TECHNICAL REPORT

ISO/TR 14799-2

Second edition

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

PROOF/ÉPREUVE

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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. www.iso.org/directives

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The committee responsible for this document is ISO/TC 178, *Lifts, escalators and moving walks*.

This second edition cancels and replaces the first edition (ISO/TR 14799-2:2005), of which it constitutes a minor revision.

ISO/TR 14799 consists of the following parts, under the general title *Comparison of worldwide escalator and moving walk safety standards*:

— *Part 1: Rule by rule comparison*

— *Part 2: Abbreviated comparison and comments*

Annexes A and B form an integral part of this part of ISO/TR 14799.

Introduction

At the 1995 Plenary Meeting of ISO/TC 178, the work on a comparison of world-wide standards which includes the American, Australian, European, Russian, and Japanese escalator and moving walk safety code was passed to ISO/TC 178 WG 5 (Resolution Singapore 1995/114). In October 1995, Working Group 5 was officially formed to carry out the task of preparing a cross reference between the relevant sections of these standards and to analyse the differences on selected subjects. The goal at that time was to prepare a technical report which would provide reference information to assist national committees when reviewing and revising individual standards which may initiate a gradual convergence of the technical requirements. In 1996 the study was expanded to include the Korean safety standard.

Subsequently at the 2007 Plenary Meeting of ISO/TC 178 it was agreed to start the update in accordance with Resolution 190/2001. However, it was also agreed only to restrict the comparison to the American, Australian, European and Japanese safety codes. That work was completed after 6 meetings in 2012.

The content of this part of ISO/TR 14799 is based on the information provided by the WG 5 members acting in personal capacity.

This part of ISO/TR 14799 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 part of ISO/TR 14799 is not intended to replace existing safety standards which may 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 part of ISO/TR 14799 is intended to be read in conjunction with the various safety standards. Unless approved by the relevant standard writing organisations, the information contained in this part of ISO/TR 14799 does not necessarily represent the opinions of these standards writing organizations (see Bibliography for references).

This part of ISO/TR 14799 was done with the European Standard EN 115-1:2008 and its Amendment A1:2010 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. 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.

Comparison of worldwide escalator and moving walk safety standards —

Part 2:
Abbreviated comparison and comments

1 Scope

This part of ISO/TR 14799 consists of a comparison of the requirements of selected topics as covered by the following world-wide safety standards (excluding local deviations):

a) Europe (CEN) – EN 115-1; Safety of escalators and moving walks – Part 1: Construction and installation (Edition 2010, including Amendment 1);

b) North America - ASME A17.1/CSA B44-2010, Safety Code for Elevators and Escalators;

c) Australia - AS 1735 Part 5 (Edition 2003);

d) 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).

It should be noted that in addition to the above listed standards and other regulations, escalators and moving walks may be required to conform to the requirements of other standards as appropriate. Where ISO/TC 178/WG 5 was aware of these standards they are mentioned in the Bibliography.

2 Abbreviated terms and terminology

2.1 Abbreviated terms

The following abbreviated terms are used by the codes compared when making reference to regulations and organisations:

ANSI	American National Standards Institute
AS	Australian Standard
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 Normalisation (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 Organization for Standardization
JEAC	Japan Electrical Association Code
JEAS	Japan Elevator Association Standard
JIS	Japanese Industrial Standard
MOC-N	Notifications of the Ministry of Construction (Japan)
NEC	National Electrical Code (USA)
NFPA	National Fire Protection Association (USA)
OSHA	Occupational Safety and Health Administration (USA)

2.2 Terminology (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, American, and Australian 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 **(Europe)**	A17.1/B44 **(North America)**	AS 1735 **Part 5 (Australia)**	**Japanese Codes**
auxiliary brake (5.4.2.2)	main drive shaft brake (6.1.5.3.2)	auxiliary brake (12.3.1, 12.4.1, 12.6)	main drive shaft brake
balustrade decking (3.1.3, 5.5.2.2)	high deck balustrades (6.1.6.3.1, 6.2.3.3.7, 6.2.6.3.1)	balustrade decking (5.1.5.1.4)	deck board
balustrade exterior panelling (mod)	exterior panel	balustrade exterior panelling (5.1.5.1.5)	exterior panel
balustrade interior panelling (mod)	interior panel 6.1.3.3.1, 6.2.3.3.4)	balustrade interior panelling (5.1.5.1.3)	interior panel
brake load (3.1.4)	brake rated load (6.1.3.9.3, 6.2.3.10.3, 6.2.5.3.1, 6.2.5.3.2)	brake load (3.9b))	
criss-cross (A.2.3, A.2.4)	6.1.3.3.13	criss-cross (5.2.4, 7.3.1)	criss-cross
safety factor (5.4.1.3.2, 5.4.3.2)	design factor of safety (3.6.1, 3.6.4)	factor of safety (9.1.2, 9.2.1)	safety factor
height above the steps (A.2.1)	head-room (8.10.4.1.1)	height above the steps (7.3.1, 7.6)	height above the steps
inclination (3.1.1)	slope/inclination (6.2.3.1, 6.2.3.7, 6.2.3.9.1)	maximum angle 30 degrees	
inspection cover and floor plate (5.2.4)	access door/plate (US) (6.2.7.3.3)	inspection doors and trap door (5.3) + Supports of non combustible material 5.3	
lower inner decking (5.5.2.6)	low-deck interior (802.3d)	interior profile (5.1.5.1.2)	
multiplex chain (5.4.1.3.1, 5.4.2.2.1))	multi-strand chain	multiplex chain (12.3.1)	
not easy to ignite (0.5.1)	non/limited combustible (6.1.2.1, 6.2.2.1)	not easy to ignite (0.5.1)	
moving walk	moving walk	passenger conveyor	moving (side) walk
rated load[a]	rated load[a] (6.2.3.10)		rated load[a]
rated speed [a](3.6)	rated speed[a] (6.1.4, 6.2.4)	rated speed[a] (3.6)	rated speed[a]
skirting (3.1.23, 5.5.3)	skirt (panel) (6.1.3.3.6, 6.2.3.3.6)	skirting (3.5, 5.1.5.1.1)	skirt guard (panel)
structural load	structural rated load (6.1.3.9.1, 6.2.3.10.1)	structural load	
supporting structure (5.2)	truss (6.1.2, 6.1.3.7, 6.1.3.10.1, 6.2.3.11.1, 6.2.7.1.2)	supporting structure (5.3) + Supports of non combustible material	truss
supporting structure (of the combs) (8.3.2.4, 8.3.2.6, 16.2.1.1.1)	comb plate (6.1.6.3.13, 6.2.6.3.11, 6.2.8.3), access plate (6.1.7.3, 6.2.7.3)	supporting structure (of the combs) (8.3.2.4, 8.3.2.6, 16.2.1.1.1) + comb-plate switch and specified actuating forces	comb plate
maximum capacity (Annex H.1)		theoretical capacity (3.8)	

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

Table 1 *(continued)*

EN 115-1 **(Europe)**	A17.1/B44 **(North America)**	AS 1735 **Part 5 (Australia)**	**Japanese Codes**
		underside enclosure (5.1.1.3) + non combustible material	
	machinery rated load (6.1.3.9.2, 6.2.3.10.2)		
	conventional/modular moving walk (6.1.3.9.2, 6.1.3.9.3, 6.1.3.10)		
	skirt obstruction device (6.1.6.3.6)		skirt guard switch (JEAS-406F (draft), 2.1) MOC-N (No. 1424-2000), 2(d)
	skirtless balustrade (6.2.3.3.5)		
horizontal movement (5.7.2.1)	flat step (6.1.3.6.5)	*(diff. definition)*	(flat step)

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

3 Basis for escalator and moving walk safety standards

3.1 Historical origin and development of standards

3.1.1 The European Standard EN 115-1

3.1.1.1 Why do we have 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.

So, in the early 1960s specialists/experts from 7 European countries joined together and founded the "Commission Internationale pour la Réglementation des Ascenseurs et Monte-charge" (CIRA). The CIRA draft for escalators was produced in June 1972, containing safety guidelines for escalators to protect persons and objects against possible accidents and injury.

The Technical Committee CEN/TC10 "lifts" established the group WG2 in June 1974 with the request to prepare a draft European Standard for escalators and moving walks.

The convenorship of this work group was initially given to a member of the German delegation. In December 1974, the German convenor distributed a first proposal for the construction and installation of escalators founded on the CIRA guidelines, which after careful examination through the "CEN/TC10 WG2" was submitted to all member countries of the CEN for consideration in June 1977.

It should be noted that the EC Committee BTS2 gave the CEN a mandate for drawing up this standard in 1976.

Finally following a second and a third draft the final edition of the European Standard, EN 115 was prepared and accepted by CEN on 3rd January, 1995 (firstly amended January 1998).

Considering that EN 115:1995 had given rise to requests for interpretation and this standard did not fully comply with EN 414 (today CEN Guide 414 "Safety of machinery - Rules for the drafting and presentation of safety standards"), CEN/TC 10 asked its working group 2 to revise EN 115:1995. This

task was completed by CEN/TC 10/WG 2 in 2007 when the final draft of EN 115-1 was available. An Amendment 1 was published in 2010.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

3.1.1.2 How did we get EN 115-1?

The drawing up of the harmonized European Standard removed the technical trade restraints on the escalators and moving walks within the CEN countries listed above. The safety level of the CIRA Directives Edition June 1972 and the existing national regulations or standards of the CEN Member States essentially became reference documents which illustrate how the new standard was derived.

Therefore all CEN members are bound to follow the CEN/ CENELEC requirements and all national standards for escalators and moving walks are superseded by the harmonized EN 115-1 standard.

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

The purpose of the 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.

3.1.1.4 Is EN 115-1 a compulsory standard?

Some exceptions are possible (such as sections 0.3 and 1.3).

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

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

3.1.1.6 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.

3.1.2 The North American Standard A17.1/B44

3.1.2.1 Why do we have 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.

3.1.2.2 How did we get A17.1/B44?

The use of elevators and escalators began to rapidly expand in the early 1900s, as larger and taller buildings were transforming American cities into high rise population centres. With the growth of

the elevator industry, came a proliferation of new manufacturers and maintenance organizations that lacked the knowledge and background of the industry developers. They often, because of this lack of experience, failed to understand or enforce safe practices in the work they performed.

It became apparent that in order for these cities with their high rise buildings to remain viable, the public had to have unwavering faith in the safety of the elevators that made these buildings usable. A safety code developed by experts in the field of vertical transportation would help develop this public confidence.

In 1915, ASME assembled a committee of engineers who were knowledgeable about elevators and charged them with developing a set of standards for elevator manufacturers, architects, consulting engineers, insurance inspectors, and building owners. The committee recognized the harmful influence of wear, rough usage, and atmospheric conditions under which elevator apparatus must operate, particularly on door locks, interlocks, and electrical contacts.

This effort resulted in the first edition of the A17.1 code being developed in 1921. New editions are periodically published, which in recent years has been every third year. An addendum is published annually between editions.

As a result of a joint effort by the CSA B44 Technical Committee on the Elevator Safety Code and the ASME A17 Committee on Elevators and Escalators harmonization of the provisions of CSA B44 and ASME A17.1 was completed and published as ASME A17.1 / CSA B44 in 2007. The 2nd edition of ASME A17.1 / CSA B44 was published as ASME A17.1-2010 / CSA B44-10 in 2010.

3.1.2.3 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.

3.1.2.4 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.

3.1.2.5 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 may be in the form of a permissive recommendation.

3.1.2.6 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. Because of the unique nature of the industry, some rules are of a design nature, but efforts are continually underway to replace them with performance language.

3.1.3 The Australian Standard AS 1735 Part 5

3.1.3.1 Why do we have AS 1735 Part 5?

The mission statement of Standards Australia (The body writing the above mentioned standards in Australia) states the general position relative to having appropriate standards namely:

“To excel in meeting the needs of Australia’s technical infrastructure for contemporary, internationally aligned Standards and related services which enhance the nation’s economic efficiency, international competitiveness, and fulfil community desire for a safe and sustainable environment”

In the specific case of escalators and moving walks, the accent is on writing standards that provide for a minimum level of safety for the users of these units and for the mechanics servicing the equipment.

All state government safety relevant acts provide for public and employee safety.

The "Occupational Health and Safety Acts", through their regulations and code of practices, require escalators and moving walks comply with the provisions in AS 1735.5. (In the case of Victoria the requirement is to employ "published technical standards" in the hazard control process and AS 1735 is the example shown in the code of practice tables).

AS 1735 Part 5 are the "reference tools" employed by the various state inspectorates of lifts, escalators and moving walks and they form the basis of the newly emerging self-regulatory legislative frame work.

3.1.3.2 How did we get AS 1735 Part 5?

Standards Australia was founded in 1922. Its original name was the Australian Commonwealth Engineering Standards Association. It became the Standards Association of Australia in 1929 and in 1950, it was granted a Royal Charter. In 1988 its trading name was changed to Standards Australia.

The workings of the original Australian Commonwealth Engineering Standards Association was to produce hand-written minutes of all meetings in minute books.

The first reference to escalator installations can be found in a record dated 18 July 1932.

The first reference to glass is in the 1935 edition of the standard ASCA3 (ASCA 3 is the predecessor to AS 1735).

In a 1944 min book there is a reference to A.S.A. 17.1: 1937.

Standards were and are produced under the umbrella of Standards Australia and its predecessors by an open process of consultation and consensus in which all interested parties are invited to participate.

Specifically the interested parties in AS 1735 Part 5 are the lift companies, governmental institutions, consultants, architects and, through an owners association, the users.

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

The intent and purpose of AS 1735 Part 5 is to prescribe uniform requirements for use within Australia and Australian territories that will provide for the safety of the users and mechanics of escalators and moving walks.

3.1.3.4 Is AS 1735 Part 5 compulsory?

AS 1735 Part 5 on its own has no legal standing however the standards are cited in all state government safety relevant acts.

The "Occupational Health and Safety Acts" in force in all states and territories with the exception of Victoria make AS 1735 Part 5, through their regulations and code of practices, compulsory.

(In the case of Victoria the requirement is to employ "published technical standards" in the hazard control process. AS 1735 is an example shown in the Victoria code of practice tables as one standard that may be employed as a specification for hazard control with the design and manufacture of escalators and moving walks)

3.1.3.5 Is AS 1735 Part 5 technical descriptions, requirements or recommendations?

AS 1735 Part 5 contains all of the above to form a standard for escalators and moving walks.

Technical descriptions show up in the nomenclature as well as in the clauses. The contents of the clauses are, when the standards are called up, compulsory requirements and the notes may be read as recommendations or as one example of satisfying a particular requirement.