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**Comparison of worldwide escalator and  
moving walk safety standards —**

**Part 1:  
Rule by rule comparison**

*Comparaison des normes mondiales de sécurité des escaliers  
mécaniques et trottoirs roulants —*  
*Partie 1: Comparaison paragraphe par paragraphe*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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.

ISO/TR 14799-1 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators and moving walks*.

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*

## 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.

The content of this report is based on the information provided by the WG 5 members acting in personal capacity.

This Technical Report 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 Technical Report is not intended to replace existing safety standards which may 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 Technical Report must be read in conjunction with the various safety standards. Unless approved by the relevant standard writing organisations the information contained in this report does not necessarily represent the opinions of these standards writing organizations (see bibliography for references).

The Technical Report was done with the European Standard EN 115: 1995 and its amendment A1: 1998 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. The resultant 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.

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# Comparison of worldwide escalator and moving walk safety standards —

## Part 1: Rule by rule comparison

### 1 Scope

This Technical Report 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; Safety rules for the construction and installation of escalators and passenger conveyors (Edition January 1995 and amendment A1: 1998);
- b) USA – ASME A 17.1-1996; Safety Code for Elevators and Escalators

NOTE The requirements for Canada (B 44) are generally the same as for the USA. Any differences are stated in the text.

- c) Australia – AS 1735 parts 5 and 6 for escalators and moving walks (Edition 1996);
- d) Japan – Safety requirements mainly comprised of Building Standard Law Enforcement Order (BSLJ-EO), Notifications of Ministry of Construction (MOC-N, No. 1110-1981) and draft of Japan Elevator Association Standard (JEAS);
- e) Russia – PUBEE 10-77-94, Regulations for the installation and safe use of escalators (Edition 1995);
- f) Korea – The Elevator Inspection Standards, KATS 2001-414 Edition according to the Korea Elevator Law 4482, both cover the safety requirements on the escalator and moving walk.

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 Rule by rule comparison

#### General

This comparison is between EN 115 and the rules in A 17.1, AS 1735, PUBEE (Russia), Japanese and Korean Code. There are other standards, see listed in Scope, in the countries concerned that have requirements not shown in the escalator/moving walk standards compared, but address some of the same requirements as EN 115.

The principal dimensions (e.g.  $L_1$ ,  $b_8$ ,  $h_6$  etc.) of EN 115 can be seen in the figures shown in Annex A.

EN 115 clause numbers in brackets serve only as a reference point. They do not exist in the published EN 115.

Where the Australian Standard requirements are given in italics, they only apply to moving walks.

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**EN 115:1995 (Europe)**

**ASME A 17.1-1996 (USA)**

**AS 1735 parts 1, 5 & 6 (Australia)**

**Japanese Codes**

**PUBEE 10-77-94:1995 (Russia)**

**Korean Code**

**0 Introduction**

The purpose of this standard is to define safety rules for escalators and passenger conveyors in order to safeguard people and objects against risks of accidents during operation, maintenance and inspection work.

**GENERAL**

This Code is one of the numerous codes and standards developed and published by The American Society of Mechanical Engineers (ASME) under the general auspices of the American National Standards Institute, Inc. (ANSI).

The Code is intended to serve 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 chairlifts. 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 management of structures where equipment covered in the Scope of the Code is used.

Safety codes and standards are intended to enhance public health and safety. Revisions result from committee consideration of factors such as technological advances, new data, and changing environmental and industry needs. Revisions do not imply that previous editions were inadequate.

It is recommended that, prior to

The objective of this Standard is to provide requirements for electric escalators (moving walks) that carry passengers. The objective of this revision is to accommodate recent changes in engineering practices and advances in technology.

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**1. GENERAL**

1.1 The PUBEE establishes requirements for the design, installation, manufacture, assembly, or modernization or refurbishment, and use of escalators.

**Generic law**

Occupational Safety and Health Act, its sublevel regulations or administrative order (Notification by minister) herein after KOSHA.

**Specific law**

Laws relating to manufacture and management of elevator and it sublevel regulation or administrative order(Notice) herein after KEL 4482.  
Other related laws to elevators and escalators:  
- Building construction law;  
- Housing construction promotion act (1.2);  
- Construction business act;  
- Electric construction act.

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EN 115:1995 (Europe) ASME A 17.1-1996 (USA) AS 1735 parts 1, 5 & 6 (Australia) Japanese Codes PUBEE 10-77-94:1995 (Russia) Korean Code

adoption, all pertinent state and local laws or ordinances be reviewed and where there is a conflict with any of the Rules of this Code an exception to such conflicting Rules be noted, quoting the section of the law which applies.

0.1 It is necessary that all components are properly dimensioned, of sound mechanical and electrical construction and made of material with adequate strength and of suitable quality and free from defects; the use of materials with asbestos is not permitted;

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**BSLJ-EO**  
 (Fundamental Principles of Structural Design)  
**Article 36-2**  
 In planning the structural design of buildings, columns, beams, floors, walls, etc. shall be arranged effectively according to use, scale, and structural features of the building concerned, as well as the conditions of the land concerned, so that the said building as a whole will be of structure safe from dead load, live load, snow load, wind pressure, ground pressure and water pressure as well as earthquakes or other vibration or shock acting upon the said building.

**2.8** The escalator and its components must ensure the specified strength and reliability and be safe and easy to use, inspect, maintain, repair and lubricate.

**2.11** The fastening of detachable joints must preclude self-separation.

**2.12** Force fits must not be used in torque-transfer components of an escalator without additional fastening with keys, bolts etc.

**2.13** Escalator components shall be protected against corrosion according to their climate version as specified by GOST 9.104.

**Annex 4** Materials of important welded components. Welding and quality control of the welding.

2. Principal parts necessary for structural strength shall be arranged in balance so as to resist any horizontal forces acting upon the building concerned.

3 Principal parts of a building necessary for structural strength shall be designed to have rigidity enough to prevent distortion or vibration adversely affecting the use of the said building and toughness enough to prevent sudden destruction.

EN 115:1995 (Europe)

ASME A 17.1-1996 (USA)

ASME A 17.1-1996 (USA)

AS 1735 parts 1, 5 & 6 (Australia)

Japanese Codes

PUBEE 10-77-94:1995 (Russia)

Korean Code

0.1.2 are kept in good repair and working order. In particular, care shall be taken that the dimensions indicated are maintained despite wear; if necessary, the worn parts shall be replaced.

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BSLJ (Maintenance) Article 8-1  
The owner, custodian or occupant of a building shall endeavor to maintain the site, structure and building equipment of the building in a state complying with legal requirements.

BSLJ (Reports, Inspection, etc.) Article 12-2

The owners of elevatory equipment and those of building equipment other than elevatory equipment (including building equipment installed in buildings of the State, a prefecture, or a city, town or village having building officials) of a building as mentioned in Article 6 paragraph 1 item (1) or any other building specified by Cabinet Order as mentioned in the preceding paragraph and designated by the special administrative agency shall, in accordance with Ministry of Construction Order, have a 1st class licensed architect/building engineer, 2nd-class licensed architect/building engineer or a qualified person as designated by the Ministry of Construction, periodically inspect the said building equipment, and report the inspection results to the special administrative agency.

3.1.1(1) Shall be designed in a safety structure to prevent persons or objects from being caught by, or collided with, escalators or moving walks.

0.2 Where for elucidation of the text, an example is given this shall not be considered as the only possible design. Any other solution leading to the same

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result is permissible if it is guaranteed that with an equivalent function the same safety level exists.

0.3 It is not the purpose of this standard to preclude new developments of escalators and passenger conveyors. A new design shall meet at least the safety requirements of this standard.

## THIS STANDARD PREVIEW

### PREFACE (APPLICATION OF EQUIVALENT STATEMENT IN PART 1 OF RULES TO NEW TECHNOLOGY AS 1735)

Where present Rules are not applicable or do not describe the product or system, the enforcing/sist/1da75caf-92ca-497d-a2ca-authority should recognize the need for exercising latitude and granting exceptions where the product or system is equivalent in quality, strength or stability, fire resistance, effectiveness, durability, and safety to that intended by the present Code Rules.

#### 0.4 Certain escalators and passenger conveyors are subject to special operational conditions. For these cases some additional requirements are defined, marked in this standard with the note "For Public Service Escalators and Conveyors". Additional recommendations for that kind of escalators and passenger conveyors are given in annex D (informative).

During the planning stage it should be specified if it will be a public service escalator or public service passenger conveyor (for criteria and definition see 3.9).

The specific requirements of this Code may be modified by the authority having jurisdiction based upon technical documentation or physical performance verification to allow alternative arrangements that will assure safety equivalent to that which would be provided by conformance to the corresponding requirements of this Code.

**Definitions:**

**enforcing authority** - See

2.1 Escalators shall be designed, manufactured, installed, and used in accordance with the requirements of these Regulations and of building codes.

EN 115:1995 (Europe) ASME A 17.1-1996 (USA) AS 1735 parts 1, 5 & 6 (Australia) Japanese Codes PUBEE 10-77-94:1995 (Russia) Korean Code

authority having jurisdiction.

approved. Acceptable to the authority having jurisdiction. **IT STANDARD PREVIEW**  
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**authority having jurisdiction** - The organization, office, or individual responsible for approving equipment. Where compliance with this Code has been mandated by law, the "authority having jurisdiction" is the federal, state, or local department or individual so designated in the enacting legislation or administrative regulation.

**0.5 Special indications**

**0.5.1** Fire protection and building requirements differ from country to country and so far neither have been harmonized, either on the international level or in Europe. Therefore, this standard cannot include specific requirements for fire protection and building requirements. However, it is recommended that as far as possible, escalators and passenger conveyors are made of materials that are not easy to ignite.

**SECTION 800/900 PROTECTION OF FLOOR OPENINGS**  
**800.1/900.1 Protection Required**  
 Floor openings for escalators/moving walks shall be protected against the passage of flame, heat, and/or smoke in accordance with the provisions of the building code.  
**SECTION 801/901 PROTECTION OF TRUSSES/SUPPORTS AND MACHINE SPACES AGAINST FIRE**

**801.1/901.1 Protection Required**  
 The sides and undersides of an escalator/moving walk truss or group of adjacent trusses in a single wellway shall be enclosed in materials defined as either noncombustible or limited-combustible by the building code or ANSI/NFPA 101<sup>1)</sup>. Means provided for adequate ventilation of the driving machine and control spaces when included in the truss

**4.8 SPRINKLER SYSTEMS**  
 Where sprinkler systems are required, the machine room sprinkler head shall comply with AS 2118 and shall have a temperature rating not less than 100°C, but shall not encroach into the machine access space. Automatic, gas type fire extinguisher systems shall not be used.

**BSLJ (Definition of Terms) Article 2.**

In this law, the meaning of the terms in the following items shall be as defined in each item concerned:

(9) Non-combustible materials The materials used as construction materials, with non-combustibility characteristic such as no burning with the fire heat in an ordinal fire and others which are specified by Cabinet Order) which complies with the technical standards defined by Cabinet Order and is registered by the Minister of Land, Infrastructure and Transport.

**BSLJ-EO (Non-combustible Materials)**

**Article 108-2.**

Property and principles for Building materials as specified by Cabinet Order under Article

**2.4** The design of an escalator shall comply with the requirements of fire safety.

EN 115:1995 (Europe)

ASME A 17.1-1996  
(USA)

AS 1735 parts 1, 5 & 6  
(Australia)

Japanese Codes

PUBEE 10-77-94:1995  
(Russia)

Korean Code

enclosure area shall be permitted.

The term "fire resistive materials" has been replaced with a specific specification to eliminate subjective interpretations by the enforcing authorities.

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2 item (9) of the law shall be satisfied following each item for 20 minutes after start of heating (excluding item(1) and (2) in the case of those used for external finish of buildings) against the heat of normal fires.

(1) Materials which neither burn.

(2) Materials which neither develop deformation, melting, cracking or other damaging their fire resisting properties;

(3) Materials which do not generate smoke or gas hampering fire protection.

**0.5.2** If escalators or passenger conveyors have to be operated under special conditions, such as directly exposed to the weather or explosive atmosphere, or in exceptional cases serve as emergency exits, appropriate design criteria, components, materials and instructions for use shall be used that satisfy the particular conditions.

In addition, it is recommended that for escalators and passenger conveyors which otherwise would be exposed to weather conditions, the customer provides a roof and enclosure.

A cover, directly over the horizontal projection of the escalator/moving walk, shall be provided. The cover shall extend outward from the centerline of the handrail so that a line extended from the edge of the cover to the center line of the handrail forms an angle of not less than 15 deg. from the vertical. The sides may be open.

When the escalator/moving walk is indirectly subject to snow or freezing rain, heaters shall be operated to prevent accumulation and freezing on the steps and landing plates.

Drains shall be provided in the

**JEAS XXX (Draft) Standard for Outdoor Escalators**

**2. Description**

**2.1 Classification of the outdoor type and the semi-outdoor type escalator**

The escalator without overhead roof or whose line connecting the roof edge and the escalator forms an angle of less than 30° to the vertical line, is classified as the outdoor type (Refer to Fig. 1) and the escalator with above angle of not less than 30° and not more than 70° is classified as the semi-outdoor type (Refer to Fig. 2).

**2.2 Considerations in construction**

As to the outdoor type and the semi-outdoor type escalators, the following considerations by the building side are required. It is also recommended that a roof be furnished especially in case of rainfall or snowfall

**2.13** Escalator components shall be protected against corrosion according to their climatic version as specified by GOST 9.104.

The foundation in the vicinity of facilities shall not be settled or collapsed.

The concrete foundation shall not have cracks or damage affecting structure. There shall be no soil discharge or collapse in the vicinity of the foundation.

There shall be no uneven settlement or slope, or movement, in the foundation. Anchor bolts and bases shall be free of rust or corrosion.

Anchor bolts shall be firmly tightened, and an appropriate measure shall be taken to prevent bolts from being easily loosened. The structural members, such as the columns or

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lower pit/all pits where water could collect.

**ITC STANDARD PREVIEW**

807.31907.3 Slip Resistance

Landing plates and combplates shall be designed to provide a secure foothold when wet.

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where the treads are slippery and the passengers may lose their balances when getting on and off with the use of umbrellas.

(1) The landings of the escalator should be installed higher than the surrounding floors so that rainwater or snow may not flow into the inside of the escalator and the drainage slope as well as the drainage should be provided. (Refer to Fig. 3)

(2) An equipment for releasing water accumulated inside of the lower pit of the escalator should be furnished. Further, as drained water is mixed with oil, dust or pebbles, a proper filtering device at the external drain is required and measures to prevent any adverse flow are recommended. (Refer to Fig. 4)

(3) In consideration of the use during night time etc., lighting fixtures are necessary to be equipped for the passengers to be able to see where they are stepping well.

(4) At the pull-in end of the power source for the escalator, necessary protection measures are required.

(5) The supervisory panel for supervision, TV camera or the like are preferable to be furnished.

(6) Depending on the installation circumstances, measures by heating devices or the like are recommended to be equipped to prevent

beams, shall be free of rust, corrosion, cracks, damage or deformations.

Auxiliary members and joints shall be free of rust, corrosion, cracks, damage or deformations.

To prevent rainwater from infiltrating into the inside the truss, the truss shall be installed on a level higher than the bottom around the landing area. The area between the bottom and the landing site shall be inclined, and appropriate drainage holes or other drainage facilities shall be installed to drain water accumulated in the truss bottom pit. In addition, appropriate water purifying system shall be installed in case the accumulated water might be seriously contaminated by oils.

Appropriate lighting system shall be installed so that passengers can easily recognize steps during night.

The electric power cable inlet shall be water-proof treated in an appropriate manner.

An appropriate system capable of melting snow or ice during winter shall be installed, and sufficient power supply required.

**3.3.1 (2)** For the escalator installed in outdoors condition the additional test items are applied as in ?