

Comparison of worldwide escalator and moving walk safety standards —

Part 1: Rule by rule comparison

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National foreword

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Summary of pages

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TECHNICAL REPORT

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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.

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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is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.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.

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.	—	1. GENERAL 1.1 The PUBEE establishes requirements for the installation, design, manufacture, assembly, 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.

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	—	—	BSLJ-EO (Fundamental Principles of Structural Design)	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.	—
0.1.1 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;			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. 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.	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 the climate version as specified by GOST 9.104. Annex 4 Materials of important welded components. Welding and quality control of the welding.	

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
0.1.2 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.	—	—	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	—	—	—	—	—

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
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.	PREFACE APPLICATION OF RULES TO NEW TECHNOLOGY Where present Rules are not applicable or do not describe the product or system, the enforcing 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.	<i>Equivalent statement in Part 1 of AS 1735</i>	—	2.1 Escalators shall be designed, manufactured, installed, and used in accordance with the requirements of these Regulations and of building codes.	—
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 Public Service Passenger 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).	1.1 Equipment covered by this Code The provisions of this Code are not intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety to those prescribed by this Code, provided that there is technical documentation to demonstrate the equivalency of the system, method, or device. 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	—	—	—	—

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
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authority having jurisdiction.

approved - Acceptable to the authority having jurisdiction.

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 101¹⁾. 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 (The 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 or is approved 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.

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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
	enclosure area shall be permitted. <i>¹⁾ The term "fire resistive materials" has been replaced with a specific specification to eliminate subjective interpretations by the enforcing authorities.</i>		2 item (9) of the law shall be satisfied following each items 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.	OUTDOOR ESCALATORS 807.1/907.1 Weatherproofing Escalators/moving walks shall be so constructed that exposure to the weather will not interfere with normal operation. 807.2/907.2 Precipitation 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.	4.3.2 (18) The outdoors installation shall comply with the requirements as below. 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. 807.3/907.3 Slip Resistance Landing plates and combplates shall be designed to provide a secure foothold when wet.		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 ?

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
			freezing etc.. 2.3 Considerations on supervision Concerning the outdoor type or the semi-outdoor type escalator, the following considerations on supervision in operation are recommendable. (1) In case of snowfall or freezing in winter, operation of the escalator should be suspended to prevent the passengers from sliding and the equipment from being damaged. (2) When operation of escalator is suspended, necessary measures should be taken not to be used as a stairway. (3) The lifetime of the equipment of the escalator which was installed under outdoor or semi-outdoor is generally shorter than that of indoor and therefore regular maintenance and inspection in accordance with the installation circumstances are indispensable. 2.4 Considerations on equipment Concerning the outdoor type or the semi-outdoor type escalator, the following considerations are required. (1) Adequate rustproof measures for the main structures are required. (2) Necessary protection measures for the electric apparatus are required.		and ? as below. The wiring and conduits installation shall be properly ensured; The earthing and bonding shall be ensured and the earthing resistance shall comply with the value in Table 11.

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
0.5.3 If, exceptionally, means of transportation, e.g. push chairs, luggage trolleys or baggage carts, shall be carried on escalators or passenger conveyors, special measures shall be agreed between the manufacturer of the escalator/passenger conveyor, the manufacturer of the means of transportation and the customer. Within those measures, it has to be taken care that the conditions defined in 8.2.1 for the steps, pallets and the belt are observed when selecting the means of transportation. The measures to be taken are governed by very different conditions which make a standardization within the scope of EN 115 impossible.	SCOPE This Part applies to escalators/moving walks used to transport passengers.²⁾ <i>²⁾ The A17.1 code addresses safety for escalators as described in the Scope. It is not intended to apply to material conveyers. Carrying carts, wheelchairs, or other wheeled carriages is discouraged because of the hazards they represent to passengers and the damage they can cause to the equipment that compromise safety.</i>	3.9 (Amendment no 1) Notice. A notice similar to one of those illustrated in Fig. 3.9 shall be prominently displayed at each end of each escalator where it is visible to passengers entering the escalator. <i>The Australian Standard does not explicitly prohibit the carrying of trolleys, prams etc. on escalators but in the notice specified states "Passengers only".</i> <i>Generally speaking one finds the people managing the equipment (department stores, public utilities etc.) provide large signs discouraging the use of escalators for carrying prams, pushers, trolleys etc.</i>	Commentary: <u>1. The present situation of wheelchair escalator</u> The time is getting ripe for repletion of social welfare and there is a great need in Japan for installation of elevatory equipment for wheelchair users at the public institutions, (stations, city halls, public halls, etc.). With regard to escalator for wheelchair, there are at present approx. 600 sets operating in Japan. Especially, there is a steady increase in a demand of escalator for wheelchair in existing stations because of a merit of installation space and transport capacity. Recently, the need of escalator for wheelchair is shifting to the one which is able to carry an electric wheelchair from the conventional manual type. In the meantime, „A guideline to development of escalator at a railway station (1991)“ was issued by Ministry of Transport, and installation of escalator for wheelchair is promoted. As there is no law or regulation for wheelchair escalator, escalator manufacturers are getting approval from the Building Center of Japan (BCJ), which is an affiliate of MOC, to cope with the situation. This the figure for 1996 <u>2. The present situation for carrying trolley, baby cart, etc. on escalators</u>	—	—

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
			There is no law or regulation regarding use of trolley or baby cart on ordinary escalators. Carrying trolley, baby cart, etc. on escalators is warned against use of them by „Caution label“ for reasons of safety and elevators are recommended in general for the purpose. MOC-N (No.1417-2000) 1. The construction of escalator devised so as persons or articles not to be caught, not to be collide with obstacles prescribed by BSLJ-EO; Article 129-12 item 1 paragraph 1, shall be specified as follows (1), (2) and (3). However (1) and (2) shall not apply to the escalator providing following conditions. - 2 or more steps are kept in the same level of tread surface when the escalator carries the person sitting on wheelchair. - The rated speed in that operation does not exceed 30 m/min. - Stoppers for the wheels are furnished on the tip of that levelled tread surface. (1) The clearance between the steps and the skirt guard panel should not exceed 5 mm. (2) The clearance between the adjacent steps should not exceed 5 mm. (3) When the horizontal distance between the outer side of handrail and any obstacle which intersects and close to that outer side of		

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

handrail, e.g. the building ceiling, building beam etc. or the lower surface of the adjacent escalator is not greater than 50 cm, a wedge guard should be furnished as follows.

(a) The wedge guards should be furnished at lower side of the obstacle.

(b) The thickness of the wedge guard end should be equal to or greater than 6 mm with no sharp edge. The wedge guard should have construction of the length with which the wedge guard reaches at 20 cm or more, vertically lower than upper surface of the handrail.

(c) The wedge guard surface should not differ in rank with the obstacle surface facing the escalator.

EXP.1. The escalator of this notification includes moving walks and escalator for person sitting on wheelchair. Because only the person sitting on wheelchair rides on these special steps, the specification (1) and (2) shall not apply.

EXP.[Notice of designing]

1. Escalator with steps for wheelchair

(1) Only the attendant of the building manager should be allowed to handle the wheelchair and operate the escalator carrying wheelchair.

(2) The effective distance between the interior panels of balustrade should be approx. 1.2 m.

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
			(3) The speed of the escalator should become zero or very slow when the person sitting on wheelchair gets on/off the escalator. (4) Operation panels should be furnished at the upper and lower landings. Emergency stop switch(es) which is effective in wheelchair carrying operation shall be furnished in intermediate section if necessary. (5) It is recommended that an interphone is furnished near the landing for requesting the wheelchair operation to the attendant of the building manager.		
0.6 Requirements related to the life of the escalators and passenger conveyors are not included in this standard as it depends on the place of installation and customers' special specifications.	—	5.13 DESIGN LIFE Where it is necessary to remove any step (<i>pallet</i>) to gain access to the machine or motor within the truss, the bearings, gears, and other moving parts of machinery shall have a design life not less than 50000 h based on an average loading of the escalator (<i>moving walk</i>). NOTE For rolling contact bearings, the bearing manufacturer's recommendations may be used.	—	—	—
0.7 This standard has been drawn up taking into account in certain cases the imprudent act of the user. However, this standard takes into consideration proper use and not abuse.	—	—	—	—	—
0.8 An Interpretation Committee has been established to clarify, if necessary, the spirit in which the clauses of the standard have	Requesting Interpretations. On request, the A17 Committee will render an interpretation of any requirement of the Code.	No equivalent Commentary: <i>Even though no equivalent statement exists in the Australian standard, an</i>	There is no Interpretation Committee.	—	—

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
been drafted and to specify the requirements appropriate to particular cases.	Interpretations can only be rendered in response to a written request sent to the Secretary of the Main Committee. The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his request utilizing the following format: Subject: Cite the applicable Rule number(s) and a concise description. Edition: Cite the applicable edition and supplement of the Code for which the interpretation is being requested. Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings which are necessary to explain the question; however, they should not contain proprietary names or information. Requests which are not in this format will be rewritten in this format by the committee prior to being answered, which may inadvertently change the intent of the original request.	<i>interpretation mechanism is available to industry. The mechanism consists of writing to the Project Manager for committee ME/4 (Lifts, Escalators and Moving Walks) of Standards Australia who in turn will pass on a request to the chairman of the interpretation committee at the same time as circulating the interpretation committee members. The interpretation committee members subsequently provide input to the chairman who formulates a draft response for ratification by the main committee ME/4. All ratified interpretations are published and one can subscribe to an interpretation update service provided by Standards Australia.</i>			

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ASME procedures provide for reconsideration of any interpretation when or if additional information which might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME committee or subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

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1 Scope 1.1 This standard is applicable for all new escalators and passenger conveyors (pallet or belt type).	SCOPE Equipment Covered by This Code This Code of safety standards covers the design, construction, operation, inspection, testing, maintenance, alteration, and repair of the following equipment, its associated parts, and its hoistways, where located in or adjacent to a building or structure (except as modified by paragraph 1.2): a) hoisting and lowering mechanisms, equipped with a car or platform, which move between two or more landings. This equipment includes, but is not limited to the following (see Section 3 definitions): (1) elevators; (2) wheelchair and stairway chairlifts; b) power-driven stairways and walkways for carrying persons between landings. This equipment includes, but is not limited to the following (see Section 3 definitions): (1) escalators; (2) moving walks; c) hoisting and lowering mechanisms equipped with a car which serves two or more landings and is restricted to the carrying of material by its limited size or limited access to the car. This equipment includes, but is not limited to the following (see Section 3 definitions): (1) dumbwaiters;	SCOPE This Standard sets out requirements for electric escalators which carry passengers.	BSLJ-EO (Scope of Application) Article 129-3. The provisions of this Section shall apply to the elevatory equipment installed in buildings and described in each of the following items. (2) Escalator Notwithstanding the provision of the preceding paragraph, the provisions of each said item shall not apply to the elevatory equipment described in following each item. (2) The escalators of special construction and special use form, of which structural method designated by the Minister of Land, Infrastructure and Transport : The provisions of Article 129-12 paragraph 1.	1.2 These regulations cover: a) tunnel escalators - Escalators designed for installation in tunnels (galleries). b) floor escalators - Escalators designed for installation between floors of buildings and structures.	1. Scope of application: This standard is applicable to safety inspection of elevators, escalators and motor-drive dumb waiters that are facilities attached to a building or machine and used in transportation of passenger or freight through a certain hoistway.

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	(2) material lifts and dumbwaiters with automatic transfer devices.				
1.2 Existing escalators and passenger conveyors are not subject to this standard. It is, however, recommended that they be adapted to this standard.	1.3 Application of Parts (of A17.1) This code applies to new installations only, except Parts X, XII, and XIX which apply to both new and existing installations. Definitions: - installation, new - any installation not classified as an existing installation by definition, or an existing elevator, dumbwaiter, escalator, material lift, inclined lift, or moving walk moved to a new location subsequent to the effective date of this Code. - installation, existing - an installation that has been completed or is under construction prior to the effective date of this Code. - installation placed out of service - an installation whose power feed lines have been disconnected from the mainline disconnect switch and; (c) an escalator or moving walks whose entrances have been permanently barricaded.	Each requirement and amendment in the SAA lift code applies after the date on which it was included.	—	15.2 The necessity of proper re-equipment of the existing escalators and the escalators manufactured in accordance with earlier designs in connection with the present Regulations coming into effect and the time of the re-equipment shall be specified by the owner of the escalator upon agreement with a Gosgortekhnadzor body. Should there be any inconsistency with the present regulations of the escalators manufactured before January 1, 1995 and corresponding to the Regulations for Installation and Safe Use of Escalators approved by the Gosgortekhnadzor of the USSR on December 27 1977, the approval of such escalators by respective Gosgortekhnadzor bodies shall not be required.	—
1.3 If some dimensions of this standard cannot be kept due to structural conditions in existing buildings, it has to be defined in the individual case which alternative requirements are necessary. NOTE: in addition see 0.5 and 0.6	SECTION 2 PURPOSE AND EXCEPTIONS The purpose of this Code is to provide for the safety of life and limb, and to promote the public welfare. The provisions of this Code are not intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and	—	—	—	—

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	safety to those prescribed by this Code, provided that there is technical documentation to demonstrate the equivalency of the system, method, or device. 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.				
(1.4)	—	4.3 LIMITATIONS ON USE No part of the escalator (<i>moving walk</i>) truss, machine room, or machine area shall be used to gain access to ceiling spaces or other parts of the building, nor shall they be used for the housing of equipment not associated with the escalators (<i>moving walk</i>). NOTE: Architectural lighting equipment with voltages exceeding 1000 V, for the purposes of Clause 7.11, is not considered part of the escalator (<i>moving walk</i>) installation.	—	—	—

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2 Normative references This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.	SECTION 4 REFERENCE CODES, STANDARDS, AND SPECIFICATIONS This Section covers the codes, standards, and specifications incorporated in this Code by reference; the specific editions which are applicable; and the Rules of this Code which reference each document [see Table 4(a)]. This Section also lists the names and addresses of the organizations from which these documents may be procured [see Table 4(b)]. Only that portion of the code, standard, or specification as specified by the Rule in this Code is applicable.	List of Normative references in AS 1735 Parts 1,5 & 6. (no details here)	JIS The following Standards are cited in JIS A 4302 - 1992.....	Normative references to the documents below, are given in the corresponding places of the text.	—

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
3 Definitions For the purposes of this standard, the following definitions apply: 3.1 Escalator: Power-driven installation with endless moving stairway for the conveyance of passengers in the upward or downward direction (see also 0.5.3).	SECTION 3 DEFINITIONS This section defines various terms used in this code. In addition, a number of other terms are defined for the standardization of nomenclature and terminology ³⁾ <i>3) There are many more definitions in A 17.1 than is shown here. The ones shown here correspond to the definitions in EN 115.</i> escalator - power-driven, inclined, continuous stairway used for raising or lowering passengers - escalator, conventional - an escalator on which the running gear is driven by a single drive shaft at a terminal - escalator, modular - an escalator on which the running gear along the incline is driven by one or more drive units	Part 1 General Requirements of AS 1735 "Lift Escalator & Moving Walk Code". 2.57 Escalator -a power-driven, inclined, continuous stairway used for raising or lowering passengers	BSLJ-EO; Article 129-12 EXP. 1 The escalator means "power driven, continuous stairway or walkway for the transport of passengers.	1. Escalator- Lifting and transportation facility with a continuous stairway belt to carry people from one level to another.	Definition of escalator : a facility that transports up and down by driving steps with power.
3.2 Passenger conveyor: Power-driven installation with endless moving walkway (e.g. pallets, belt) for the conveyance of passengers either on the same or between different traffic levels (see also 0.5.3).	moving walk - a type of passenger-carrying device on which passengers stand or walk, and in which the passenger-carrying surface remains parallel to its direction of motion and is uninterrupted - moving walk, belt pallet type -a moving walk with a series of connected and power-driven pallets to which a continuous belt treadway is fastened - moving walk, belt type - a moving walk with a power-driven continuous belt treadway - moving walk, edge supported	In Part 1 of AS 1735 2.107 Moving Walk -a power-driven device on which passengers may stand or walk and of which the passenger-carrying surface remains parallel to its direction of motion and is uninterrupted. 2.107.1 Edge-supported belt type - a moving walk with the treadway supported near its edges by a succession of rollers. 2.107.2 Roller-bed type -a moving walk with the treadway supported throughout its width by	BSLJ-EO; Article 129-12 EXP. 1 The walkway (called passenger conveyor) means that the angle of inclination is equal to or less than 15 degrees, and the tread surface of pallets or belts which the height difference between pallets is equal to or less than 4 mm is horizontal or inclined.	—	Definition of horizontal moving walk : a facility that transports horizontally by driving pallets or belts with power, having inclination angle of not more than 15 degrees.

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	belt type-a moving walk with the treadway supported near its edges by succession of rollers - moving walk, pallet type - a moving walk with a series of connected and power-driven pallets which together constitute the treadway - moving walk, roller bed type - a moving walk with the treadway supported throughout its width by a succession of rollers - moving walk, slider-bed type - a moving walk with the treadway sliding upon a supporting surface	a succession of rollers. 2.107.3 Sliderbed-type-a moving walk with the treadway sliding upon a low friction supporting surface.			
3.3 Handrail: Moving part intended to serve as a handhold for the passengers.	—	2.157.13 Handrail -a power-driven moving rail for passengers to grip while using the escalator or moving walk.	—	77. Handrail of escalator - Continuous band moving along the handrail system track and designed to support hands of passengers.	—
3.4 Comb: Parts which at both landings mesh with the steps, pallets or the belt in order to facilitate the transition of passengers.	—	2.157.9 Comb -the pronged portion of the combplates at the landing which mesh with the step tread grooves	—	56. Comb of escalator landing - Part of landing designed for safe entry of passengers to the stair-way belt and safe exit therefrom.	—
3.5 Deflector device: An additional device to minimize the risk of trapping between the step and the skirting.	—	—	—	—	—
3.6 Rated speed: Speed in the direction of the moving steps, pallets or the belt, when operating the equipment under no load condition, stated by the manufacturer as that for which the escalator or passenger conveyor had been designed and at which it should operate.	rated speed - the speed at which the elevator, dumbwaiter, escalator, moving walk, material lift, or inclined lift is designed to operate under the following conditions: - elevator, dumbwaiter, or material lift - the speed in the up direction with rated load in the car (also see operating speed in the down direction) - escalator or inclined lift - the rate of travel of the steps or	2.157.17 Rated speed -the design speed for unloaded running conditions.	BSLJ-EO (Construction of Escalators) Article 129-12 1.(5) The rated speed of the steps shall be not more than the speed per minute designated by the Minister of Land, Infrastructure and Transport according to the inclination of the escalators within the limit of not more than 50 m/min.	11. Rated speed of escalator - Speed of stair-way belt during operation without load in steady-state mode.	—

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	carriage, measured along the angle of inclination, with rated load on the steps or carriage. In the case of a reversible escalator, the rated speed shall be the rate of travel of the steps in the up direction, measured along the angle of inclination, with rated load on the steps. - moving walk - the rate of travel of the treadway, horizontally or at an incline, with rated load on the treadway. In the case of reversible inclined moving walks, the rated speed is the rate of travel of the treadway in the up direction, measured along the angle of inclination, with rated load on the treadway.				
3.7 Angle of inclination: Maximum angle to the horizontal in which the steps, the pallets or the belt move.	—	2.157.1 Angle of inclination -the angle at which a passenger travels with respect to the horizontal.	—	8. Angle of inclination of escalator - Angle between the inclined base and the horizontal base of escalator.	—
3.8 Theoretical capacity: Number of persons that can be carried theoretically by the escalator or passenger conveyor in 1 h. For the determination of the theoretical capacity it is assumed that on one step with an average depth of 0,4 m, and per 0,4 m visible length of a pallet or belt, there are carried: 1 person at a nominal width $z_1 = 0,6$ m 1,5 persons at a nominal width $z_1 = 0,8$ m 2 persons at a nominal width $z_1 = 1,0$ m. The theoretical capacity calculation is then:	capacity - see rated load.	There is no definition for 'Theoretical capacity' in AS 1735 Parts 5 & 6.	BSLJ-EO; Article 129-12 EXP.1.(4) Notice of Designing The official transportation capacity is assumed to be a table below according to rated speed. The official transportation capacity is maximum number which is capable of transportation theoretically. In case of escalator ,the transportation number is one person/step for the S600 type, two person/step for the S1000 type. In case of moving walk ,the transportation number is one person for the S600 type, two person for the S1000 type per	10. Carrying capacity of escalator - The number of passengers the escalator can carry in a time unit. Theoretical carrying capacity of escalator- man/hr, maximum p/hr 18,000BV man/hr, maximum p/min 300BV Actual carrying capacity of escalator- man/hr, maximum p/hr 8.800 (2.1V)•VxB man/hr, maximum p/min 190 (2.1-V)• VxB, where B is step width in m.	—

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any time interval of 3 h.					
(3.10)	controller - a device or group of devices which serves to control in a predetermined manner the apparatus to which it is connected.	2.35 Controller -a device or group of devices comprising the principal components of the control equipment.	—	—	—
(3.11)	driving machine - the power unit which applies the energy necessary to raise and lower an elevator, material lift, or dumbwaiter car or to drive an escalator, an inclined lift, or a moving walk.	2.102 Machine, Driving -the power unit which applies the energy necessary to raise and lower a car or to drive an escalator or moving walk.	—	—	—
(3.12)	flat steps - the distance, expressed in step length, that the leading edge of the escalator step travels after emerging from the comb before moving vertically	—	—	—	—
(3.13)	landing - the stationary area at the entrance to or exit from an escalator/moving walk	—	—	—	—
(3.14)	pallet, moving walk - one of a series of rigid platforms which together form an articulated treadway or the support for a continuous treadway	2.157.16 Pallet -one of a series of rigid platforms which together form an articulated treadway, or one of a series of rigid platforms supporting a continuous treadway.	—	—	—
(3.15)	slope, moving walk - the angle which the treadway makes with the horizontal	2.157.19 Slope -the angle which the treadway makes with the horizontal.	—	—	—
(3.16)	travel (rise) - the vertical distance between the bottom terminal landing and the top terminal landing of an elevator, dumbwaiter, escalator, material lift, or inclined lift.	—	—	—	—
(3.17)	treadway, moving walk - the passenger-carrying member of a moving walk.	2.157.20 Treadway -the passenger carrying member of a moving walk; (a) Belt type-a moving walk with a continuous belt treadway. (b) Belt-pallet type-a moving walk	—	—	—

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		with a series of connected pallets to which a continuous belt treadway is fastened. (c) Pallet type-a moving walk with a series of connected pallets which together constitute the treadway.			
(3.18)	width, moving walk - the exposed width of the treadway. 802.2/902.2 Geometry (a) the width of the escalator/moving walk shall be the width of step tread/exposed tread, to the next whole inch(see 802.5b/902.7)	2.157.22 Width -the width between balustrades measured at a point 700 mm above the noseline of the steps of an escalator or the treadway of a moving walk.	—	—	—
(3.19)	rated load - elevator, dumbwaiter, escalator, or inclined lift - the load which the equipment is designed and installed to lift at the rated speed; - moving walk - the load which the moving walk is designed and installed to move, horizontally or at an incline, at the rated speed	2.119 Rated Load -the load which the lift, escalator, or moving walk is designed and installed to lift or move at rated speed.	—	—	—
(3.20)	—	Further definitions which appear in AS 1735 (not in EN 115 as definitions): 2.2 Alteration -any change in the design of or addition to the equipment, other than ordinary maintenance, repairs or replacement. 2.32 Contactor -an electromagnetically operated switch for making or breaking a main electrical circuit, e.g. a lift motor circuit (see Clause 2.122). 2.33 Control -the system governing the starting, stopping, direction of motion, acceleration, speed, and retardation of the	—	—	—

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moving member.

2.50 Enclosure drip-proof-an enclosure with openings protected so that liquid or solid particles falling on it cannot enter in an amount sufficient to interfere with satisfactory operation of the enclosed equipment, and which complies with the relevant requirements of AS 1939.

2.60 Fire-resistance Rating- the measured time in hours or fractions thereof that the material or construction will withstand fire exposure as determined by fire resistance tests conducted in accordance with AS 1530.

2.61 Fire resistance construction- a method of construction which prevents or retards the passage of hot gases or flame as defined by the fire resistance rating.

2.70 Installation-a complete lift, escalator, or moving walk including its lift well, lift well enclosure and related construction, and all machinery and equipment necessary for its operation.

2.103 Machine Room-the enclosed space or, if self-contained, the room used to house the driving machine (of a lift, escalator, or moving walk) and any associated equipment which is required to be similarly located. It may be necessary for a machine room to have two or more levels.

2.105 May-the word "may" implies the right to use

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		discretionary power.			
		2.112 Passenger -a person, other than an attendant, who is carried by a passenger lift, escalator, or moving walk.			
		2.122 Relay -an electromagnetically operated switch for making or breaking a control or auxiliary circuit (see Clause 2.32)			
		2.132 Shall and Should -the word "shall" is to be understood as mandatory' and the word "should" as advisory. (Commentary; Some states in Australia take the word should as if it means shall.)			
		2.149 Travel (Rise) -the vertical distance between the bottom landing and the top landing of a lift, escalator, or moving walk.			
		2.157 DEFINITIONS RELATING TO ESCALATORS AND MOVING WALKS			
		2.157.2 Balustrading -the enclosure at either side of the moving steps of an escalator or moving treadway of a moving walk and the decking or deck board adjacent to the moving handrails.			
		2.157.3 Broken drive belt device -a device to stop the machine in the event of a broken driving belt between the motor and the gearbox.			
		2.157.4 Broken drive chain device -a device to stop the machine in the event of a broken drive chain.			
		2.157.5 Broken pallet chain device -a device to stop the machine in the event of a broken			

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		pallet chain.			
		2.157.6 Broken step chain device -a device to stop the machine in the event of a broken step chain.			
		2.157.7 Broken treadway belt device -a device to stop the machine in the event of a broken treadway belt.			
		2.157.8 Ceiling intersection guard -a guard provided at the intersection angle of the decking and the ceiling grooves.			
		2.157.10 Combplates -the supporting plate at the landings for the combs.			
		2.157.12 Governor -a device which automatically actuates safety devices which cause an escalator or a moving walk to stop, by the operation of an electric contact or contacts in the event of the speed exceeding a predetermined limit.			
		2.157.14 Handrail guard -a guard for the moving handrail at the point where the handrail enters or leaves the balustrading.			
		2.157.21 Truss -the supporting structure on which the various components are mounted.			
4 Symbols for quantities The units used are chosen from the International System of units (SI).	—	—	—	—	—

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5 Enclosure, surrounds, supporting structure and lighting 5.1 Enclosure of the escalator and passenger conveyor 5.1.1 General 5.1.1.1 All mechanically moved parts of the escalator or passenger conveyor shall be completely enclosed within imperforate panels or walls. Exempt from this are the accessible steps, the accessible pallets, the accessible belt and that part of the handrail available for the user. Apertures for ventilation are permitted.	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 ¹⁾ . Means provided for adequate ventilation of the driving machine and control spaces when included in the truss enclosure area shall be permitted. <i>¹⁾ The term "fire resistive materials" has been replaced with a specific specification to eliminate subjective interpretations by the enforcing authorities.</i> 802.3a/902.3a Construction (2) The balustrade shall be totally closed, except: (a) where the handrail enters the newel base (see Rule 802.4c/902.4c); (b) gaps between interior panels shall not be wider than 3/16 in. (4.8 mm). The edges shall be rounded or beveled.	3.2 Trusses 3.2.2 Protection 3.2.2.1 Fire protection Where the truss is not positioned in a fire resistant tunnel or duct accessible only to authorized persons, it shall be totally clad with and fixed to a suitable non shattering material not deemed combustible when tested in accordance with AS 1530.1, to resist the spread of fire from within the truss. For the purpose of this requirement, the lower pit section shall be regarded as part of the truss, and parallel abutting trusses can be considered as one truss. 3.2.2.2 Mechanical protection A non-perforated barrier preventing contact with moving components shall be provided between abutting parallel trusses. SECTION 4 MACHINE ROOMS, MACHINE AREAS AND PITS 4.1 GENERAL Every escalator shall be provided with a machine room or machine area of adequate size to permit the safe and efficient maintenance of the machinery and the equipment contained therein. A height not less than 2000 mm shall be provided at the controller and at the machine. This height may be obtained at the controller by opening of the access hatchway, covers and at the	BSLJ - EO; Article 129 - 12 1.(1) As specified by the Minister of Land, Infrastructure and Transport, escalators shall be devised so as persons or articles not to be caught, and so as not to be collide with obstacles under the normal using condition.	5.6.1 The carrying run of the stairway belt and of the handrail shall be separated from the mechanisms and steelwork of the escalator with a balustrade: a strong, rigid, smooth, and inflammable lining. 2.15 Easily accessible moving parts of the escalator (sprockets, gears, traction and driving chains, shafts with protruding bolts and keys, etc.) shall be covered with guards that ensure safety of personnel but provide easy access for inspection, lubrication, and maintenance. The guards may be detachable if necessary.	—

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machine by means of removable panels, or steps in the case of machines located within the stepband. Machine rooms or machine areas shall be of such dimensions as will provide a clear level standing area not less than 380 mm by 600 mm, convenient to the machine and clear of any obstructions, for normal maintenance work.

4.2 ACCESS AND GUARDING

Safe, permanent, and convenient means of access and guarding shall be provided to the machine area and the top and the bottom truss extensions. Where access to the machine room, machine area, or any equipment installed therein is by means of trapdoors or hatch covers in the floor adjacent to the escalator, such openings shall be provided with suitable guardrails of adequate strength, which may be readily and conveniently erected, but which are not removable, and the trapdoor or hatch cover shall restrict access until such guarding is positioned. Any hinged section of the guardrail arranged to permit access shall open outwards and be spring-loaded to the closing position.

Trapdoors and hatch covers shall be capable of being opened by a force not greater than 250 N.

4.4 ENCLOSURE

Machine rooms or machine areas shall be totally enclosed with non-perforated non-shattering materials of not less than the strength of sheet steel of 1.2 mm thickness, except that perforated

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		material may be used for ventilation requirements. Such enclosure and the enclosure supports shall be of material not deemed combustible when tested in accordance with AS 1530.1, to reduce the spread of fire from within the machine room or machine area. The walls shall be supported and braced so as to deflect not more than 25 mm when sustaining a horizontal force of 440 N distributed over any square of 50 mm side.			
5.1.1.2 It is permissible to omit an enclosure of the mechanically moved parts if other measures (such as rooms with locked doors accessible to authorized personnel only) make a hazard to the public impossible.	—	—	—	—	—
5.1.1.3 Accumulation of materials (e.g. grease, oil, dust, paper) represents a fire risk. Therefore it should be possible to clean the underside enclosure, if any, of dirt. If such cleaning is not possible, other precautions (e.g. sprinkler-system or other fire abatement system) shall be taken to avoid the related fire hazard arising.	1206.6 Maintenance of Escalator and Moving Walks 1206.6a Cleaning. The interiors of escalators, moving walks, and their components shall be periodically cleaned to prevent an accumulation of oil, grease, lint, dirt, and refuse. The frequency of the cleaning will depend on service and conditions, but an inspection to determine if cleaning is necessary shall be required at least once a year.	—	—	2.17 The design of the escalator shall include special devices, such as housings and trays, to protect the mechanisms and electric equipment in close proximity with moving and folding steps against dust and dirt.	—
5.1.2 The enclosure shall have adequate mechanical strength and rigidity.	(defined in building codes)	3.2 Trusses 3.2.2 Protection 3.2.2.1 Fire protection Where the truss is not positioned in a fire resistant tunnel or duct accessible only to authorized persons, it shall be totally clad with and fixed to a suitable non	—	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	—

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		shattering material not deemed combustible when tested in accordance with AS 1530.1, to resist the spread of fire from within the truss. For the purpose of this requirement, the lower pit section shall be regarded as part of the truss, and parallel abutting trusses can be considered as one truss. 3.2.2.2 Mechanical protection A non-perforated barrier preventing contact with moving components shall be provided between abutting parallel trusses. 4.4 ENCLOSURE Machine rooms or machine areas shall be totally enclosed with non-perforated non-shattering materials of not less than the strength of sheet steel of 1.2 mm thickness, except that perforated material may be used for ventilation requirements. Such enclosure and the enclosure supports shall be of material not deemed combustible when tested in accordance with AS 1530.1, to reduce the spread of fire from within the machine room or machine area. The walls shall be supported and braced so as to deflect not more than 25 mm when sustaining a horizontal force of 440 N distributed over any square of 50 mm side.		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.	
5.1.3 Inspection doors and trap doors 5.1.3.1 Inspection doors and trap doors shall be provided only where necessary for the	806.3/906.3 Access to Interior Reasonable access to the interior of the escalator shall be provided for inspection and maintenance.	—	—	3.10 Deflection of floor slab (plate) Elastic deformation of floor slabs including dead load and construction cover of	—

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inspection and maintenance of the equipment.				the slabs shall not exceed 1/600 of the span under the load q_{e2} . $q_{e2} = 4000 \text{ N/mm}^2$. 6.3 The design of the floor escalator shall provide access to escalator components and opportunity for maintenance, assembly and dismantling through openings in the stairway belt, the balustrade and floor slabs.	
5.1.3.2 It shall be possible to open inspection doors and trap doors by means only of a key or a tool specially suited for that purpose, which shall be in the hands of authorized persons only. If rooms behind inspection or trap doors can be entered, it shall be possible to open the inspection or trap doors from the inside without a key even when locked.	Access plates requiring no more than 70 lbf (311 N) effort to open shall be provided at the top and bottom landing/ both landings for inspection and maintenance. The plates shall be made of a material which will afford a secure foothold. The use of stone, terrazzo, or concrete as a fill material is prohibited in panels within the confines of the escalator truss. Access plates at the top and bottom landings shall be securely fastened. If access doors are provided in the side of the escalator enclosure, they shall be locked	—	—	6.7 The machine room shall have at least two entrances provided with lockable doors. 6.8 The tension device chamber shall have a trap door or a door with a ladder for a convenient and safe exit to the bottom landing of the escalator. The tension device chamber and its entrance shall be isolated from other rooms not related to the handling and maintenance of the escalator equipment.	—
5.1.3.3 Inspection doors or trap doors which open on to adjacent escalator or passenger conveyor treadways shall be provided with safety contacts according to 14.1.2 which prevent adjacent escalators or passenger conveyors from being operated when these doors are opened.	and the key kept in a location accessible to authorized persons, but not to the general public. The key shall be removable only when in the locked position.	—	—	—	—
5.1.3.4 Inspection doors and trap doors shall be imperforate and conform to the same conditions as required for the enclosure		—	—	—	—

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material (see 5.1.2).					
5.1.4 Apertures for ventilation It shall not be possible to touch any moving part through a ventilation aperture (see 5.4 of EN 294: 1992).	—	Comment: 4.7 VENTILATION <i>Every escalator shall be effectively ventilated to dissipate the heat generated by the machinery. Any perforated ventilation panels shall be of metal, the perforations shall not pass a 13 mm diameter ball, and the panels shall be positioned so as not to allow discharge directly onto any combustible material.</i>	—	—	—
5.1.5 Balustrades (see figure 2) 5.1.5.1 Balustrades shall be installed on each side of the escalator or passenger conveyor. The balustrade consists of components for which the following terms are usual	802.3/902.3 Balustrades Balustrades shall be installed on each side of the escalator/moving walk (see Appendix D, Fig. D3/D2.).	2.2 WIDTH The width of an escalator (<i>moving walk</i>) shall be taken as the width between the balustrades, measured at a point 685 mm vertically above the nose line of the steps (<i>treadway</i>) , and shall be not less than the width of the step (<i>treadway</i>)(see Figure 2.2). It shall not exceed the width of the step (<i>treadway</i>) by more than 330 mm, subject to a maximum of 165 mm on each side of the escalator (<i>moving walk</i> . However, the width between balustrades shall be not less than 600 mm nor more than 1380 mm (see Clause 3.6.2(1)). 3.3 BALUSTRADES 3.3.1 Construction 3.3.1.1 General Solid panel balustrading shall be provided at each side of the steps. On the passenger side, the balustrading shall be smooth and substantially flush. Mouldings or other projections shall not be raised more than 6 mm nor be depressed more than 6 mm from the panel surface. Any projecting mouldings or fillets shall be bevelled.	BSLJ - EO; Article 129 - 12 1.(3) Escalators shall be provided with handrails at each side of steps (the portion going up and down, on which the persons step). The upper surface of the handrails shall move in the same direction and at the same speed as the steps.	5.6.1 The carrying run of the stairway belt and of the handrail shall be separated from the mechanisms and steelwork of the escalator with a balustrade: a strong, rigid, smooth, and inflammable lining. 2.15 Easily accessible moving parts of the escalator (sprockets, gears, traction and driving chains, shafts with protruding bolts and keys, etc.) shall be covered with guards that ensure safety of personnel but provide easy access for inspection, lubrication, and maintenance. The guards may be detachable if necessary.	—

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5.1.5.1.1 Skirting - A Portion of the enclosure adjacent to the outer edges of the steps, pallets or belt (see figure 2 and 5.1.5.6).	—	2.157.18 Skirting -a vertical portion of the balustrade adjacent to the outer edge of the escalator steps or moving walk treadway.	—	74. Balustrade apron - Lower vertical part of balustrade along the stairway belt on the level of steps and designed for adjusting the clearance between the step and balustrade.	—
5.1.5.1.2 Interior profile - B This profile connects the skirting with the balustrade interior panelling.	—	—	—	73. Balustrade plinth - Balustrade element over apron to which balustrade panels are attached.	—
5.1.5.1.3 Balustrade interior panelling - C Interior panels between the skirting or the interior profile and the balustrade decking underneath the handrail.	—	—	—	—	—
5.1.5.1.4 Balustrade decking - E This decking is situated underneath the handrail and forms the top cover of the balustrade panelling.	—	2.157.11 Decking or deck board -the portion of the balustrade outside the moving handrails which is transversely horizontal (or approximately so).	—	72. Balustrade decking - Balustrade element to which handrail guides and balustrade panels are attached.	—
5.1.5.1.5 Balustrade exterior panelling - D Exterior panelling which from the balustrade deckings encloses the escalator or passenger conveyor.	—	—	—	—	—
5.1.5.1.6 Newel End of the balustrade on the landings, where the handrails change their direction of movement.	—	2.157.15 Newel -the portion of the balustrading on the landings at the ends where the moving handrail changes its direction.	—	78. Newel - Device located where the handrail passes over from the carrying run to the non-carrying run.	—
5.1.5.2 The balustrades shall have no parts on which a person would normally stand. Appropriate measures shall be taken to discourage people from climbing on the outsides of the	802.3h Anti-Slide Device. On high deck balustrades, anti-slide devices shall be provided on decks or combination of decks when the outer edge of the deck is greater than 12 in. (305 mm) from the center line of the	3.3.8 Side guarding The balustrades shall have no parts on which a person would normally stand. Appropriate measures shall be taken to discourage people from climbing on the outsides of the balustrade	JEAS -406H (Draft) Standard for surroundings and supervision of escalators 2. Description 2.1 Related matters with floor openings etc. surrounding	—	—

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
balustrade if there is a danger of people falling from them. Normally, climbing on the outside of the balustrade is possible only at the lower landings because at the upper landings, railings or parapets prevent access to the balustrade. Climbing on the balustrade within the area of the lower landings is prevented, for instance, by the smooth outer balustrade decking, by railings arranged parallel to the balustrade, or by additional parts arranged at right angle to the balustrade.	handrail or on adjacent escalators when the distance between the center line of the handrail is greater than 16 in. (406 mm). These devices shall consist of raised objects fastened to the decks, no closer than 4 in. (102 mm) to the handrail and spaced no greater than 6 ft. (1.83 m) apart. The height shall be no less than 3/4 in. (19 mm). There shall be no sharp corners or edges. 802.3i Deck Barricades. A barricade to restrict access to the outer deck on low deck exterior balustrades shall be provided at the top and bottom ends of each escalator where the outer deck width exceeds 5 in. (127 mm). On parallel abutting unit, this protection shall be provided where the combined outer deck width exceeds 5 in. (127 mm). The barricade shall extend to a height which is nominally 4 in. (102 mm) below the top of the handrail. When an escalator is not located at the edge of a floor surface, the barricade shall be installed on the outer deck at a point 40 in. (1.02 m) above the floor where the bottom of the barricade intersects the outer deck. Barricades may be made of glass or plastic provided that they meet the requirements of Rule 802.3c. 902.3h Deck Barricades (1) A barricade to prevent access to the outer deck on low deck exterior balustrades shall be provided on each moving walk when the exterior deck is greater	if there is a danger of falling. NOTE: Normally, climbing on the outside of the balustrade is possible only at the lower landings because at the upper landings, rails or parapets prevent access. Climbing on the balustrade within the area of the lower landings is prevented, for instance, by the smooth outer balustrade decking, by railings arranged parallel to the balustrade or by additional parts arranged at right angle to the balustrade.	escalators (To be done by building side) 2.1.6 If there is any possibility that children can easily approach the side of the escalator and go upstairs on the deck board for fun, a partition plate etc. shall be furnished halfway on the deck board to prevent them for safety measures. Furthermore, it is recommended that partition plates to prevent climbing up be furnished at two locations on one side. (Refer to Fig. 3.)		

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	than 36 in. (915 mm) above the floor in any part of its travel and the exterior deck width exceeds 5 in. (127 mm), and is sloped at 45 deg. or less from the treadway. The barricade shall extend to a height which is nominally 4 in. (102 mm) below the top of the handrail. (2) The barricades shall be located wherever the exterior deck exceeds the 36 in. (915 mm) height above the floor. (3) Barricades may be of glass or plastic, provided that they meet the requirements of Rule 902.3c. All exposed barricade attachment fastener heads shall be of the tamper-resistant type.				
5.1.5.3 With a vertical force of 900 N distributed over the surface of the handrail for a length of 0,5 m there shall be no permanent deformation, no breakage or displacement of any balustrade parts.	802.3b/902.3b Strength. Balustrades shall be designed to resist the simultaneous application of a static lateral force of 40 lbf/ft (584 N/m) and a vertical load of 50 lbf/ft (730 N/m), both applied to the top of the handrail stand.	3.3 BALUSTRADES 3.3.1 Construction 3.3.1.1 General Solid panel balustrading shall be provided at each side of the steps. On the passenger side, the balustrading shall be smooth and substantially flush. Mouldings or other projections shall not be raised more than 6 mm nor be depressed more than 6 mm from the panel surface. Any projecting mouldings or fillets shall be bevelled.	—	—	—
5.1.5.4 The parts of the balustrade facing the steps, pallets or belt shall be smooth. Covers or strips not in the direction of travel shall not project more than 3 mm. They shall be sufficiently rigid and have rounded or bevelled edges. Covers or strips of such nature are not permitted at the skirting. Cover joints in the direction of travel (in particular between the skirting and the balustrade interior panelling) shall be arranged and formed in such a manner that the risk of trapping is	802.3a/902.3a Construction (1) The balustrade on the step/tread side shall have no areas or moldings depressed or raised more than 1/4 in. (6.4 mm) from the parent surface. Such areas or moldings shall have all boundary edges bevelled or rounded. (2) The balustrade shall be totally closed, except: (a) where the handrail enters the newel base (see Rule 802.4c/902.4c); (b) gaps between interior panels	Amendment no1 1997 With a vertical force of 900 N distributed over the surface of the handrail for a length of 0.5 m there shall be no permanent deformation, no breakage or displacement of any balustrade parts. The balustrade interior panelling shall have adequate mechanical strength and rigidity. When a force of 500 N is applied to the	BSLJ-EO; Article 129-12 1. (1) As specified by the Minister of Land, Infrastructure and Transport, escalators shall be devised so as persons or articles not to be caught, and so as not to be collide with obstacles under the normal using condition. MOC-N (No.1417-2000) EXP.1. The escalator of this notification includes moving walks and escalator for person sitting on wheelchair Further the interior panel should be smooth and durable	5.6.4 The differences between planes of balustrade elements, such as panels, strips, and moldings, must not be greater than 3 mm from the side of the stairway belt. 5.6.6 The surfaces of the aprons facing the steps shall prevent the shoes of passengers from being drawn in. No strips or moldings shall be installed on the aprons facing the stairway belt. The permissible gaps in the	—

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reduced to a minimum. Gaps between the interior panels of the balustrade shall be not wider than 4 mm. The edges shall be rounded off or bevelled. The balustrade interior panelling shall have adequate mechanical strength and rigidity. When a force of 500 N is applied to the balustrade interior panelling at any point of the panelling at right angles on an area of 25 cm², there shall be no gap greater than 4 mm and no permanent deformation (settling tolerances are permitted). The use of glass for the balustrade interior panelling is permitted provided it is splinter-free one-layer safety glass (tempered glass) and has sufficient mechanical strength and rigidity. The thickness of the glass shall be not less than 6 mm. 5.1.5.5 Protrusions and indentations shall not present sharp edges.	shall not be wider than 3/16 in. (4.8 mm). The edges shall be rounded or bevelled. (3) The width between the balustrade interior panels in the direction of travel shall not be changed. 802.3c/902.3c Use of Glass or Plastic. Glass or plastic, if used in balustrades, shall conform to the requirements of ANSI Z97.1 or 16 CFR Part 1201, except that there shall be no requirement for the panels to be transparent. Plastic bonded to basic supporting panels is not required to conform to the requirements of ANSI Z97.1.	balustrade interior panelling at any point of the panelling at right angles on an area of 25 cm², there shall be no gap greater than 4 mm and no permanent deformation (settling tolerances are permitted). 3.3.1.2 Angle and width of transition piece The angle between the horizontal and any transverse section of any transition piece, between the balustrade adjacent to the steps and the upper part of the balustrading, shall be not less than 25 degrees (see Figure 2.2). NOTE: In designs prior to 1969, this angle was permitted to be not less than 20 degrees. Where this angle is not more than 45 degrees, the horizontal width of the transition piece shall be not more than 120 mm. Where this angle is more than 45 degrees, the horizontal width of the transition piece shall be not more than 165 mm. Any horizontal part of the transition adjacent to the balustrade internally, shall not be more than 30 mm wide. 3.3.2 Change in width between balustrades The width between the balustrades in the direction of travel shall not be changed abruptly, and by not more than 8% of the greatest width. Where changes of width are provided, the angle of change in the balustrading to the line of travel shall be not more than 15 degrees. 3.3.3 Use of glazing in	construction without rugged portion as much as possible and it should be installed so as not to catch hands or fingers of the passengers.	joints of panels and aprons of the balustrade shall not exceed 4 mm. 5.6.5 Apron joints should not have differences in height more than 0.5 mm and their displacement relative to each other should be impossible (except the area of the temperature joint).	

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		balustrades (Amendment no 1 1997) Glazing panel materials, when used in escalator balustrades, shall be in accordance with table 3.3.3.(see table 3.3.3 at end of document) and comply with the following: (a) AS 2208 Safety glazing materials for use in buildings (Human impact considerations); (b) AS 1701 SAA Loading Code part 1 with regard to "Live Loads"(Section 4); (c) The exposed surface of the glazing panels shall not be lower than the step nosing or step tread surface; (d) Exposed edges of glazing panels shall be substantially flush and either rounded, smooth or bevelled and the gap between panels shall be no greater than 4 mm; otherwise, plastics, joining strips, mouldings, or their equivalent, complying with Clause 3.3.1.1 shall be provided 3.2.3 Lighting of trusses and pits. Where exterior access is provided to trusses and pits, suitable lighting controlled by a switch adjacent to the entrance shall be provided. 3.2.4 Lighting at inspection panels. Where an inspection panel is provided for machinery spaces which contain unguarded moving parts, suitable lighting controlled by a switch adjacent to the opening shall be provided. AS 1170.1 "Loading Code" (b) All other handrails, balustrades, and the like,			

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		including parapets and railings to all roofs, shall be designed to resist a static load of 0,75 kN/m acting inward, outward or downward, or the appropriate wind load, whichever produces the most adverse effects. NOTE: On railings or balustrades which may be called upon to restrain crowds or people under panic conditions, a load up to 3 kN/m run may be encountered.			
5.1.5.6 The skirting shall be vertical. The vertical distance h_2 between top edge of skirting or bottom edge of projecting cover joints or the rigid part of deflector devices (for definition see 3.5) where installed and the tread surface of the steps, pallets or belt shall be not less than 25 mm (see figure 2).	802.3f/902.3f Skirt Panels (1)/(2) The height of the skirt above the tread nose line/top of the tread shall be at least 1 in. (25 mm) measured vertically.	—	—	74. Balustrade apron - Lower vertical part of balustrade along the stairway belt on the level of steps and designed for adjusting the clearance between the step and balustrade.	3.3.1(6) The skirt guard shall satisfy the following standards. The skirt guard shall be vertical. The vertical height between the tread and the top of the skirt guard (To the bottom of the cover in case there is a cover, or to the bottom of the auxiliary device if an auxiliary safety device is installed.) shall be 25mm or higher. The skirt guard shall be positively fixed and level.
5.1.5.6.1 The skirting shall be extremely rigid, plane, and butt-jointed. However, special arrangements instead of butt-jointing will possibly be necessary for long passenger conveyors at the points where they pass over building expansion joints.	802.3f/902.3f Skirt Panels (2)/(3) Skirt panel shall not deflect more than 1/16 in. (1.6 mm) under a force of 150 lbf (667 N). ⁴⁾ ⁴⁾ A17.1 is equivalent to EN 115. A deflection of 4mm would require 1667 N.	—	—	5.6.5 Apron joints should not have differences in height more than 0.5 mm and their displacement relative to each other should be impossible (except the area of the temperature joint).	The deflection of the skirt guard shall not exceed 4mm in any part when a force of 1500N(153kgf) is applied at right angle to an area of 25?, and shall not carry permanent strain after the test. However, if this test cannot be conducted at the acceptance inspection at site due to the characteristics of the elevator design structure, such requirements may be verified by checking design documents or test reports
5.1.5.6.2 The skirting defined in 5.1.5.6 shall yield not more than 4 mm under a single force of 1500 N acting at the most unfavourable point at right angles to the	—	3.3.7.1 Stiffness The skirting shall be capable of sustaining a force of 1500 N at right angles to the surface, distributed over an area of 2500 mm ² at any position	—	3.12 Elastic deflection of the balustrade apron under a load of 1500 N imposed at right angle to the surface over an area of 0.0025 m ²	

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surface over an area of 25 cm ² . No permanent deformation shall result from this.		without deflecting more than 4 mm or permanently deforming.		between supports shall not exceed 4 mm. There shall be no residual deformation.	issued by authorized testing institutions. The skirt guard shall be made of materials featuring low friction coefficient or the surface treated materials.
5.1.5.6.3 On escalators, the possibility of trapping between skirting and steps shall be reduced. For this purpose, the following three conditions shall be fulfilled: - sufficient rigidity of the skirting according to 5.1.5.6.2; - clearances to be in accordance with 11.2.1; - reduction of coefficient of friction by the use of suitable materials or suitable type of lining for the skirting.	802.3f Skirt Panels (3) The exposed surfaces of the skirt panels adjacent to the steps shall be smooth and made from a low friction material or treated with a friction reducing material.⁵⁾ 902.3f Skirt Panels (4) The exposed surfaces of the skirt panels adjacent to the steps shall be smooth. ⁵⁾ See Rule 802.3e for clearances. A17.1 does not prohibit yellow side markings but inquiry 94-73 held deflector devices as violating Rules 802.3a(1) and 802.3f(3).	3.3.7 Skirting 3.3.7.1 Stiffness The skirting shall be capable of sustaining a force of 1500 N at right angles to the surface, distributed over an area of 2500 mm² at any position without deflecting more than 4 mm or permanently deforming. 3.3.7.2 Friction In order to reduce the danger of objects being pulled into any gap between the steps and the skirting panels, the frictional properties of the exposed surfaces of the skirting panels shall be kept to a minimum by appropriate design.	MOC-N (No.1417-2000); 1. The construction of escalator devised so as persons or articles not to be caught, not to be collide with obstacles prescribed by BSLJ-EO; Article 129-12 item 1 paragraph 1, shall be specified as follows (1), (2) and (3). However (1) and (2) shall not apply to the escalator providing following conditions. - 2 or more steps are kept in the same level of tread surface when the escalator carries the person sitting on wheelchair. - The rated speed in that operation does not exceed 30 m/min. - Stoppers for the wheels are furnished on the tip of that leveled tread surface. (1) The clearance between the steps and the skirt guard panel should not exceed 5 mm. EXP.1.(1) The horizontal clearance between the steps and the skirt guard panel (at one side) should not exceed 5 mm in the condition that no force is acting on the skirt guard panel when the escalator stands still. For the moving walks in which the skirt guard panel is placed above the steps, the vertical clearance between the tread surface and	3.12 Elastic deflection of the balustrade apron under a load of 1500 N imposed at right angle to the surface over an area of 0.0025 m² between supports shall not exceed 4 mm. 5.6.6 The surfaces of the aprons facing the steps shall prevent the shoes of passengers from being drawn in. No strips or moldings shall be installed on the aprons facing the stairway belt. The permissible gaps in the joints of panels and aprons of the balustrade shall not exceed 4 mm.	—