Step treads and pallets (see Figure 5, detail X and Figure 8). 5.3.2.2.1 Step height $x_1 \leq 0,24 \text{ m}$. 5.3.2.2.2 Step depth $y_1 \geq 0,38 \text{ m}$.	6.1.3.5.2	MOC-N (No.1413-2000) Step depth ($EN y_1$) $\geq 0,35 \text{ m}$ 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 $\leq 220 \text{ mm}$; step depth $\geq 400 \text{ mm}$ 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 $5 \text{ mm} \leq b_7 \leq 7 \text{ mm}$.	6.1.3.5.5	No equivalent requirements.
WORLDWIDE ACCEPTANCE: $5 \text{ mm} \leq b_7 \leq 6,5 \text{ mm}$.		
5.3.2.2.6 Depth of grooves $h_7 \geq 10 \text{ mm}$.	6.2.3.5.1	No equivalent requirements.
WORLDWIDE ACCEPTANCE: $h_7 \geq 10 \text{ mm}$.		
5.3.2.2.7 Web width $2,5 \text{ mm} \leq b_8 \leq 5 \text{ mm}$	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: $7,5 \text{ mm} \leq \text{slot} \leq 9,5 \text{ mm}$.		
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.		

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 $4,5 \text{ mm} \leq b_7 \leq 7 \text{ mm}$. 5.3.2.3.3 $h_7 \geq 5 \text{ mm}$. 5.3.2.3.4 $4,5 \text{ mm} \leq b_8 \leq 8 \text{ mm}$.	6.2.3.6.2	No equivalent requirements.
WORLDWIDE ACCEPTANCE: $4,8 \text{ mm} \leq b_7 \leq 6,4 \text{ mm}$; $9 \text{ mm} \leq \text{slot} \leq 13 \text{ mm}$.		
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) $6\,000 \text{ N/m}^2$.	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): $\leq 30 \text{ kg}$ 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 $0,2 \text{ m} \times 0,3 \text{ m}$ deflection $\leq 4 \text{ mm}$ (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.

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.		

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 $\geq 0,025$ 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.		

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 $\pm 5\%$ 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 $\pm 5\%$ 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 ($30^\circ < \alpha \leq 35^\circ$) EXP. 2.(1) and (2) The rated speed ≤ 45 m/min ($8^\circ < \alpha \leq 30^\circ$) [see 2.4.2 Table 6 and 7]
WORLDWIDE ACCEPTANCE: Speed of unloaded escalator in up direction only $\leq 0,5$ 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 $\leq 1,1$ m and horizontal pallet movement $\geq 1,6$ m before entering the comb	6.1.4 6.2.4	MOC-N (No.1417-2000), EXP. 2. (1) and (2) For inclination $\leq 8^\circ$: $v \leq 50$ m/min (0,833 m/s) For inclination $> 8^\circ$ and $\leq 15^\circ$: $v \leq 45$ 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.		

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/m ² 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 5.4.2.1.1 General 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.		

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 x₁ 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:		

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 $\leq 1,25 \text{ m/s}^2$ MOC-N (No.1424-2000) Minimum stopping distance of the step; $S=V^2/9\,000 \text{ (m)}$ 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.		

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-E0 (Structure of escalator) Article 129-12 5 Deceleration rate $\leq 1,25 \text{ m/s}^2$ MOC-N (No.1424-2000) Minimum stopping distance of the step; $S=V^2/9\,000 \text{ (m)}$ 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) $h_{13} > 6 \text{ m}$	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 world-wide accepted future main drive shaft brake definition. FUNDAMENTAL DIFFERENCE:		

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.		

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.		

Table 2 (continued)

EN 115-1:2017	A17.1-2016/CSA B44-16 (North America)	Japan codes 2016
5.5 Balustrade	6.1.3.3	BSLJ-EO (Structure of escalator)
5.5.1 General	6.2.3.3	Article 129-12
Balustrades on each side.		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	6.1.3.4.5	No equivalent requirements.
5.5.2.1 Height above steps	6.2.3.2.2	
$0,9\text{ m} \leq h_1 \leq 1,1\text{ m}$ (see Figures 5 and 6) in the inclined section.		
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: $900\text{ mm} \leq h_1 \leq 1\,000\text{ mm}$.		
5.5.2.2	6.1.3.3.13	JEAS-422 (2013)
Prevention of climbing on balustrades and anti-slide device	6.2.3.3.8	3.1.5 Prevention of climbing on balustrades
Specific dimensions	6.1.3.3.12	
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	6.1.3.3.1	BSLJ-EO (Structure of escalator)
Specific requirements for Balustrade construction, mouldings, cover joints, etc.	6.2.3.3.1	Article 129-12
Force applied on the balustrade interior panelling	6.1.3.3.3	Similar
500 N over 25 cm^2 , Gap $\leq 4\text{ mm}$	6.2.3.3.3	JEAS-525 (2009), 3.1
No permanent deformation		Glass panel thickness $\geq 6\text{ mm}$
Glass panel thickness $\geq 6\text{ mm}$		
REMARK:		

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 $\gamma \geq 25^\circ$ see Figure 6	6.1.3.3.4 6.2.3.3.4	No equivalent requirements.
WORLDWIDE ACCEPTANCE: $25^\circ \leq \gamma \leq 30^\circ$.		
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 $\gamma \leq 45^\circ$ (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 $\leq 0,25$ 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 $\geq$ Deflection ≤ 4 mm No permanent deformation.	6.1.3.3.6 6.2.3.3.6	No equivalent requirements.

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.		

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: <i>EN specifically prohibits any horizontal gap. Subject for harmonisation.</i> 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: <i>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).</i>		

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 b_{18} 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: <i>EN requirements according to 5.6.2.1.</i>		
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: <i>Subject for harmonisation.</i> WORLDWIDE ACCEPTANCE: <i>70 mm ≤ handrail width ≤ 100 mm.</i>		
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: $b_5 \leq 50$ 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: <i>EN requirements according to 5.6.3.</i>		
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.

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: $100\text{ mm} \leq h_3 \leq 250\text{ mm}$.		
5.6.4.2 The horizontal distance l_4 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 $(l_2 - l_3 + 50\text{ mm})$ 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 L_1 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: $\leq 30\text{ kg}$
REMARK: Only EN defines a minimum distance in the travel direction.		
WORLDWIDE ACCEPTANCE: Surface providing secure foothold.		

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 h ₁₃ 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, high 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 $v \leq 0,5$ m/s (inclination of max. 35°); — at least 1,50 m for nominal speeds $0,5 \text{ m/s} < v \leq 0,65$ 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.		

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: <i>An inclination $\leq 3^\circ$ for a distance of 900 mm measured from the comb/pallet intersection.</i>		
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: <i>Combs are required at each entry/exit and are to be easily replaceable.</i>		
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: <i>EN defines a minimum thickness of the comb teeth.</i> WORLDWIDE ACCEPTANCE: <i>See 5.7.2.5.</i>		
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: <i>Radius of the teeth end is to be ≤ 2 mm.</i>		

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 β shown in Figure 5, detail X shall not exceed 35°.	No equivalent requirements.	No equivalent requirements.
WORLDWIDE ACCEPTANCE: $\beta \leq 35^\circ$.		
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: <i>Combs and/or their supporting structure are to be adjustable to ensure correct meshing.</i>		
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: <i>Combs must remain in mesh or break in case of trapping of object/s.</i>		
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: <i>Only A17.1/B44 defines force requirements.</i> FUNDAMENTAL DIFFERENCE: <i>Only A17.1/B44 requires manual-reset of the safety device/s.</i> WORLDWIDE ACCEPTANCE: <i>A safety device for detection of an object at the comb.</i>		
No equivalent requirements.	6.1.3.6.2 6.2.3.8.2	No equivalent requirements.
FUNDAMENTAL DIFFERENCE: <i>Only A17.1/B44 requires a visual contrast applied to the combs against the step/pallet/s.</i>		
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: $h_8 \geq 4 \text{ mm}$.		
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.		

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.

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.