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Comparison of worldwide escalator and moving walk safety standards —

Part 2: Abbreviated comparison and comments

iTeh STANDARD PREVIEW
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*Comparaison des normes mondiales de sécurité des escaliers
mécaniques et trottoirs roulants —*

Partie 2: Comparaison abrégée et commentaires

ISO/DTR 14799-2

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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

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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.

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 there 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
<p>1 Scope</p> <p>This European Standard is applicable for new escalators and moving walks (pallet or belt type) as defined in Clause 3.</p> <p>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).</p>	<p>1.1</p> <p>1.1.1</p>	<p>BSLJ-EO (Structure of escalator)</p> <p>Article 129-3</p> <p>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.</p>

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
<p>3.1.11 failsafe circuit safety related electrical and/or electronic system with defined failure mode behaviour.</p>	1.3	No equivalent requirements.
<p>3.1.12 handrail power-driven moving rail for persons to grip while using the escalator or moving walk.</p>	No equivalent requirements.	No equivalent requirements.
<p>3.1.13 interior panel panel located between the skirting or lower inner decking and the handrail guidance profile or balustrade decking.</p>	1.3	No equivalent requirements.
<p>3.1.14 lower inner decking profile that connects the skirting with the interior panel when they do not meet at a common point.</p>	1.3	No equivalent requirements.
<p>3.1.15 lower outer decking profile that connects the exterior panels with the interior panel.</p>	1.3	No equivalent requirements.
<p>3.1.16 machinery escalator or moving walk machine(s) mechanisms and associated equipment.</p>	1.3	No equivalent requirements.
<p>3.1.17 machinery spaces space(s) inside or outside of the truss where the machinery as a whole or in parts is placed.</p>	No equivalent requirements.	No equivalent requirements.
<p>3.1.18 maximum capacity maximum flow of persons that can be achieved under operational conditions.</p>	No equivalent requirements.	No equivalent requirements.
<p>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.</p>	1.3	<p>BSLJ-E0 (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</p>

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.
<i>REMARK: All codes have in common, that the speed definition is one of the design parameters for the escalator/moving walk.</i>		
<i>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.</i>		
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.