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Safety requirements for lifts (elevators) —

Part 24: Convergence of lift requirements

Exigences de sécurité pour ascenseurs —

Partie 24: Convergence des exigences pour ascenseurs

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

A list of all parts in the ISO 22559 series can be found on the ISO website.

Introduction

This document has been developed as a step towards the convergence of key requirements in the major world-wide lift codes and also the updating of ISO/TR 11071 (all parts).

ISO/TR 11071 (all parts) represents a comprehensive comparison of the major lift prescriptive safety standards in use at the time of publication. Since that time, there has been considerable harmonization and rationalization of various standards with the result that there are currently three major sets of prescriptive safety requirements in extensive use. These are the CEN EN 81 series of standards, the ASME A17 series/CSA B44 of standards, and the JIS TS A 0028-1 and the Building Standard Law of Japan (BSLJ).

The goal of this document is to provide recommendations to assist national committees, when reviewing and revising individual standards, to initiate convergence towards harmonization of the technical requirements.

This document expands the list of “agreed-upon points”, with a view to facilitate convergence of key requirements of the documents identified above.

In order to divide the work into manageable increments and set the priorities, it was deemed constructive to start with requirements for door locks, buffers, governors, safeties and brakes as the first step towards the complete lift.

In order to expedite the convergence process, the recommendations have been prioritized to implement the harmonization of requirements for safety components. The priorities are ranked as follows:

a) Priority 1, where the design of safety components are directly affected;

b) Priority 2, where the design of systems or requirement language only are affected.

NOTE Priority 1 includes items that should be harmonized first as it affects the design of the components directly. Priority 2 includes items that should be harmonized at a later stage as it affects the system or language only.

The comparison of requirements in different parts of the world indicated the importance of good engineering practice in the implementation of standards with regard to safety. It was concluded that guidance on good engineering practice was necessary and it would be best to provide this guidance in ISO/TS 22559-2, the scope of which covers this issue. It is important that this document be read in conjunction with ISO/TS 22559-2.

This document was prepared by the Task Force on Convergence (TFC) and is based on information and input provided by the code study groups from Europe (EUCSG), North America (NACSG) and Japan (JPCSG). After in-depth analysis of differences and rationale, the code study groups have agreed and formulated actions to be implemented in the course of development or revisions of standards in their respective regions. Completion of those actions will result in harmonization of code requirements for door locks, buffers, governors, safeties and brakes and will facilitate free circulation of those safety components around the world.

This document is intended for use by standard writers in order to implement the prescriptive recommendations when developing or revising standards.

Safety requirements for lifts (elevators) —

Part 24:
Convergence of lift requirements

1 Scope

This document provides a comparison of the requirements for door locks, buffers, governors, safeties and brakes covered by the major prescriptive safety standards:

a) CEN EN 81-1:1998+A3:2009;

b) ASME A17.1-2010/CSA B44-10;

c) JIS TS A 0028-1:2011;

d) The Building Standard Law of Japan.

It also includes prescriptive recommendations to harmonize the requirements within those standards.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 22559-2:2010, CEN EN 81-1:1998 and its amendment CEN EN 81-1:1998/Amd. A3:2009, ASME A17.1-2010/CSA B44-10 and JIS TS A 0028-1:2011 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Comparison of CEN-ASME/CSA-Japanese standards and prescriptive recommendations

4.1 Door locks

Table 1 contains a comparison of door locks in the CEN-ASME/CSA-Japanese standards and prescriptive recommendations prepared by the TFC.

Table 1 — Convergence of CEN-ASME-Japan elevator standards —Door locks

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	7.7.1 Locking and closed landing door check Protection against the risk of falling It shall not be possible in normal operation to open a landing door (or any of the panels in the case of a multi-panel door) unless the car has stopped, or is on the point of stopping, in the unlocking zone of that door.	**SECTION 2.12** **HOISTWAY DOOR LOCKING DEVICES AND ELECTRIC CONTACTS, AND HOISTWAY ACCESS SWITCHES** **2.12.1 General** **2.12.1.1** When the car is stopped within the unlocking zone, the hoistway doors shall be unlocked, or locked but openable from the landing side either manually or by power.	Basically, the unlocking zone is same as EN 81-1. Added the definition of Leveling, Re-leveling and door zone.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language and parameters from EN 81-1.
	NOTE For Emergency unlocking, see 7.7.3.2 l.	**2.12.1.2** When the car is outside the unlocking zone, the hoistway doors shall be openable from the landing side only by a hoistway door unlocking device (see 2.12.6, 2.12.7, and Nonmandatory Appendix B).			
	Not in EN 81–1	**2.12.1.3** For security purposes, hoistway doors shall be permitted to be locked out of service, subject to the requirements of 2.11.6. NOTE For 2.12.1.4 and 2.12.1.5, see 7.7.3.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language and parameters from ASME A17.1/CSA B44.
	7.7.1 (second and third paragraphs) The unlocking zone shall not extend more than 0,20 m above and below the landing level. In the case, however, of mechanically operated car and landing doors operating simultaneously, the unlocking zone may extend to a maximum of 0,35 m above and below the landing level.	**1.3 DEFINITIONS** **Unlocking zone:** a zone extending from the landing floor level to a point not less than 75 mm (3 in.) nor more than 450 mm (18 in.) above and below the landing. **Leveling zone:** ±250 mm if manual levelling.	(BSLJ-EO 129–10 item 3 paragraphs 1 and 2) ±200 mm New JIS is considered to be 350 mm.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting requirements similar to EN 81-1:1998, 7.7.1.
	7.7.2 Protection against shearing **7.7.2.1** With the exception of 7.7.2.2, it shall not be possible in normal operation to start the lift nor keep it in motion if a landing door, or any of the panels in the case of a multi-panel door is open. However, preliminary operations for the movement of the car may take place.	**1.3 Definitions** **Hoistway door interlock:** a device having two related and interdependent functions, that are: (a) to prevent the operation of the driving machine by the normal operating device unless the hoistway door is locked in the closed position; **NOT in ASME A17.1/CSA B44.**	Basically, the unlocking zone is same as EN 81–1. Added the definition of preliminary operations for the movement of the car.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting requirements similar to EN 81-1:1998, 7.7.2.
	Not in EN 81–1	(b) to prevent the opening of the hoistway door from the landing side unless the car is within the landing zone and is either stopped or being stopped.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting requirements similar to paragraph (b) of hoistway door interlock definition of ASME A17.1/CSA B44.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	7.7.2.2 Operation with doors open is permitted in the following zones: a) in the unlocking zone to permit levelling or relevelling at the corresponding floor level, provided the requirements of 14.2.1.2 are met;	**2.12.2.3 Operation of the Driving Machine With a Hoistway Door Unlocked or Not in the Closed Position.** Operation of the driving machine when a hoistway door is unlocked or not in the closed position (see 2.12.2.2) shall be permitted under one of the following conditions: (a) by a car leveling or truck zoning device (see 2.26.1.6);	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language of of EN 81–1:1998, 7.7.2.2 and EN 81-1:1998, 14.2.1.2.
	Not in EN 81–1	(b) when a hoistway access switch is operated (see 2.12.7);	b) Excluded docking operation		
	Not in EN 81–1	(c) when a bypass switch is activated (see 2.26.1.5).			
	b) in a zone extending to a maximum height of 1,65 m above the landing level to permit the loading or unloading of the car, provided the requirements of 8.4.3, 8.14 and 14.2.1.5 are met, and:	**2.26.1.6.4** The truck zone at any landing shall not extend more than 1 700 mm (67 in.) above the landing.			This is a priority 2 item as it does not affect the door lock as a component.
	1) the clear height between the landing door header and the floor of the car, in any position, shall not be less than 2 m;	**NOT in ASME A17.1/CSA B44**			
	2) whatever the position of the car inside this zone, it must be possible, without special operation, to effect the complete closure of the landing door.	**NOT in ASME A17.1/CSA B44**			
	7.7.3 Locking and emergency unlocking Each landing door shall be provided with a locking device satisfying the conditions of 7.7.1.	**2.12.2 Interlocks** **2.12.2.1 General**. Each entrance at a landing to an elevator used for passengers or freight and not conforming to 2.12.3.1 shall be equipped with one or more interlocks meeting the design requirements of 2.12.2.4.	Same as EN 81-1		Proposals: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider using the term landing entrance in EN 81–1:1998, 7.7.3.
		2.12.1.4 Passenger elevator hoistway doors shall be equipped with interlocks conforming to 2.12.2.			
	Not in EN 81–1	**2.12.1.5** Freight elevator hoistway doors shall be equipped with interlocks conforming to 2.12.2 or combination mechanical locks and electric contacts conforming to, and where permitted by, 2.12.3.			Do not consider freight elevators at this stage.
	This device shall be protected against deliberate misuse.	**2.12.2.6 Location.** Interlocks shall be so located that they are not accessible from the landing side when the hoistway doors are closed.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language from ASME A17.1-2010/CSA B44-10, 2.12.2.6.

Table 1 *(continued)*

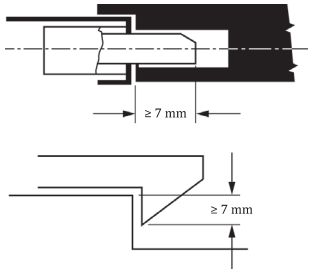
Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	7 Landing Doors **7.1 General Provisions** The openings in the well giving access to the lift car shall be provided with imperforate landing doors. When closed, the clearance between panels, or between panels and uprights, lintels or sills, shall be as small as possible. This condition is considered to be fulfilled when the operational clearances do not exceed 6 mm. This value due to wear, may reach 10 mm. These clearances are measured at the back of recesses, if present.	**2.12.2.2 Closed Position of Hoistway Doors.** Hoistway doors shall be considered to be in the closed position under the following conditions. These dimensions apply to the doors in their normal operating condition (see 2.14.4.11): (a) for horizontally sliding or swinging doors, when the leading edge of the door is within 10 mm (0.375 in.) of the nearest face of the jamb or when the panels of centre-opening doors are within 10 mm (0.375 in.) of contact with each other;	The following sentence is deleted. "This value due to wear, may reach 10 mm." (10 mm is too big)		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider expanding of EN 81–1:1998, 7.1 to harmonize with ASME A17.1-2010/CSA B44-10, 2.12.2.2.
		(b) for vertically sliding counterweighted doors, when the leading edge of the door is within 10 mm (0.375 in.) of the sill for doors that slide up to open, or 10 mm (0.375 in.) of the lintel for doors that slide down to open; (c) for vertically sliding biparting counterbalanced doors, when the astragal on the upper panel is within 19 mm (0.75 in.) of the lower panel.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding requirements from ASME A17.1-2010/CSA B44-10, 2.12.2.2 (b) and (c).
	7.7.3.1 Locking The effective locking of the landing door in the closed position shall precede the movement of the car. However, preliminary operations for the movement of the car may take place. The locking must be proved by an electric safety device in conformity with **14.1.2**. **7.7.3.1.1** The car shall not be able to start until the locking elements are engaged by at least 7 mm. See **Figure 3**.  **Figure 1 — Examples of locking elements**	**2.12.2.4.3** The interlock shall lock the door in the closed position with a minimum engagement of 7 mm (0.28 in.) of the locking members before the interlock contacts are closed and before the driving machine can be operated, except as permitted in 2.12.2.3.	Japan is considering adopting a 7 mm parameter. Same as EN 81–1 The swing door is out of scope.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting the text and diagram of EN 81–1:1998, 7.7.3.1.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	Not in EN 81–1	**2.12.2.4.3** (second paragraph) Devices that permit operation of the driving machine by the normal operating device when the door is closed but before it is locked are not interlocks and are not permitted where interlocks are required by this Code.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting ASME A17.1-2010/ CSA B44-10, 2.12.2.4.3. Consider adopting EN 81–1:1998, 14.1.2.
	7.7.3.1.2 The element of the electric safety device proving the locked condition of the door panel(s) shall be positively operated without any intermediate mechanism by the locking element. It shall be foolproof but adjustable if necessary. **Specific case**: In the case of locking devices used in installations requiring special protection against risks of humidity or explosion, the connection may be only positive, provided the link between the mechanical lock and the element of the electric safety device proving the locked condition can only be interrupted by destroying deliberately the locking device.	**2.12.2.4 General Design Requirements.** Interlocks shall conform to 2.12.2.4.1 to 2.12.2.4.7. **2.12.2.4.1** Interlock contacts shall be positively opened by the locking member or by a member connected to and mechanically operated by the locking member, and the contacts shall be maintained in the open position by the action of gravity, or by a restrained compression spring, or by both, or by means of the opening member (see 2.26.2.14). Contacts shall be open when the hoistway door interlock is unlocked.	No specification (generally, positive opening contacts are used) Same as EN 81–1		Proposals: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Accept EN 81–1:1998, 7.7.3.1.2 as modified: “The element of the electric safety device proving the locked condition of the door panel(s) shall be positively operated without any intermediate mechanism by the locking element.”
	Not in EN 81–1	**2.12.2.4.1** (continuation) If the contacts are maintained in the open position by other than the locking member, the interlock shall be located such that the contacts cannot be closed by hand from the car or landing when the doors are open.			
	Not in EN 81–1	**2.12.2.4.1** (second paragraph) The electrical contact bridging means shall withstand a separating force of 200 N (45 lbf) in any direction from the locking member.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding similar requirement as ASME A17.1-2010/CSA B44-10, 2.12.2.4.1 second paragraph, i.e. 200 N separating force.
	7.7.3.1.3 For hinged doors, locking shall be effected as near as possible to the vertical closing edge(s) of the doors, and maintained even in the case of panels sagging.	**NOT in ASME A17.1/CSA B44**	Not in JIS (swing door)		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting EN 81–1:1998, 7.7.3.1.3.
	7.7.3.1.4 The locking elements and their fixings shall be resistant to shock, and be made or reinforced with metal.	**NOT in ASME A17.1/CSA B44**	Same as EN 81-1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider performance based language and appropriate parameters rather than requirements for metal. Priority 1 Consider adding the shock requirement. See also F. 1.2.2.3.
	7.7.3.1.5 The engagement of the locking elements shall be achieved in such a way that a force of 300 N in the opening direction of the door does not diminish the effectiveness of locking.	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding requirements similar to EN 81–1:1998, 7.7.3.1.5, i.e. 300 N locking force.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	7.7.3.1.6 The lock shall resist, without permanent deformation during the test laid down in **F.1**, a minimum force at the level of the lock and in the direction of opening of the door of:	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adding requirements similar to EN 81–1:1998, 7.7.3.1.6.
	a) 1 000 N in the case of sliding doors; b) 3 000 N on the locking pin, in the case of hinged doors.	**8.3.3.4.8** (see also F.1.2.2.2): ...The force shall be 1 000 N (225 lb) in the case of a locking device intended for use with sliding doors, and 3 000 N (675 lb)...in the case of locking device intended for use with swinging doors.	b) is out of scope.	6.1.6 [p2] When locked, locking device to resist an opening force ≥1 000 N.	
	7.7.3.1.7 The locking action shall be effected and maintained by the action of gravity, permanent magnets, or springs. The springs shall act by compression, be guided and of such dimensions that, at the moment of unlocking, the coils are not compressed solid.	**2.12.2.4.2** The locking member of the interlock shall hold the door in the locked position by means of gravity, or by a restrained compression spring, or by both, or by means of a positive linkage.	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting EN 81–1:1998, 7.7.3.1.7. Priority 1 — Consider deleting requirements for permanent magnets. Priority 1 — Consider adding requirements for positive linkage.
	7.7.3.1.7 (second paragraph) In the event of the permanent magnet (or spring) no longer fulfilling its function, gravity shall not cause unlocking.	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting EN 81–1:1998, 7.7.3.1.7.
	7.7.3.1.7 (third paragraph) If the locking element is maintained in position by the action of a permanent magnet, it shall not be possible to neutralize its effect by simple means (e.g. heat or shock).	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding requirement from third paragraph of EN 81–1:1998, 7.7.3.1.7 if permanent magnets are retained.
	7.7.3.1.8 The locking device shall be protected against the risk of an accumulation of dust, which could hinder its proper functioning.	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding the requirement in EN 81–1:1998, 7.7.3.1.8.
	7.7.3.1.9 Inspection of the working parts shall be easy, as, for example, by use of a vision panel.	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider revising EN 81–1:1998, 7.7.3.1.9 to a performance requirement.
	7.7.3.1.10 In the case where the lock contacts are in a box, the fixing screws for the cover shall be of the captive type, so that they remain in the holes in the cover or box when opening the cover. **0.3.19** (Assumption) The fixing systems of guards or covers, which have to be removed during maintenance and inspection, remains attached to the guard or cover, or equipment when the guard or cover is removed.	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of assumption EN 81–1:1998, 0.3.19. Consider replacing EN 81–1:1998, 7.7.3.1.10 with EN 81–1:1998, 0.3.19.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	Not in EN 81–1	**2.12.2.4.5** Interlock systems employing a single master switch for more than one door are prohibited.	NOT in JIS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider deletion of ASME A17.1-2010/ CSA B44-10, 2.12.2.4.5.
	Not in EN 81–1	**2.12.2.4.6** Mercury tube switches shall not be used.	NOT in JIS		
	Not in EN 81–1	**2.12.2.5 Interlock Retiring Cam Device.** Retiring cams used to actuate an interlock shall exert a force at least double the average force required to operate the interlock and shall have a movement at least 13 mm (0.5 in.) more than the average movement required to operate the interlock. An interlock retiring cam device shall be permanently marked by the manufacturer with its rated horizontal force and rated horizontal movement. The rated horizontal force shall be the static force exerted by a retiring cam device in the horizontal direction when extended a distance equal to 75 % of its rated horizontal movement. The rated horizontal movement shall be the horizontal distance travelled by the retiring cam device from the fully retired position to the fully extended position.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting ASME A17.1-2010/ CSA B44-10, 2.12.2.5.
	Not in EN 81–1	**2.12.3 Hoistway Door Combination Mechanical Locks and Electric Contacts** **2.12.3.1 Where Permitted.** Hoistway door combination mechanical locks and electric contacts shall be permitted only on freight elevators equipped with manually operated vertically sliding doors and only at the following landings: (a) the top terminal landing and the landing whose sill is located not more than 1 225 mm (48 in.) below the top terminal landing sill, provided that the elevator rise does not exceed 4 570 mm (15 ft); (b) any landing whose sill is within 1 525 mm (60 in.) of the pit floor, regardless of the elevator rise. NOTE 2.12.3.2 to 2.12.3.5 are not copied since there are no corresponding requirements in EN 81–1.	NOT in JIS		

Table 1 *(continued)*

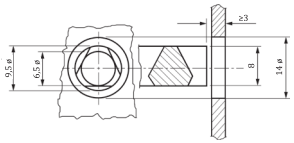
Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	Not in EN 81–1	**2.12.5 Restricted Opening of Hoistway or Car Doors** Hoistway and car doors of passenger elevators shall conform to 2.12.5.1 to 2.12.5.3. **2.12.5.1** When a car is outside the unlocking zone, the hoistway doors or car doors shall be so arranged that the hoistway doors or car doors cannot be opened more than 100 mm (4 in.) from inside the car.	NOT in JIS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of ASME A17.1-2010/CSA B44-10, 2.12.5.
		2.12.5.2 When the car doors are so arranged that they cannot be opened when the car is outside the unlocking zone, the car doors shall be openable from outside the car without the use of a special tool(s).			
		2.12.5.3 The doors shall be openable from within the car (see 2.14.5.7) when the car is within the unlocking zone. NOTE (2.12.5) See also 2.12.1 and Nonmandatory Appendix B, Unlocking Zone.			
	7.7.3.2 Emergency unlocking Each of the landing doors shall be capable of being unlocked from the outside with the aid of a key, which will fit the unlocking triangle as defined in Annex B. 	**2.12.6 Hoistway Door Unlocking Devices** **2.12.6.1 General.** Except in jurisdictions that limit the use of hoistway door unlocking devices, they shall be provided for use by elevator and emergency personnel for each elevator at every landing where there is an entrance. **2.12.6.2 Location and Design.** Hoistway door unlocking devices shall conform to 2.12.6.2.1 to 2.12.6.2.5. **2.12.6.2.1** The device shall unlock and permit the opening of a hoistway door from a landing irrespective of the position of the car. **2.12.6.2.4** The hoistway door unlocking device shall be Group 1 Security* (see 8.1). The operating means shall also be made available to emergency personnel during an emergency.	Same as EN 81–1 (Japan is going to use the triangle key.) Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of ASME A17.1-2010/CSA B44-10, 2.12.6.2.1.
	Keys of this type shall be given only to a responsible person.	***8.1.2 Group 1: Restricted** **8.1.2 (k)** Requirement 2.12.6.2.4, hoistway door unlocking device. (Shall also be made available to emergency personnel during an emergency.)	NOT in JIS		

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	They shall be accompanied by a written instruction detailing the essential precautions to be taken in order to avoid accidents which could result from an unlocking which was not followed by effective relocking.	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1		
	Not in EN 81–1	**2.12.6.2.2** The device shall be designed to prevent unlocking the door with common tools.	NOT in JIS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting ASME A17.1-2010/ CSA B44-10, 2.12.6.2.2.
	After an emergency unlocking, the locking device shall not be able to remain in the unlocked position with the landing door closed.	**NOT in ASME A17.1/CSA B44**	NOT in JIS		
	Not in EN 81–1 NOTE 2.12.6.2.3 intended for "lock and contact" not for Interlocks.	**2.12.6.2.3** Where a hoistway unlocking device consists of an arrangement whereby a releasing chain, permanently attached to a door locking mechanism, is kept under a locked panel adjacent to the landing door, such a panel shall be self-closing and self-locking and shall not have identifying markings on its face.	Same as EN 81–1		
	Not in EN 81–1	**2.12.6.2.5** The unlocking device keyway and locked panel (see 2.12.6.2.3), if provided, shall be located at a height not greater than 2 100 mm (83 in.) above the landing.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider amending ASME A17.1-2010/ CSA B44-10, 2.12.6.2.5 to include the alternative use of special lock release tools where the height is greater than 2.1 m.
	In the case of landing doors driven by the car door, a device (either weight or springs) shall ensure the automatic closing of the landing door if this door becomes open, for whatever reason, when the car is outside the unlocking zone.	**2.11.3 Closing of Hoistway Doors** **2.11.3.1** Horizontally sliding or single-section swinging doors of automatic-operation elevators shall be provided with door closers arranged to close an open door automatically if the car, for any reason, leaves the landing zone.			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	7.7.3.3 The locking device is regarded as a safety component and shall be verified according to the requirements in **F.1**.	**2.12.4 Listing/Certification Door Locking Devices and Door or Gate Electric Contacts** **2.12.4.1 Type Tests.** Each type and make of hoistway door interlock, hoistway door combination mechanical lock and electric contact, and door or gate electric contact shall conform to the type tests specified in 8.3.3, unless tested prior to: (a) August 1, 1996, and shall have been subjected to the tests specified in A17.1a–1994, Section 1101; (b) March 23, 2002 in jurisdictions enforcing CSA B44 and shall have been subjected to the tests specified in CSA B44S1–97, 11.5. The tests shall be done by or under the supervision of a certifying organization. **2.12.4.2 Listing/Certification.** Each type and make of hoistway door interlock, hoistway door combination mechanical lock and electric contact, and door or gate electric contact shall conform to the general requirements for tests and certification specified in 8.3.1.	Same as EN 81–1. But the locking device is not in the category of safety device in new notice.)		See section in table below pertaining to EN 81–1 and ASME A17.1-2010/CSA B44-10 test requirements NOTE EU administrative requirements are contained in the Lifts Directive.
	7.7.4 Electrical device for proving the landing door closed **7.7.4.1** Each landing door shall be provided with an electric safety device in conformity with **14.1.2** for proving the closed position, so that the conditions imposed by **7.7.2** are satisfied.	**2.26.2.14 Hoistway Door Interlocks and Hoistway Door Electric Contacts.** Hoistway door interlocks or hoistway door electric contacts conforming to 2.12 shall be provided for all elevators. **2.26.4.3** The devices covered by 2.26.2 shall meet the requirements of either 2.26.4.3.1 or 2.26.4.3.2. **2.26.4.3.1** They shall have contacts that are positively opened mechanically; their opening shall not be solely dependent on springs. Exceptions are devices… **2.12.2.4.4** Interlocks, used with multisection doors, shall conform to the following requirements:	Same as EN 81–1		Proposals: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting EN 81–1:1998, 7.7.4.1 and EN 81–1:1998, 7.7.4.2.
	7.7.4.2 In the case of horizontally sliding landing doors, coupled with car doors, this device may be in common with the device for proving the locked condition, provided that it is dependent upon the effective closing of the landing door.		Same as EN 81–1		

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	Not in EN 81–1	(b) Where used with vertically sliding biparting counter balanced doors, they shall be so arranged that the interlock contacts are mechanically held in the open position by the door or devices attached thereto, unless the door is in the closed position. (c) Where used with centre-opening horizontally swinging doors, either (1) both door panels shall be equipped with interlocks, or	NOT in JIS (out of scope)		
	7.7.4.3 In the case of hinged landing doors, this device shall be placed adjacent to the closing edge of the door or on the mechanical device proving the closed condition of the door.	(2) where the door panels are so arranged that one panel can be opened only after the other panel has been opened, the interlock is not required on the section that opens last, if that door panel is provided with a door electric contact conforming to 2.14.4.2.3, 2.14.4.2.5, and 2.26.2.15, except that terms “door or gate” and “car door or gate” shall be replaced with the term “hoistway door” or “hoistway door section” and the term “accessible from inside the car panel” with the term “accessible from the landing side when the hoistway doors are closed.”	The swing door is out of scope.		
	Not in EN 81-1	(d) Where used with combination horizontally sliding and swinging doors, either (1) the sliding and swinging panels shall both be equipped with interlocks, or (2) where the sliding and swinging panels are interconnected in conformity with the requirements of 2.11.13.5, the interlock is not required on the swinging panel, provided that the interlock on the sliding panel is so designed and installed that the car cannot be operated unless the sliding and swinging panels are both locked in the closed position, as defined in 2.12.2.2.	NOT in JIS (out of scope)		
	Not in EN 81–1	(e) Where a door closer, used with a combination sliding and swinging door, is arranged to be disconnected to allow the sliding panel to swing, it shall be so designed and installed that it shall not make the interlock contact when disconnected and released.	NOT in JIS (out of scope)		

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	7.7.5 Requirements common to devices for proving the locked condition and the closed condition of the door **7.7.5.1** It shall not be possible, from positions normally accessible to persons, to operate the lift with a landing door open or unlocked, after one single action not forming part of the normal operating sequence.	**2.26.1.5 Inspection Operation With Open Door Circuits.** A single set of switches marked "CAR DOOR BYPASS" and "HOISTWAY DOOR BYPASS" shall be provided in the elevator controller enclosure containing the car door and gate electric contact circuits and hoistway door interlock and hoistway door electric contact circuits (see 2.26.2.14 and 2.26.2.15); except where the switches are not accessible from outside the hoistway, they shall be located in the inspection and test panel (see 2.7.6.5). The switches shall prepare the control system so that, only when top-of-car or in-car inspection operation is activated, the car shall be permitted to be moved with open door contacts. The switches shall conform to 2.26.1.5.1 to 2.26.1.5.8.	The swing door is out of scope		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting EN 81–1:1998, 7.7.5 and add ASME A17.1-2010/CSA B44-10, 2.12.2.4.1 to EN 81–1:1998, 7.7.5.2 text for clarity. Priority 2 — Consider the addition of "inspection operation with open door circuits" (i.e. bypass operation) to EN 81–1:1998, 7.7.5.1.
	7.7.5.2 The means used to prove the position of a locking element shall have positive operation.	**2.12.2.4.1** Interlock contacts shall be positively opened by the locking member or by a member connected to and mechanically operated by the locking member, and the contacts shall be maintained in the open position by the action of gravity, or by a restrained compression spring, or by both, or by means of the opening member (see 2.26.2.14). Contacts shall be open when the hoistway door interlock is unlocked	Same as EN 81–1.		
	7.7.6 Sliding doors with multiple, mechanically linked panels **7.7.6.1** If a sliding door comprises several directly mechanically linked panels, it is permitted: a) to place the device required in **7.7.4.1** or **7.7.4.2** on a single panel, and b) to lock only one panel, provided that this single locking prevents the opening of the other panel(s) by hooking the panels in the closed position in case of telescopic doors.	**2.12.2.4.4** Interlocks, used with multisection doors, shall conform to the following requirements: (a) They shall lock all sections of the door, but shall be permitted to be applied to only one section of the door, provided the device used to interconnect the door sections is so arranged that locking one section will prevent the opening of all sections.	Same as EN 81–1.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider harmonizing ASME A17.1-2010/CSA B44-10, 2.12.2.4.4 with EN 81–1:1997, 7.7.6 requirements.
	7.7.6.2 If a sliding door comprises several indirectly, mechanically linked panels (e.g. by rope, belt or chain), it is permitted to lock only one panel, provided that this single locking will prevent the opening of other panels, and that these are not fitted with a handle.	**NOT in ASME A17.1/CSA B44**	Same as EN 81–1.		

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	The closed position of the other panel(s), not locked by the locking device, shall be proved by an electric safety device in conformity with 14.1.2.	NOTE The following is partially repeated from 2.12.2.2.4.4 (c) copied in line with 7.7.4.3 above. 2.12.2.2.4.4 (c)(2) where the door panels are so arranged that one panel can be opened only after the other panel has been opened, the interlock is not required on the section that opens last, if that door panel is provided with a door electric contact conforming to 2.14.4.2.3, 2.14.4.2.5, and 2.26.2.15			
	14.1.2.2 Safety contacts **14.1.2.2.1** The operation of a safety contact shall be by positive separation of the circuit-breaking devices. This separation shall occur even if the contacts have welded together. The design of a safety contact shall be such as to minimize the risk of a short-circuit resulting from component failure. NOTE Positive opening is achieved when all the contact-breaking elements are brought to their open position and when for a significant part of the travel there are no resilient members (e.g. springs) between the moving contacts and the part of the actuator to which the actuating force is applied.	**2.26.4.3** The devices covered by 2.26.2 shall meet the requirements of either 2.26.4.3.1 or 2.26.4.3.2 [PESSRAL]. **2.26.4.3.1** They shall have contacts that are positively opened mechanically; their opening shall not be solely dependent on springs. Exceptions are devices described by 2.26.2.4, 2.26.2.19, 2.26.2.29, and 2.26.2.30; and 2.26.2.12 and 2.26.2.16 where magnetically operated, optical, or static-type switches are used.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adding requirements for interruption of circuit in case of welded contacts as per EN 81-1:1998, 14.1.2.2.1.
	14.1.2.2.2 The safety contacts shall be provided for a rated insulation voltage of 250 V if the enclosure provides a degree of protection of at least IP 4X, or 500 V if the degree of protection of the enclosure is less than IP 4X. The safety contacts shall belong to the following categories as defined in EN 60947-5-1: a) AC-15 for safety contacts in AC circuits; b) DC-13 for safety contacts in DC circuits.	**Not in ASME A17.1/CSA B44**			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, 14.1.2.2.2, 14.1.2.2.3, 14.1.2.2.4, and 14.1.2.2.5.
	14.1.2.2.3 If the degree of protection is equal or less than IP4X, the clearances shall be at least 3 mm, the creepage distances at least 4 mm and the distances for breaking contacts at least 4 mm after separation. If the protection is better than IP4X the creepage distance can be reduced to 3 mm.	**See 8.3.3.4.9**			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider clearance and creepage parameters and background for the purpose of identifying any variations and discrepancies. See CSA B44.1/ASME A17.5, IEC 60947-5-1, and JISC 0664-1.
	14.1.2.2.4 In the case of multiple breaks, the distance after separation between the contacts shall be at least 2 mm.	**Not in ASME A17.1/CSA B44**			
	14.1.2.2.5 Abrasion of conductive material shall not lead to short circuiting of contacts.	**Not in ASME A17.1/CSA B44**			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	15.13 Locking Devices On locking devices, a data plate shall be fixed indicating a) the name of the manufacturer of the locking devices, and b) the type examination sign and its references.	**2.12.4.3 Identification Marking.** Each listed/certified device shall be labelled. It shall be permanently attached to the device, and shall be so located as to be readily visible when the device is installed in its operating position. The labels shall include the following data: (a) the name, trademark, or certifying organization file number by which the organization that manufactured the product can be identified; (b) the certifying organization name or identifying symbol; (c) statement of compliance with ASME A17.1 or CSA B44; (d) a distinctive type, model, or style letter or number; (e) rated voltage and current, and whether AC or DC; (f) rated test force and rated test movement when the device is of a type released by an interlock retiring cam (see 8.3.3.4.7); (g) date (month and year) devices subjected to type test specified in 2.12.4.1; (h) if the device has only been type-tested and listed/certified for use on a private residence elevator, the label shall indicate the restricted use.	Same as EN 81–1. (The certification system is under study.)		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider removing these requirements from the ASME A17.1/CSA B44 label and having them added to the report. Priority 2 — Clarify the meaning of EN 81-1:1998, 15.13 b).
	Annex F **(normative)** **Safety components — Tests procedures for verification of conformity** **F.0 Introduction** **F.0.1 General provisions** **F.0.1.1** For the purposes of this standard, it is assumed that the laboratory undertakes both the testing and the certification as an approved body. An approved body may be that of a manufacturer operating an approved full quality assurance system. In certain cases, the test laboratory and the body approved for the issue of type examination certificates may be separate. In these cases, the administrative procedures may differ from those described in this annex.	**SECTION 8.3** **ENGINEERING TESTS, TYPE TESTS, AND CERTIFICATION** **8.3.1 General Requirements for Tests and Certification** **8.3.1.1 General** (a) Type Tests (see 1.3) shall be carried out when required. (b) Engineering Tests (see 1.3) shall be carried out when required. (c) The tests shall be permitted to be made by laboratories other than the certifying organization or manufacturers, but the responsibility shall remain with the original certifying organization.	Same as EN 81–1 **But Annex F is informative.** (under study)		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2: Consider including the text of Annex F. Priority 2 — Consider revision for administrative and general requirements for testing to be harmonized with Annex F.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.0.1.2 The application for type examination shall be made by the manufacturer of the component or his authorized representative and shall be addressed to an approved test laboratory. NOTE At the request of the laboratory, the necessary documents may be required in triplicate. The laboratory may likewise call for supplementary information, which might be necessary for the examination and tests.	**8.3.1.2 Application for Certification** **8.3.1.2.1** The application for engineering or type tests shall be made by the component manufacturer, equipment manufacturer, installer, or importer. **8.3.1.2.2** The application shall include: (a) the manufacturer's name and the equipment or component designation or model; (b) two sets of assembly and detail drawings showing details as specified in 8.3; (c) a description of the elevator component or equipment, and its field of application, along with calculated performance feature.			
	F.0.1.3 The despatch of samples for examination shall be made by agreement between the laboratory and the applicant.	**NOT in ASME A17.1/CSA B44**			
	F.0.1.4 The applicant may attend the tests.	**8.3.1.3.4** The applicant shall be permitted to examine and copy the test records upon request.			
	Not in EN 81–1	**8.3.1.4 Changes to Listed/Certified Components or Equipment** **8.3.1.4.1** Where any change is made in the design of the component or equipment after certification, including changes resulting from the revisions in applicable code requirements, revised drawings showing such changes shall be filed with the original or other certifying organization. The certifying organization shall issue to the applicant a revised certificate, based upon the previous test results or any new tests that are needed, depending on the nature of the changes.			
	F.0.1.5 If the laboratory entrusted with the complete examination of one of the components requiring the supply of a type examination certificate has no available appropriate means for certain tests or examinations, it may, under its responsibility, have these made by other laboratories.	**The following is partial repeat of 8.3.1.1 shown in line with F.0.1.1** (c) The tests shall be permitted to be made by laboratories other than the certifying organization or manufacturers, but the responsibility shall remain with the original certifying organization.			
	Not in EN 81–1	**8.3.1.4.2** Changes in the design that do not affect the performance of the component or equipment shall be permitted to be made without the approval of the certifying organization. The certifying organization shall be apprised in writing of the change.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting ASME A17.1-2010/ CSA B44-10, 8.3.1.4.2.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.0.1.6 The precision of the instruments shall allow, unless particularly specified, measurements to be made within the following tolerances: a) ±1 % masses, forces, distances, speeds; b) ±2 % accelerations, retardations; c) ±5 % voltages, currents; d) ±5 °C temperatures;	**8.3.1.5 Testing Instruments.** The precision of the instruments shall allow measurements to be made, unless otherwise specified, within the following tolerances: (a) ±1 % — masses, forces, distances, time, speeds, and hydraulic pressure; (b) ±2 % — accelerations, retardations, and flow rating; (c) ±5 % — voltages and currents; (d) ±10 % — temperatures			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting F.0.1.6 d) temperature tolerance.
	e) recording equipment shall be capable of detecting signals, which vary in time of 0,01 s.	**NOT in ASME A17.1/CSA B44**			
	F.1 Landing door locking devices	**8.3.3 Type Tests of Interlocks, Combination Mechanical Locks and Electric Contacts, and Door or Gate Electric Contacts**	Landing door locking device is not a safety device in new BSLJ in 2008.		
	F.1.1 General provisions **F.1.1.1 Field of application** These procedures are applicable to locking devices for lift landing doors. It is understood that each component taking part in the locking of landing doors and in the checking of the locking forms part of the locking device.	**8.3.3.1 General.** This Section specifies the type test of hoistway door interlocks, car door interlocks, combination mechanical locks and electric contacts, and hoistway door and car door or gate electric contacts.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Clarify certification requirements for hoistway door and car door electric contacts.
	F.1.1.2 Object and extent of the test The locking device shall be submitted to a test procedure to verify that insofar as construction and operation are concerned, it conforms to the requirements imposed by this standard.	**8.3.3.2 Examination Before Test.** Prior to testing, the certifying organization shall examine each device submitted to ascertain that it conforms to the applicable requirements in Part 2.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider harmonizing ASME A17.1-2010/CSA B44-10, 8.3.3.2 with EN 81–1:1998, F.1.1.2 and F.1.1.3.
	It shall be checked in particular that the mechanical and electrical components of the device are of adequate size and that in the course of time, the device does not lose its effectiveness, particularly through wear.	**NOT in ASME A17.1/CSA B44**			
	If the locking device is needed to satisfy particular requirements (waterproof, dust proof or explosion proof construction), the applicant shall specify this and supplementary examinations and/or tests under appropriate criteria shall be made.	**NOT in ASME A17.1/CSA B44**			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.1.1.3 Documents to be submitted The following documents shall be attached to the application for a type test: **F.1.1.3.1** Schematic arrangement drawing with description of operation This drawing shall show clearly all the details relating to the operation and the safety of the locking device, including:	**8.3.1.2.2** (b) two sets of assembly and detail drawings showing details as specified in 8.3; (c) a description of the elevator component or equipment, and its field of application, along with calculated performance feature.			
	a) the operation of the device in normal service showing the effective engagement of the locking elements and the point at which the electrical safety device operates;	**NOT addressed in ASME A17.1/CSA B44**			
	b) the operation of the device for mechanical checking of the locking position if this device exists; c) the control and operation of the emergency unlocking device; d) the type (AC and/or DC) and the rated voltage and rated current.	**8.3.3.3.1 Connections for and Test of Electrical Parts.** During the tests……., the devices shall have their electrical parts connected in a noninductive electrical circuit having a constant resistance and in which a current of twice the rated current at rated voltage is flowing. The electric circuit shall be closed, but shall not be broken at the contact within the device on each cycle of operation during the tests.			
	F.1.1.3.2 Assembly drawing with key This drawing shall show all parts, which are important to the operation of the locking device, in particular those required to conform to requirements of this standard. A key shall indicate the list of principal parts, the type of materials used, and the characteristics of the fixing elements.	**NOT specifically covered in ASME A17.1/ CSA B44**			
	F.1.1.4 Test samples One door locking device shall be submitted to the laboratory. If the test is carried out on a prototype, it shall be repeated later on a production model. If the test of the locking device is only possible when the device is mounted in the corresponding door (for example, sliding doors with several panels or hinged doors with several panels), the device shall be mounted on a complete door in working order. However, the door dimensions may be reduced by comparison with a production model, on condition that this does not falsify the test results.	**NOT specified in ASME A17.1/CSA B44**			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, F.1.1.4.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	NOT specified or permitted in EN 81–1	**8.3.3.3.4 Tests of Hoistway Door (Runway Door) Combination Mechanical Locks and Electric Contacts.** The testing equipment shall actuate the mechanical locking members of hoistway door (runway door) combination mechanical locks and electric contacts to unlock at each cycle of operation during the tests specified by 8.3.3.4.1, 8.3.3.4.3, and 8.3.3.4.4.			
	F.1.2 Examination and tests **F.1.2.1 Examination of operation** This examination has the aim of verifying that the mechanical and electrical components of the locking device are operating correctly with respect to safety, and in conformity with the requirements of this standard, and that the device is in conformity with the particulars provided in the application. In particular it shall be verified: a) that there is at least 7 mm engagement of the locking elements before the electric safety device operates. Examples are shown in 7.7.3.1.1.	**8.3.3.4.10 Examination of Operation.** Verify that there is at least 7 mm (0.28 in.) engagement of the locking elements before the hoistway door interlock contact closes.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting EN 81–1:1998, F.1.2.1
	b) that it is not possible from positions normally accessible to persons to operate the lift with a door open or unlocked, after one single action, not forming part of the normal operation (7.7.5.1).	**NOT in ASME A17.1/CSA B44**			
	F.1.2.2 Mechanical tests These tests have the purpose of verifying the strength of the mechanical locking components and the electrical components. The sample to the locking device in its normal operating position is controlled by the devices normally used to operate it. The sample shall be lubricated in accordance with the requirements of the manufacturer of the locking device. When there are several possible means of control and positions of operation, the endurance test shall be made in the arrangement which is regarded as the most unfavourable from the point of view of the forces on the components.	**F.1.2.2 NOT in ASME A17.1/CSA B44**			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting EN 81–1, F.1.2.2.
	The number of complete cycles of operation and the travel of the locking components shall be registered by mechanical or electrical counters.	**8.3.3.4 Required Tests and Procedure**. Each device submitted shall be subjected to and shall successfully pass the following tests			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.1.2.2.1 Endurance test **F.1.2.2.1.1** The locking device shall be submitted to 1 000 000 (±1 %) complete cycles; one cycle comprises one forward and return movement over the full travel possible in both directions.	**8.3.3.4.1 Endurance Test**. The device, lubricated in accordance with the manufacturer's instructions, shall complete 960 000 cycles of operation without failure of any kind, without excessive wearing or loosening of parts, or without undue burning or pitting of the contacts (see 8.3.3.3.1). For private residence elevators, the number of cycles shall be reduced to 25 000.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, F.1.2.2.1.
	The driving of the device shall be smooth, without shocks, and at a rate of 60 (±10 %) cycles per minute.	**NOT in ASME A17.1/CSA B44**			
	During the endurance test, the electrical contact of the lock shall close a resistive circuit under the rated voltage and at a current value double that of the rated current.	**8.3.3.3.1 Connections for and Test of Electrical Parts.** During the tests……., the devices shall have their electrical parts connected in a noninductive electrical circuit having a constant resistance and in which a current of twice the rated current at rated voltage is flowing. The electric circuit shall be closed, but shall not be broken at the contact within the device on each cycle of operation during the tests.			
	Not in EN 81–1	**8.3.3.4.3 Test Without Lubricant.** After completion of the test specified by 8.3.3.4.2, the device used therein shall be used for this test. The device, except self-lubricating bearings and bearings of a type not requiring frequent replenishment of lubricant, shall then be taken apart and freed of lubricant by washing in nonflammable liquids having cleansing characteristics. After reassembling, the device shall, without other than the usual initial adjustment (i.e. without adjustment especially made to meet the conditions of the particular test) and without further attention, complete 25 000 cycles or 20 000 cycles for private residence elevator of operation without failure of any kind, without excessive wearing or loosening of parts, and without undue burning or pitting of contacts.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting ASME A17.1-2010/ CSA B44-10, 8.3.3.4.3, 8.3.3.4.4, 8.3.3.4.5, 8.3.3.4.6, 8.3.3.4.7, 8.3.3.4.9, and 8.3.3.4.11.
		ASME A17.1-2010/CSA B44-10, 8.3.3.4.3 to 8.3.3.4.9 and also 8.3.3.4.11 are not in EN 81–1.			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.1.2.2.1.2 If the locking device is provided with a mechanical checking device for the locking pin or the position of the locking element, this device shall be submitted to an endurance test of 100 000 (±1 %) cycles.	**NOT in ASME A17.1/CSA B44**			
	The driving of the device shall be smooth, without shocks, and at a rate of 60 (±10 %) cycles per minute.	**NOT in ASME A17.1/CSA B44**			
		8.3.3.4.4 Test in Moist Atmosphere. After completion of the test specified by 8.3.3.4.3, the device used therein shall be used for this test. The device shall be subjected continuously, in an unventilated enclosure, to an atmosphere saturated with a range of 3,5 % to 5 % solution of sodium chloride for 72 consecutive hours. During this period, it shall be operated for only 10 consecutive cycles at the end of each of the first two 24 h periods and shall be allowed to stand exposed to the air for 24 h, and shall not fail in a manner that creates an unsafe condition. The device shall again be lubricated and shall, without adjustment and without further attention, complete 15 000 cycles or 10 000 cycles for private residence elevator of operation without failure of any kind.			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
		8.3.3.4.5 Misalignment Test (a) All Types of Doors. The device shall operate effectively when the car cam or other equivalent operating device used in making the test has been displaced horizontally from its normal position (the position in which it was when the device was installed) successively as follows: (1) in a direction perpendicular to the plane of the door opening (a) backward 6 mm (0.25 in.) (b) forward 6 mm (0.25 in.) (2) in a direction parallel to the plane of the door opening (a) to the right 6 mm (0.25 in.) (b) to the left 6 mm (0.25 in.) (b) Horizontally Sliding Doors. The device shall operate effectively: (1) when the bottom of the door has been displaced horizontally from its normal position in a direction perpendicular to the plane of the door opening (a) backward 6 mm (0.25 in.) (b) forward 6 mm (0.25 in.) (2) when the top of the door has been displaced horizontally from its normal position in a direction perpendicular to the plane of the door opening			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
		(a) backward 3 mm (0.125 in.) (b) forward 3 mm (0.125 in.) (c) Swinging Doors. The device shall operate effectively when the strike edge of the door has been displaced: (1) perpendicular to the plane of the door opening (a) forward 3 mm (0.125 in.) (b) backward 3 mm (0.125 in.) (2) parallel to the plane of the door opening (a) 3 mm (0.125 in.) to the right (b) 3 mm (0.125 in.) to the left (c) 3 mm (0.125 in.) up (d) 3 mm (0.125 in.) down (d) Vertically Sliding Doors. The device shall operate effectively when the door has been displaced: (1) perpendicular to the plane of the door opening (a) forward 3 mm (0.125 in.) (b) backward 3 mm (0.125 in.) (2) parallel to the plane of the door opening: (a) 3 mm (0.125 in.) to the right (b) 3 mm (0.125 in.) to the left			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
		8.3.3.4.7 Force and Movement Test. When testing devices of a type that are released by retiring cam (see 2.12.2.5), measurements shall be made of the force required to release the device and of the movement of the element engaged by the cam, with the device mounted in its normal position as specified by the manufacturer, before and after the test specified by 8.3.3.4.1. The force and movement recorded in each test shall be, respectively: (a) the maximum force, measured in a horizontal plane, that must be applied to that member of the device that is directly actuated by the cam to release the door locking member of the device from locking engagement (b) the distance, projected on a horizontal plane, that the member of the device directly actuated by the cam travels from its position when the lock is fully engaged to its position when the locking member is released from engagement. The force and movement markings required by 2.12.4.3 (f) shall be not less than the average of these recorded values.			
		8.3.3.4.9 Examination of Electrical Spacings. The electrical spacings shall comply with CSA B44.1/ASME A17.5, Section 16.			
		8.3.3.4.11 Testing of Bridging Means. The electrical contact bridging means shall be tested to verify conformance to 2.12.2.4.1.			
	F.1.2.2.2 Static test For locking devices intended for hinged doors, a test shall be made consisting of the application over a total period of 300 s of a static force increasing progressively to a value of 3 000 N. This force shall be applied in the opening direction of the door and in a position corresponding as far as possible to that which may be applied when a user attempts to open the door. The force applied shall be 1 000 N in the case of a locking device intended for sliding doors.	**8.3.3.4.8 Static Test.** After completion of the endurance test in 8.3.3.4.1, a type test shall be made consisting of a static force applied over a period of 300 s with the force increasing incrementally. The force shall be applied in the opening direction of the door and at a location as near to the locking element as possible, but not to exceed 300 mm (12 in.). The force shall be 1 000 N (225 lb) in the case of a locking device intended for use with sliding doors, and 3 000 N (675 lb) or 670 N (150 lb) for private residence elevator applied at right angles to the panel evenly distributed over an area of 5 cm^2 (0.78 $in.^2$) in round or square section in the case of a locking device intended for use with swinging doors.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting ASME A17.1-2010/ CSA B44-10, 8.3.3.4.8 or clarifying requirement related to test time for locking devices intended for sliding doors.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.1.2.2.3 Dynamic test The locking device, in the locked position, shall be submitted to a shock test in the opening direction of the door. The shock shall correspond to the impact of a rigid mass of 4 kg falling in free fall from a height of 0,50 m.	**NOT in ASME A17.1/CSA B44**			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, F.1.2.2.3.
	F.1.2.3 Criteria for the mechanical tests After the endurance test (F.1.2.2.1), the static test (F.1.2.2.2) and the dynamic test (F.1.2.2.3), there shall not be any wear, deformation or breakage, which could adversely affect safety.	**NOT in ASME A17.1/CSA B44**			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, F.1.2.3.
	F.1.2.4 Electrical test **F.1.2.4.1 Endurance test of contacts** This test is included in the endurance test laid down in **F.1.2.2.1.1**.	**8.3.3.3 General Requirements** **8.3.3.3.1 Connections for and Test of Electrical Parts.** During the tests specified by 8.3.3.4.1, 8.3.3.4.3, and 8.3.3.4.4, the devices shall have their electrical parts connected in a noninductive electrical circuit having a constant resistance and in which a current of twice the rated current at rated voltage is flowing. The electric circuit shall be closed, but shall not be broken at the contact within the device on each cycle of operation during the tests. **8.3.3.3.2 Retesting of Electric Contacts Previously Tested.** If the electric contact of a device submitted for test has already been tested as part of another device, and has successfully met the test requirements (see 8.3.3), the electrical tests of the contact need not be repeated. **8.3.3.3.3 Tests of Retiring Cams or Equivalent Devices.** Tests of retiring cams or equivalent devices used to operate interlocks shall not be required.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, F.1.1.3.1, F.1.2.2.1.1, and F.1.2.4.1.

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.1.2.4.2 Test of ability to break circuit This test is to be carried out after the endurance test. It shall check that the ability to break a live circuit is sufficient. This test shall be made in accordance with the procedure in EN 60947–4-1 and EN 60947–5-1, the values of current and rated voltage serving as a basis for the tests shall be those indicated by the manufacturer of the device. If there is nothing specified, the rated values shall be as follows: a) alternating current: 230 V, 2 A; b) direct current: 200 V, 2A. In the absence of an indication to the contrary, the capacity to break circuit shall be examined for both AC and DC conditions.	**8.3.3.4.2 Current Interruption Test.** After completion of the test specified by 8.3.3.4.1, the device used therein shall satisfactorily complete the following additional tests, to check that the ability to break a live circuit is adequate. The tests shall be carried out with the locking device located in accordance with the manufacturer's drawings. If several positions are indicated, the test shall be made in the position that the laboratory judges to be the most unfavourable.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of language in EN 81–1:1998, F.1.2.4.2, F.1.2.4.3, F.1.2.4.4, and F.1.2.4.5.
	The tests shall be carried out with the locking device in the working position. If several positions are possible, the test shall be made in the most unfavourable position.	**NOT in ASME A17.1/CSA B44**			
	The sample tested shall be provided with covers and electric wiring as used in normal service.	The sample tested shall be provided with covers and electrical wiring in accordance with the manufacturer's drawings.			
	F.1.2.4.2.1 AC locking devices shall open and close an electric circuit under a voltage equal to 110 % of the rated voltage 50 times, at normal speed, and at intervals of 5 s to 10 s. The contact shall remain closed for at least 0,5 s.	(a) AC rated locking devices shall have their electrical parts connected to an inductive circuit with a power factor of (0.7 ± 0.05) in which a current of 11 times the rated current, at 110 % of rated voltage, is flowing. The AC locking devices shall open and close 50 times, at normal speed, and at intervals of 5 s to 10 s, with the contact remaining closed for at least 0,5 s.			
	The circuit shall comprise a choke and a resistance in series. Its power factor shall be 0,7 ± 0,05 and the test current shall be 11 times the rated current indicated by the manufacturer of the device.				
	F.1.2.4.2.2 DC locking devices shall open and close an electric circuit under a voltage equal to 110 % of the rated voltage 20 times, at normal speed, and at intervals of 5 s to 10 s. The contact shall remain closed for at least 0,5 s. The circuit shall comprise a choke and a resistance in series having values such that the current reaches 95 % of the steady-state value of the test current in 300 ms. The test current shall be 110 % of the rated current indicated by the manufacturer of the device.	(b) DC rated locking devices shall have their electrical parts connected to an inductive circuit in which the current reaches 95 % of the steady-state value of 110 % of the rated current in 0,3 s maximum, at 110 % of rated voltage. The DC locking devices shall open and close 20 times, at normal speed, and at intervals of 5 s to 10 s, with the contact remaining closed for at least 0,5 s.			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.1.2.4.2.3 The tests are considered as satisfactory if no tracking or arcing is produced and if no deterioration occurs which could adversely affect safety.	(c) The test results are considered satisfactory if no evidence of insulation breakdown due to arcing or tracking occurs and if no deterioration occurs that could adversely affect safety.			
	F.1.2.4.3 Test for resistance to leakage currents This test shall be made in accordance with the procedure in CENELEC HD 214 S2 (see IEC 112). The electrodes shall be connected to a source providing an AC voltage which is sinusoidal at 175 V, 50 Hz.	**8.3.3.4.6 Insulation Test.** The insulation of the electrical parts shall withstand a test with a root-mean square (effective) voltage of twice the rated voltage plus 1 000 V, 60 Hz, applied for 1 min.	JIS A 4302 4.2.1 (2) Insulation resistance (see NOTE) ≤150 V DC −0,1 MΩ −150 V DC but −300 V DC −0,2 MΩ NOTE JAPAN column indicates the insulation resistance which should be measured in commissioning inspection and annual inspection. It is not the voltage that the insulation must withstand during an insulation test.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of EN 81–1:1998, F.1.2.4.2, F.1.2.4.3, F.1.2.4.4, and F.1.2.4.5.
	F.1.2.4.4 Examination of clearances and creepage distances The clearances in air and creepage distances shall be in accordance with **14.1.2.2.3**.	**NOT in ASME A17.1/CSA B44**			
	F.1.2.4.5 Examination of the requirements appropriate to safety contacts and their accessibility (14.1.2.2) This examination shall be made taking account of the mounting position and the layout of the locking device, as appropriate.	**NOT in ASME A17.1/CSA B44**			

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.1.3 Test particular to certain types of locking devices **F.1.3.1 Locking device for horizontally or vertically sliding doors with several panels** The devices providing direct mechanical linkage between panels according to 7.7.6.1 or indirect mechanical linkage according to 7.7.6.2 are considered as forming part of the locking device. These devices shall be submitted in a reasonable manner to the tests mentioned in F.1.2. The number of cycles per minute in such endurance tests shall be suited to the dimensions of the construction.	**NOT in ASME A17.1/CSA B44**			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of EN 81–1:1998, F.1.3.
	F.1.3.2 Flap type locking device for hinged door **F.1.3.2.1** If this device is provided with an electric safety device required to check the possible deformation of the flap and if, after the static test envisaged in F.1.2.2.2 there are any doubts on the strength of the device, the load shall be increased progressively until the safety device begins to open. No component of the locking device or of the landing door shall be damaged or permanently deformed by the load applied.	**Not in ASME A17.1/CSA B44**			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of EN 81–1:1998, F.1.3.2.1.
	F.1.3.2.2 If, after the static test, the dimensions and construction leave no doubt as to its strength, it is not necessary to proceed to the endurance test on the flap.				

Table 1 *(continued)*

Sq #	EN 81–1:1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.1.4 Type examination certificate **F.1.4.1** The certificate shall be drawn up in triplicate, i.e. two copies for the applicant, and one for the laboratory. **F.1.4.2** The certificate shall indicate the following: a) information according to **F.0.2**; b) type and application of locking device; the type (A.C. and/or DC) and values of rated voltage and rated current; d) in the case of flap type door locking devices: the necessary force to actuate the electric safety device for checking the elastic deformation of the flap.	**8.3.1.3 Certification and Test Records** **8.3.1.3.1** A certificate shall be issued for a component or equipment that has been successfully tested. The certificate shall include the following: (a) the name of applicant (see 8.3.1.2.1); (b) the name of the manufacturer; (c) the manufacturer 's designation of the type or model tested; (d) the certifying organization's label/mark and the method of affixing the label/mark to each component or each piece of equipment subsequently manufactured, where required; (e) the method of testing, the test report, and a list of the instruments used (Note: this may be attached to the certificate); (f) the conditions for use of the certificate and label/mark; (g) a statement to the effect that the component or equipment tested has met the specified test requirements; (h) any other information required in ASME A17.1 or CSA B44; (i) the edition of the Code under which the component was tested and certified.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider harmonizing ASME A17.1-2010/CSA B44-10, 8.3.1.3 with EN 81–1:1998, F.1.4.
		8.3.1.3.2 The certificate shall be valid until recalled by the certifying organization or until the applicable requirements in ASME A17.1 or CSA B44 are changed unless otherwise stated (see 8.3.1.4).			
		8.3.1.3.3 The drawings and other documents submitted by the applicant (see 8.3.1.2), together with the original test records, data, performance curves, and certificate shall be filed, as a permanent record for future reference.			

NOTE 1 Sequence follows EN 81-1 requirements 7.7, F.0 and F.1.

NOTE 2 ASME A17.1/CSA B44 requirements in 2.12, part of 2.11, and 2.26, 8.3.1 and 8.3.3 and Japanese requirements are reorganized to match EN 81-1 as much as possible.

4.2 Buffers

Table 2 contains a comparison of buffers in the CEN-ASME/CSA-Japanese standards and prescriptive recommendations prepared by the TFC.

Table 2 — Convergence of CEN-ASME-Japan elevator standards — Buffers

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	10.3.3 Energy accumulation type buffers, with linear and nonlinear characteristics, shall only be used if the rated speed of the lift does not exceed 1 m/s.	**2.22.1.1.1** Spring buffers or their equivalent shall be permitted to be used where the rated speed is not in excess of 1 m/s (200 ft/min). Nonlinear type not covered.	Same as EN 81–1 for linear. Nonlinear characteristics apply less than 0,5 m/s.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of language in EN 81–1:1998, 10.3.3 pertaining only to linear buffer requirements. Equivalent types to be retained.
	10.3.5 Energy dissipation type buffers can be used whatever the rated speed of the lift.	**2.22.1.1.2** Oil buffers or their equivalent shall be used where the rated speed is in excess of 1 m/s (200 ft/min).	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of language in EN 81–1:1998, 10.3.5 pertaining only to linear buffer requirements. Equivalent types to be retained.
	NOT in EN 81–1	**2.22.4.7.2** A type test on an oil buffer shall be permitted to be acceptable for similarly designed buffers, provided that the longest stroke of the type is subjected to the type test; and the load range of the buffer is within the maximum and minimum range for the oil portings of the given buffer.	NOT in JIS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding requirements similar to 2.22.4.7.2.
	10.4.1 Energy accumulation type buffers **10.4.1.1 Buffers with linear characteristics** **10.4.1.1** The total possible stroke of the buffers shall be at least equal to twice the gravity stopping distance corresponding to 115 % of the rated speed ($0{,}135\ v^2$), the stroke being expressed in metres. However, the stroke shall not be less than 65 mm. Note 7: $\frac{2 \cdot (1{,}15v)^2}{2 \cdot g_n} = 0{,}134\ 8\ v^2$ rounded to $0{,}135\ v^2$.	**2.22.3 Spring Buffers** **2.22.3.1 Stroke.** The stroke of the buffer spring, as marked on its marking plate, shall be equal to or greater than the value specified in Table 2.22.3.1. **Table 2.22.3.1 Minimum Spring Buffer Stroke** Rated Car Speed (m/s) / Minimum Stroke (mm) 0,5 or less — 38 0,51 to 0,75 — 63 0,76 to 1,00 — 100	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Review minimum value of stroke based on ASME A17.1/CSA B44. Consider adoption of EN 81–1 linear principle. Consider buffer stroke minimum equivalent to ASME A17.1/CSA B44 or EN 81–1, and linear formula according to EN 81–1. For information, see ISO/TR 11071:2004, Figure A.2.
	10.4.1.1.2 Buffers shall be designed to cover the stroke defined in **10.4.1.1.1** under a static load of between 2,5 times and 4 times the sum of the mass of the car and its rated load (or the mass of the counterweight).	**2.22.3.2 Load Rating** **2.22.3.2.1** Buffers for cars and counterweights shall be capable of supporting, without being compressed solid or to a fixed stop, a static load having a minimum of 2 times the total weight of: (a) the car and its rated load for car buffers; (b) the counterweight for counterweight buffers **2.22.3.2.2** Buffers for cars and counterweights shall be compressed solid or to a fixed stop with a static load of three times the weight of: (a) the car and its rated load for car buffers; (b) the counterweight for counterweight buffers.	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Review reason for maximum and minimum values of static loads. Consider harmonization of values.

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	NOT in EN 81–1	**2.22.3.3 Marking Plates.** Each spring buffer shall be provided with a marking plate showing its load rating and stroke and the number of springs. Where the springs are removable, each spring shall be identified, and the assembly marking plate shall indicate this identification. Markings shall be made in a permanent and legible manner.	NOT in JIS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider marking requirements based on ASME A17.1/CSA B44
	10.4.1.2 Buffers with nonlinear characteristics **10.4.1.2.1** Energy accumulation type buffers with nonlinear characteristics shall fulfil the following requirements: a) hitting the car buffer with rated load in the car, in case of free fall with a speed of 115 % of the rated speed, the average retardation shall not be more than 1 g_n; b) retardation of more than 2,5 g_n shall not be longer than 0,04 s; c) the return speed of the car shall not exceed 1 m/s; d) there shall be no permanent deformation after actuation. **10.4.1.2.2** The term "fully compressed", mentioned in 5.7.1.1, 5.7.1.2, 5.7.2.2, 5.7.2.3 and 5.7.3.3 means a compression of 90 % of the installed buffer height.	**2.22.2 Solid Bumpers** Solid bumpers, where permitted, shall be made of wood or other suitably resilient material of sufficient strength to withstand without failure the impact of the car with rated load, or the counterweight, descending at governor tripping speed. The material used shall be of a type that will resist deterioration or be so treated as to resist deterioration. **SECTION 2.6 PROTECTION OF SPACE BELOW HOISTWAYS** **2.6.1** Where the space is underneath the counterweight and/or its guides (a) ..... (b) spring buffers, if used, shall conform to 2.22, except that they shall not be fully compressed when struck by the counterweight at the following speeds (see 2.1.2.3): (1) at governor tripping speed where the counterweight safety is governor operated, or (2) 125 % of the rated speed where the counterweight safety is not governor operated. **2.6.2** Where the space is underneath the car and/or its guides and if spring buffers are used, they shall be so designed and installed that they will not be fully compressed solid or to a fixed stop when struck by the car with its rated load at the governor tripping speed (see 2.1.2.3).	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding requirements similar to 10.4.1.2.1.

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	10.4.3.4 The normal operation of the lift shall depend on the return of the buffers to their normal extended position after operation. The device for checking this shall be an electric safety device in conformity with**14.1.2**.	**2.22.4.5 Plunger Return Requirements.** Oil buffers shall be so designed that: (a) the buffer plunger of gravity-return and spring-return-type oil buffers, when the buffer is filled with oil shall, when released after full compression, return to its fully extended position within 90 s; (c) gas spring-return oil buffers shall be provided with a switch conforming to 2.26.2.22 that shall be actuated if the plunger is not within 13 mm (0.5 in.) of the fully extended position; (b) the plunger of a spring-return-type oil buffer with a 20 kg (44 lb) weight resting on it shall, when released after being depressed 50 mm (2 in.), return to the fully extended position within 30 s.	NOT in JIS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider requirement similar to 10.4.3.4 as an alternative to relying only upon periodic testing.
	10.4.3.5 Buffers, if hydraulic, shall be so constructed that the fluid level can easily be checked.	**2.22.4.6 Means for Determining Oil Level.** Oil buffers shall be provided with means for determining that the oil level is within the maximum and minimum allowable limits. Glass sight gauges shall not be used.	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider permitting glass sight gauges on buffer
	NOT in EN 81–1	**2.22.4.9 Buffer Oil Requirements.** Oils used in oil buffers shall have a pour point of –18°C (0°F), or lower, as defined in ASTM D 97, and a viscosity index of 75, or higher, as defined in ASTM D 2270.	Not in JIS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider performance requirement for buffer fluid (see EN 81–1 F5.4.2 f and g).
	NOT in EN 81–1	**2.22.4.10.3** When compensating rope tie-down is present, the increase in load shall be taken into account (see 2.21.4.2).	Not in JIS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adding guidance as per ASME A17.1-2010/CSA B44-10, 2.22.4.10.3.

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	NOT in EN 81–1 In the case of hydraulic buffers, the graduation (openings for the passage of the liquid), in particular, shall be shown as a function of the stroke of the buffer; b) specifications for the liquid used.	**2.22.4.11 Buffer Marking Plate.** Every installed oil buffer shall have permanently attached thereto a metal plate, marked by the manufacturer in a legible and permanent manner, indicating: (a) the maximum and minimum loads and the maximum striking speeds for which the buffer has been rated for use in conformance with the requirements in 2.22; (b) the permissible range in viscosity of the buffer oil to be used, stated in Saybolt Seconds Universal at 38°C (100°F); (c) the viscosity index number of the oil to be used; (d) the pour point in degrees Celsius (Fahrenheit) of the oil to be used; (e) the stroke of the buffer in mm (in.); (f) the composition of the gas, if used; (g) the name, trademark, or file number by which the organization that manufactured the product can be identified; (h) the certification marking in accordance with 8.3.1.	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding requirements similar to 2.22.4.11 (i.e. buffer marking plate including load and striking speed range, fluid specification and gas specification if refillable gas return type buffer).
	F.5.2 Samples to be submitted The following shall be submitted to the laboratory: a) one buffer; b) in the case of hydraulic buffers, the necessary liquid sent separately.	**8.3.2.2 Test Sample.** Tests shall be made on a buffer of each type or design to be installed. Each buffer shall conform to the documents submitted and have the following oil portings: (a) the porting having the range of the maximum loads for which the buffer is designed (b) the porting having the range of the minimum loads for which the buffer is designed			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider revision of F.5.2 to clarify that each buffer type requires testing (i.e. revise (a) to read one buffer of each type)
	F.5.3.2 Energy dissipation buffers **F.5.3.2.1 Test procedure** The buffer shall be tested with the aid of weights, corresponding to the minimum and maximum masses, falling in free fall to reach at the moment of impact the maximum speed called for. The speed shall be recorded at least from the moment of impact of the weights. The acceleration and the retardation shall be determined as a function of time throughout the movement of the weights. NOTE This procedure relates to hydraulic buffers; for other types proceed by analogy. **F.5.3.2.2 Equipment to be used** The equipment shall satisfy to the following conditions:	**8.3.2 Type Tests of Car and Counterweight Oil Buffers**	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider tolerances equivalent to F.5.3.2 found in Table F.0.1.6.

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.5.3.2.2.1 Weights falling in free fall The weights shall correspond with the tolerances of **F.0.1.6**, to the maximum and minimum masses. They shall be guided vertically with the minimum of friction possible. **F.5.3.2.2.2 Recording equipment** The recording equipment shall be able to detect signals with the tolerances of **F.0.1.6** (EV: 0,01 s) The measuring chain, including the recording device for the recording of measured values as a function of time, shall be designed with a system frequency of at least 1000 Hz. **F.5.3.2.2.3 Measurement of speed** The speed shall be recorded at least from the moment of impact of the weights on the buffer or throughout the travel of the weights with the tolerances of **F.0.1.6**.	**8.3.2.3 Testing Equipment.** The testing equipment shall be of such design as to perform the tests specified herein and to determine that the buffer conforms to all the requirements of 2.22 for oil buffers and shall also conform to 8.3.2.3.1 to 8.3.2.3.3. **8.3.2.3.1 Calibration of Test Weight.** The required drop test load shall be accurate to within ±1 %. **8.3.2.3.2 Guiding of Test Weight.** The test weight shall be so guided as to ensure that when dropped onto the buffer, its travel shall be substantially vertical. **8.3.2.3.3 Test Instruments.** The instruments used to measure the test results shall conform to the following requirements: (a) The instruments shall be of the recording type.			
	F.5.3.2.2.4 Measurement of the retardation If there is a device for measuring retardation (see **F.5.3.2.1**), it shall be placed as near as possible to the axis of the buffer, and shall be capable of measurement with the tolerances of **F.0.1.6** (EV ± 2 %). **F.5.3.2.2.5 Measurement of time** Time pulses of a duration of 0,01 s shall be recorded and measured with the tolerances of **F.0.1.6.**. (EV 0,01 s). **F.5.3.2.3 Ambient temperature** The ambient temperature shall lie between +15 °C and +25 °C. The temperature of the liquid shall be measured with the tolerances of **F.0.1.6**. **F.5.3.2.4 Mounting of the buffer** The buffer shall be placed and fixed in the same manner as in normal service.	(b) The instruments shall provide data, for the plotting of the buffer performance curves showing time intervals, travel of test weight, velocity of test weight, and retardation of test weight during the buffer stroke, that shall be accurate to within the following tolerances: (1) The timing device shall record time in increments of not more than 1/60 s during the entire buffer stroke. (2) Time increments and total time shall be recorded with an error of less than ±0,5 %. (3) The position of the test weight at each time interval shall be recorded with an error of less than ±0,1 %. (4) Time, travel, velocity, and retardation shall be determined by means of a device that will provide the accuracy specified.			

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	Not in EN 81–1	**8.3.2.4 Installation of Buffer and Preparations for Tests** **8.3.2.4.1 Foundation and Location of Buffer.** A buffer of the spring-return type shall be placed on a foundation designed to withstand without appreciable deformation the forces resulting from the buffer compression on the drop tests. The buffer shall be installed in a vertical position and located centrally with relation to the drop-test weight. **8.3.2.4.2 Securing of Buffer.** The buffer shall be secured by bolts in accordance with the manufacturer's drawings or by equivalent means to: (a) the foundation for buffers of the spring-return type (b) the underside of the centre of the test drop-weight for buffers of the gravity-return type The centerline of the buffer, when secured in place, shall be vertical to within 0,25 mm (0.01 in.) in the stroke of the buffer. **8.3.2.4.3 Special Adjustments.** The buffer test shall be on a production model or a buffer identical to the model to be produced. Modifications or special adjustments for the purpose of meeting the test requirements are prohibited.			
	F.5.3.2.6 Checks **F.5.3.2.6.1 Checking of retardation** The height of free fall of the weights shall be chosen in such a way that the speed at the moment of impact corresponds to the maximum impact speed stipulated in the application. The retardation shall conform to the requirements of **10.4.3.3** (EV 115) of this standard. A first test shall be made with maximum mass with a check on the retardation. A second test shall be made with minimum mass with a check on the retardation.	**8.3.2.5 Buffer Tests.** Each oil buffer with oil portings as submitted shall be subjected to tests for retardation, strength, oil leakage, plunger return, and lateral plunger movement, as hereinafter specified. **8.3.2.5.1 Retardation Tests.** The following drop tests shall be made for each buffer porting specified in 8.3.2.2, from a height such that the striking velocity of the falling weight will be equal to 115 % of the rated car speed for which the buffer is designed: (a) three drop tests with a total test weight equal to the manufacturer's rated maximum load for which the porting is designed [see 8.3.2.2 (a)] (b) one drop test with a total test weight equal to the manufacturer's rated minimum load for which the porting is designed (see 2.7.2.2)			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adding strength tests as specified in ASME A17.1-2010/CSA B44-10, 8.3.2.5.2.

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.5.3.2.6.2 Checking of the return of the buffer to the normal position After each test the buffer shall be held in the completely compressed position for 5 min. The buffer shall then be freed to permit its return to its normal extended position. When the buffer is of a type with spring or gravity return, the position of complete return shall be reached in a maximum period of 120 s. Before proceeding to another retardation test there shall be a delay of 30 min to permit the liquid to return to the tank and for bubbles of air to escape.	**8.3.2.5.1** (second paragraph) Following each drop test, the buffer shall be held its fully compressed position for a period of 5 min, and shall then be allowed to return free to its fully extended position and stand for **30 min** to permit return of the oil to the reservoir and to permit escape of any air entrained in the oil. **8.3.2.5.4** (first paragraph) **Plunger Return Test.** During the drop tests specified in 8.3.2.5.1 and 8.3.2.5.2, the time required for the buffer plunger to return to its fully extended position, measured from the instant the test weight is raised clear of the buffer until the plunger has returned to its fully extended position, shall be noted. This time shall be not more than 90 s. **8.3.2.5.1** (third paragraph) …On each of these tests, the average retardation of the test weight, during the stroke of the buffer, shall not exceed 9,81 m/s^2 (32.2 ft/s^2), and any retardation peak having a duration of more than 0,04 s shall not exceed 24,5 m/s^2 (80.5 ft/s^2).			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Phase 2 — Consider harmonizing buffer return times
	F.5.3.2.6.3 Checking of the liquid losses The level of liquid shall be checked after having made the two retardation tests required in **F.5.3.2.6.1**, and after an interval of 30 min the level of liquid shall again be sufficient to ensure normal operation of the buffer. **Not in EN 81–1**	**8.3.2.5.3 Oil Leakage Tests**. Tests for oil leakage shall be made concurrently with the retardation tests specified in 8.3.2.5.1, and the drop test specified in 8.3.2.5.2 (a)(2), to determine the loss of oil during these tests. The oil level shall be noted after the buffer has returned to its fully extended position following each drop test, and after the time interval specified in 8.3.2.5.1. The drop in oil level, as indicated by these measurements, shall show no loss of oil exceeding 5 mm/m (0.06 in./ft) of buffer stroke, but in no case shall the loss be such as to lower the oil level below the bottom of the plunger or below the highest metering orifice, whichever is higher. Where the volume of oil above the porting is small when the buffer is filled to its normal working level, the laboratory shall be permitted to make additional tests for oil leakage			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of performance type requirement as per F.5.3.2.6.3.

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.5.3.2.6.4 Checking of the condition of the buffer after tests After the two retardation tests required in F.5.3.2.6.1 no part of the buffer shall show any permanent deformation or be damaged so that its condition shall guarantee normal operation. **F.5.3.2.7 Procedure in the case of tests failing the requirements** When the test results are not satisfactory with the minimum and maximum masses appearing in the application, the laboratory may, in agreement with the applicant, establish the acceptable limits.	**8.3.2.5.1** (fourth paragraph) On completion of the drop tests, no part of the buffer shall show any permanent deformation or injury. **8.3.2.6.3** When the test results are not satisfactory with the minimum and maximum total loads appearing in the application, the laboratory shall be permitted to, in agreement with the applicant, establish the acceptable limits. **8.3.2.5.4** (second paragraph) Should the plunger fail to return to its fully extended position, or should the time required for it to return to its fully extended position exceed the time specified, the manufacturer shall either submit a duplicate buffer or install a new pressure cylinder and piston, following which the plunger-return test shall be repeated. Should the buffer again fail to meet the plunger-return test requirements, it shall be rejected.			
	Not in EN 81–1	**8.3.2.5.2 Strength Tests** (a) Two drop tests shall be made as follows: (1) One drop test shall be made with the porting as specified in 8.3.2.2 (a), with a total test weight equal to 120 % of the manufacturer's rated maximum load, from a height such that the maximum velocity attained by the falling weight during the buffer compression shall be equal to 125 % of the rated car speed for which the buffer is rated. In this test, the retardation shall be noted and shall be permitted to exceed the values specified in 8.3.2.5.1. Immediately following this test, the buffer shall be examined externally for visible deformation or injury. If no damage is apparent, the buffer shall then be fully compressed at low speed and then released to determine if it will return freely to its extended position. (2) After the buffer has been examined externally and has returned freely to its extended position, a second drop test shall be made from the same height and with the same load as specified in 8.3.2.5.1 (a). During this test, the retardation shall not exceed the corresponding retardation developed in the test specified in 8.3.2.5.1 (a) by more than 5 %.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding strength tests as specified in ASME A17.1-2010/CSA B44-10 8.3.2.5.2.

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
		(b) If for given stroke of buffer having more than one porting, the construction of the buffer varies for the different portings, then a strength test similar to that specified in 8.3.2.5.2 (a)(1) shall also be made for the porting having the range at minimum loads for which the porting is designed as specified in 8.3.2.2 (b). Following each drop test, the buffer shall be held in its fully compressed position for a period of 5 min, and shall then be allowed to freely return to its fully extended position and stand for 30 min to permit return of the oil to the reservoir and to permit the escape of any air entrained in the oil.			

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	Not in EN 81–1	**8.3.2.5.4 Plunger Return Test.** (first and second paragraphs — see above) (third paragraph) Buffers of the spring-return type shall be tested for plunger return with a 20 kg (45 lb) test weight resting on top of the plunger during the test. The plunger shall be depressed 50 mm (2 in.) and when released, the plunger, while supporting the test weight, shall return to its fully extended position within 30 s.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding tests as specified in ASME A17.1-2010/CSA B44-10 8.3.2.5.2.
	Not in EN 81–1	**8.3.2.5.5 Tests for Lateral Movement.** The following tests shall be made for lateral movement. (a) Spring-Return-Type Buffers. The lateral movement at the top of the fully extended plunger shall be accurately measured, the upper end of the plunger being moved by hand from its extreme right to its extreme left position. One-half of the total movement measured shall be considered as being the true lateral movement at the top of the plunger and shall not exceed 5 mm/m (0.06 in./ft) of buffer stroke. (b) Gravity-Return-Type Buffers. A similar test for lateral movement shall be made. The measurement shall be taken at the lower end of the buffer cylinder when the buffer plunger is fully extended and braced to prevent lateral movement. One-half of the total movement measured shall not exceed 5 mm/m (0.06 in./ft) of buffer stroke.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider elimination of this test or incorporation into design requirements.

Table 2 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.5.4 Type examination certificate **F.5.4.1** The certificate shall be drawn up in triplicate, i.e. two copies for the applicant, and one for the laboratory. **F.5.4.2** The certificate shall indicate the following: a) information according to F.0.2; b) type and application of buffer; c) the maximum impact speed; d) the maximum mass; e) the minimum mass; f) the specification of the liquid in the case of hydraulic buffers; g) environmental conditions for use (temperature, humidity, pollution, etc.) in case of buffers with nonlinear characteristics.	**8.3.2.6 Certification** **8.3.2.6.1** After the buffer has been subjected to all of the specified tests, and all test records and data indicate that it conforms to 2.22, and to the requirements of 8.3.2, the laboratory shall issue a test report and a certificate to the manufacturer. **8.3.2.6.2** The certificate shall conform to 8.3.1.3.1 and shall include the following: (a) the maximum impact speed (b) the maximum total load (c) the minimum total load (d) specification of the fluid (e) a statement to the effect that the buffer having the particular stroke and portings tested has met the requirements of 2.22 and 8.3.2 for the maximum and minimum loads as stated in the certificate.	Same as EN 81–1 for self-certification. Third party certification to be considered in the future.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding requirements similar to F.5.4.2 g).

4.3 Governors

Table 3 contains a comparison of overspeed governors in the CEN – ASME/CSA – Japanese Standards and prescriptive recommendations prepared by the TFC.

Table 3 — Convergence of CEN-ASME-Japan elevator standards — Overspeed governor

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	9.9 Overspeed governor	**SECTION 2.18** **SPEED GOVERNORS** **2.18.1 Speed Governors Required and Location** **2.18.1.1** Counterweight safeties, where provided with rated speeds over 0,75 m/s (150 ft/min), and car safeties shall be actuated by separate speed governors. Where counterweight safeties are furnished to provide ascending car overspeed protection in accordance with 2.19.1.1, they shall be actuated by a counterweight speed governor (see 2.17.4). **2.18.1.2** The governor shall be located where it cannot be struck by the car or the counterweight in case of overtravel, and where there is adequate space for full movement of governor parts.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, 9.9.1 and F4.
	9.9.1 Tripping of the overspeed governor for the car safety gear shall occur at a speed at least equal to 115 % of the rated speed and less than: a) 0,8 m/s for instantaneous safety gears, except for the captive roller type, or b) 1 m/s for safety gears of the captive roller type, or c) 1,5 m/s for instantaneous safety gears with buffered effect and for progressive safety gear used for rated speeds not exceeding 1,0 m/s, or d) $1{,}25 \cdot v + \frac{0{,}25}{V}$ in metres per second for progressive safety gear for rated speeds exceeding 1,0 m/s. NOTE For lifts where the rated speed exceeds 1 m/s, it is recommended to choose a tripping speed as close as possible to the value required in d).	**2.18.2 Tripping Speeds for Speed Governors** **2.18.2.1 Car Speed Governors.** Speed governors for car safeties shall be set to trip at car speeds as follows: (a) at not less than 115 % of the rated speed. (b) at not more than the tripping speed listed opposite the applicable rated speed in Table 2.18.2.1**. Maximum tripping speeds for intermediate rated speeds shall be determined from Figure 8.2.5*. For rated speeds exceeding 10 m/s (2,000 ft/min), the maximum tripping speeds shall not exceed 120 % of the rated speed.			

Table 3 *(continued)*

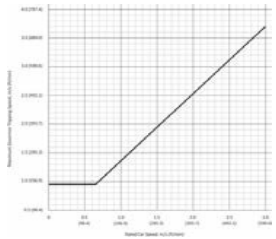
Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
		Table 2.18.2.1 Maximum Car Speeds at Which Speed Governor Trips and Governor Overspeed Switch Operates SI Units Rated Speed, m/s: 0–0.63; 0.75; 0.87; 1.00; 1.12; 1.25; 1.50; 1.75; 2.00; 2.25; 2.50; 3.00; 3.50; 4.00; 4.50; 5.00; 5.50; 6.00; 6.50; 7.00; 7.50; 8.00; 8.50; 9.00; 9.50; 10.00 Maximum Car Speed at Which Governor Trips Speed, m/s: 0.90; 1.05; 1.25; 1.40; 1.55; 1.70; 2.00; 2.30; 2.55; 2.90; 3.15; 3.70; 4.20; 4.85; 5.50; 6.00; 6.60; 7.20; 7.80; 8.40; 9.00; 9.60; 10.20; 10.80; 11.40; 12.00 Maximum Car Speed at Which Governor Overspeed Switch Operates, Down, m/s [NOTE (1)]: 0.81; 0.95; 1.13; 1.26; 1.40; 1.53; 1.80; 2.07; 2.30; 2.61; 2.84; 3.32; 4.09; 4.61; 5.23; 5.78; 6.27; 6.84; 7.41; 7.98; 8.55; 9.12; 9.69; 10.26; 10.83; 11.40 NOTE: (1) See 2.18.4.2.2. Figure 8.2-5 – Maximum Governor Tripping Speeds 			
	9.9.2 For lifts with very heavy rated loads and low rated speeds, the overspeed governor shall be specially designed for this purpose. NOTE It is recommended to choose a tripping speed as close as possible to the lower limit indicated in **9.9.1**. **9.9.3** The tripping speed of an overspeed governor for a counterweight or balancing weight safety gear shall be higher than that for the car safety gear according to **9.9.1**, not, however exceeding it by more than 10 %.	**2.18.2.2 Counterweight Speed Governors.** Speed governors, where provided for counterweight safeties, shall be set to trip at an overspeed greater than that at which the car speed governor is to trip, but not more than 10 % higher.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, 9.9.2 and F4.

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	9.9.4 The tensile force in the overspeed governor rope produced by the governor, when tripped, shall be at least the greater of the following two values: a) twice that necessary to engage the safety gear; b) 300 N. Overspeed governors using only traction to produce the force shall have grooves which a) have been submitted to an additional hardening process, or b) have an undercut in accordance with **M.2.2.1**. **9.9.5** The direction of rotation, corresponding to the operation of the safety gear, shall be marked on the overspeed governor.	**2.18.6 Design of Governor-Rope Retarding Means for Type B Safeties** Type B car and counterweight safeties shall be activated by a speed governor with a governor-rope retarding means conforming to 2.18.6.1 to 2.18.6.5. **2.18.6.1** Upon activation at the tripping speeds given by 2.18.2, the means shall retard the rope with a force that is at least 67 % greater than the force required to activate the safety or to trip the governor-rope releasing carrier, where used (see 2.17.15). **2.18.7.1** The arc of contact between the governor rope and the governor sheave shall, in conjunction with a governor-rope tension device, provide sufficient traction to cause proper functioning of the governor **2.18.7.3** Governor sheave grooves shall have machine-finished surfaces. Governor tension sheaves shall have machine-finished grooves for rated car speeds of more than 0,75 m/s (150 ft/min). Machined governor sheave grooves shall have a groove diameter of not more than 1,15 times the diameter of the governor rope.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider groove diameter of not more than 1.15 times the diameter of the governor rope. Consider revising requirements to be more performance-based, based on pull-through force.
	9.9.6 Overspeed governor ropes **9.9.6.1** The overspeed governor shall be driven by a wire rope designed for that purpose. **9.9.6.2** The minimum breaking load of the rope shall be related by a safety factor of at least 8 to the tensile force produced in the rope of the overspeed governor when tripped taking into account a friction factor μ_{max} equal to 0,2 for traction type overspeed governor. **9.9.6.3** The nominal rope diameter shall be at least 6 mm.	**2.18.5 Governor Ropes** Governor ropes shall comply with the requirements of ASME A17.6 Part 1 and the following. **2.18.5.1 Material and Factor of Safety.** Governor ropes shall be made of iron, steel, monel metal, phosphor bronze, or stainless steel. They shall be of a regular-lay construction and not less than 6 mm (0.25 in) in diameter. The factor of safety of governor ropes shall be not less than 5. Where provided, ropes of a diameter less than 9,5 mm (0.375 in.) shall have a factor of safety of not less than 8 and shall be of a 6, 8, or 9 strand construction. Tiller-rope construction shall not be used. **2.18.5.2 Speed-Governor-Rope Clearance.** During normal operation of the elevator, the governor rope shall run free and clear of the governor jaws, rope guards, or other stationary parts.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider sheave diameter requirements for ropes larger than 9,5 mm.

Table 3 *(continued)*

<table>
<tr><th>Sq #</th><th>EN 81–1 1998+Amd. A3:2009</th><th>ASME A17.1–2010/CSA B44–10</th><th>Japan</th><th>ISO/
TS 22559-2</th><th>Comments and proposals for convergence</th></tr>
<tr><td></td><td></td><td>2.18.5.3 Governor-Rope Tag. A metal data tag shall be securely attached to the governor-rope fastening. This data tag shall bear the following wire-rope data:
(a) the diameter (mm or in.)
(b) the manufacturer’s rated breaking strength
(c) the grade of material used
(d) the year and month the rope was installed
(e) whether nonpreformed or preformed
(f) construction classification
(g) name of the person or organization who installed the rope</td><td></td><td></td><td></td></tr>
<tr><td></td><td>9.9.6.4 The ratio between the pitch diameter of the pulleys for the overspeed governor rope and the nominal rope diameter shall be at least 30.</td><td>2.18.7.4 Where governor ropes of a diameter of 9,5 mm (0.375 in.) or greater are used, the pitch diameter of governor sheaves and governor tension sheaves shall be not less than the product of the diameter of the rope and the applicable multiplier listed in Table 2.18.7.4, based on the rated speed and the number of strands in the rope. Where governor ropes of a diameter less than 9,5 mm (0.375 in.) are used, the governor sheave shall have a pitch diameter of not less than the product of the diameter of the rope and a multiplier of 30.
Table 2.18.7.4 Multiplier for Determining Governor Sheave Pitch Diameter</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td><table><tr><th>Rated speed m/s</th><th>Number of strands</th><th>Multiplier</th></tr><tr><td>1,00 or less</td><td>6</td><td>42</td></tr><tr><td>1,00 or less</td><td>8 or 9</td><td>30</td></tr><tr><td>Over 1,00</td><td>6</td><td>46</td></tr><tr><td>Over 1,00</td><td>8 or 9</td><td>32</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td></td><td>9.9.6.5 The overspeed governor rope shall be tensioned by a tensioning pulley. This pulley (or its tensioning weight) shall be guided.
9.9.6.6 During the engagement of the safety gear, the overspeed governor rope and its attachments shall remain intact, even in the case of a braking distance greater than normal.
9.9.6.7 The overspeed governor rope shall be easily detachable from the safety gear.</td><td>2.18.6.4 The means shall provide a continuous tension in the governor rope as required to operate the safety during the entire stopping interval in accordance with 2.17.5.2.</td><td></td><td></td><td>Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding the wording “as required to operate the safety during the entire stopping interval” from ASME A17.1-2010/CSA B44-10, 9.9.6.5.</td></tr>
</table>

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	9.9.7 Response time The response time of the overspeed governor before tripping shall be sufficiently short not to permit a dangerous speed to be reached before the moment of safety gear operation (see **F.3.2.4.1**).	**2.17.11 Maximum Permissible Movement of Governor Rope to Operate the Safety Mechanism** For all Type B safeties, the movement of the governor rope, relative to the car or the counterweight, respectively, required to operate the safety mechanism from its fully retracted position to a position where the safety jaws begin to exert pressure against the guide rails, shall not exceed the following values based on rated speed: (a) for car safeties: (1) 1 m/s (200 ft/min) or less, 1 070 mm (42 in.) (2) 1,01 m/s (201 ft/min) to 1,9 m/s (375 ft/min), 915 mm (36 in.) (3) over 1,9 m/s (375 ft/min), 756 mm (30 in.) (b) for counterweight safeties, all speeds, 1 070 mm (42 in.)			
	9.9.8 Accessibility **9.9.8.1** The overspeed governor shall be accessible and reachable for inspection and maintenance. **9.9.8.2** If located in the well the overspeed governor shall be accessible and reachable from outside the well. **9.9.8.3** The requirement of **9.9.8.2** does not apply if the following three conditions are fulfilled: a) the tripping of the overspeed governor according to **9.9.9** is effected by means of a remote control, except cableless, from outside the well whereby an involuntary tripping is not effected and the actuation device is not accessible to unauthorized persons; b) the overspeed governor is accessible for inspection and maintenance from the roof of the car or from the pit; c) the overspeed governor returns after tripping automatically into the normal position, as the car, counterweight or balancing weight is moved in the upward direction. However the electrical parts may return into the normal position by remote control from the outside of the well which shall not influence the normal function of the overspeed governor.	**2.7.6.3.4** Where a governor is located inside the hoistway, means of access conforming to the requirements of 2.7.3.3 and 2.7.3.4 for inspection and servicing the governor shall be provided from outside the hoistway. The access opening shall not be required where: (a) the governor can be inspected and serviced from the top of the car or adjacent car, and the governor can be tripped for testing from the adjacent car or outside the hoistway; and means are furnished to prevent movement of the car when servicing the governor. A sign with the words "SECURE CAR AGAINST MOVEMENT BEFORE SERVICING THE GOVERNOR" shall be prominently posted and be visible from the governor. The sign shall conform to ANSI Z535.2 or CAN/CSA-Z321, whichever is applicable. The sign shall be of such material and construction that the letters and figures stamped, etched, cast, or otherwise applied to the face shall remain permanently and readily legible; (b) for elevators in a single hoistway, the governor can be reset automatically when the car is moved in the up direction or the governor can be reset from outside the hoistway.	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adding a sign with the wording "SECURE CAR AGAINST MOVEMENT BEFORE SERVICING THE GOVERNOR" to EN 81. Priority 2 — Consider adoption of text and requirements of 9.9.8.

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	9.9.9 Possibility of tripping the overspeed governor During checks or tests it shall be possible to operate the safety gear at a lower speed than that indicated in **9.9.1** by tripping the overspeed governor in a safe way. **9.9.10** If the overspeed governor is adjustable, the final setting shall be sealed.	**2.18.6.5** The governor shall be arranged to be manually tripped or activated to facilitate the tests specified in 8.10 and 8.11. NOTE Manually tripped or activated includes means such as but not limited to a finger, hand or cable-actuated lever, cam, etc., or some form of electromechanical actuation. **2.18.3 Sealing and Painting of Speed Governors** **2.18.3.1** Speed governors shall have their means of speed adjustment sealed after test. If speed governors are painted after sealing, all bearing and rubbing surfaces shall be kept free or freed of paint and a hand test made to determine that all parts operate freely as intended. **2.18.3.2** Where the rope retarding means provides for adjustment of the rope pull through force (tension), means shall be provided to seal the means of adjustment of the rope tension. **2.18.3.3** Seals shall be of a type that will prevent readjustment of the sealed governor adjustments without breaking the seal. Provision shall be made to enable affixing seals after tests.	Similar to EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adding wording of **2.18.3.3.** "Seals shall be of a type that will prevent readjustment of the sealed governor adjustments without breaking the seal. Provision shall be made to enable affixing seals after tests." Priority 1 — Consider adoption of text and requirements of 9.9.9 and 9.9.10.

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	9.9.11 Electrical checking **9.9.11.1** The overspeed governor **or another device** shall, by means of an electric safety device in conformity with **14.1.2**, initiate the stopping of the lift machine before the car speed, either up or down, reaches the tripping speed of the governor. However, for rated speeds **not exceeding 1 m/s**, this device may operate at latest **at the moment when the tripping speed of the governor is reached.**	**2.18.4 Speed-Governor Overspeed Switch** **2.18.4.1 Where Required and Function** **2.18.4.1.1** A switch shall be provided on every car and counterweight speed governor (see 2.26.2.10). **2.18.4.1.2** The switches required in 2.18.4.1.1 shall be operated by the overspeed action of the governor, except that the counterweight governor switch shall be permitted to be operated upon activation of the counterweight governor-rope retarding means (see 2.18.6.1). **2.18.4.2 Setting of Car Speed-Governor Overspeed Switches.** The setting of the car speed-governor overspeed switch shall conform to 2.18.4.2.1 to 2.18.4.2.5. **2.18.4.2.1** For rated speeds more than **0,75 m/**s (150 ft/min), **up to and including 2,5 m/s** (500 ft/min), the car speed-governor overspeed switch shall open in the down direction of the elevator at not more than 90 % of the speed at which the governor is set to trip in the down direction.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of text and requirements of 9.9.11 for another device. Priority 2 — Consider adoption of performance-based requirements as per 9.9.11.1.

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
		2.18.4.2.2 For rated speeds more than 2,5 m/s (500 ft/min), the car speed-governor overspeed switch shall open in the down direction of the elevator at not more than 95 % of the speed at which the governor is set to trip in the down direction. **2.18.4.2.3** For elevators with static control, the car speed-governor overspeed switch shall open in the down direction of the elevator at not more than 90 % of the speed at which the governor is set to trip in the down direction. **2.18.4.2.4** The switch, when set as specified in either 2.18.4.2.1, 2.18.4.2.2, or 2.18.4.2.3, shall open in the up direction at not more than 100 % of the speed at which the governor is set to trip in the down direction. **2.18.4.2.5** The speed-governor overspeed switch shall be permitted to open in the down direction of the elevator at not more than 100 % of the speed at which the governor is set to trip in the down direction, subject to the following requirements: (a) A speed-reducing switch of the manually reset type is provided on the governor, that will reduce the speed of the elevator in case of overspeed, and that shall be set to open as specified in 2.18.4.2.1, 2.18.4.2.2, or 2.18.4.2.3. (b) Subsequent to the first stop of the car following the opening of the speed-reducing switch, the car shall remain inoperative until the switch is manually reset.			

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	9.9.11.2 If after release of the safety gear (**9.8.5.2**) the overspeed governor does not automatically reset itself, an electric safety device in conformity with **14.1.2** shall prevent the starting of the lift while the overspeed governor is not in the reset position. This device shall, however, be made inoperative in the case provided for in **14.2.1.4 c) 2)**. **9.9.11.3** The breakage or excessive rope stretch of the governor rope shall cause the motor to stop by means of an electric safety device in conformity with 14.1.2.	**2.18.4.3 Setting of the Counterweight Governor Switch.** Where the counterweight governor switch is operated by the overspeed action (see 2.18.2.2), the switch shall be set to open when the counterweight is descending at a speed greater than the elevator rated speed, but not more than the speed at which the counterweight governor is set to trip. **2.18.4.4 Type of Speed-Governor Overspeed Switches and Speed-Reducing Switches.** Switches used to perform the function specified shall be positively opened. Overspeed and speed-reducing switches permitted by 2.18.4.2.5 and operated by the speed governor shall remain in the open position until manually reset. NOTE Manual reset includes means such as a finger, hand or cable-actuated lever, cam, etc., or some form of electromechanical actuation from the location of elevator controllers located outside the hoistway or the enclosure as specified in 2.7.6.5. **2.18.7.2** Where the rope force imparted to the governor rope (see 2.18.6.1) necessary to activate the safety, or to trip the releasing carrier, if used, is dependent upon the tension in the governor rope prior to governor tripping, a switch or switches mechanically opened by the governor tension sheave before the sheave reaches its upper or lower limit of travel shall be provided. This switch shall be of the manually reset type and shall conform to 2.26.4.3. Subsequent to the first stop of the car following the opening of the switch, the car shall remain inoperative until the switch is manually reset.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of requirements as per 9.9.11.2 and 9.9.11.3.
	9.9.12 The overspeed governor is regarded as a safety component and shall be verified according to the requirements in **F.4**.				

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
		2.18.8 Factors of Safety in Load-Bearing Parts of Speed Governor **2.18.8.1** Material, except cast iron, used in load-bearing parts of speed governors shall have a factor of safety of not less than 3,5, and the materials used shall have an elongation of not less than 15 % in a length of 50 mm (2 in.) when tested in accordance with ASTM E8. Forged, cast, or welded parts shall be stress relieved. Cast iron shall have a factor of safety of not less than 10. **2.18.8.2** The factors of safety shall be based upon the maximum stresses developed in the parts during normal or governor tripping operation.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4.
		2.18.9 Speed-Governor Marking Plate A metal plate shall be securely attached to each speed governor and shall be marked in a legible and permanent manner with letters and figures not less than 6 mm (0.25 in.) in height indicating the following: (a) the speed in m/s (ft/min) at which the governor is set and sealed to trip the governor-rope retarding means; (b) the size, material, and construction of the governor rope on which the governor-rope retarding means were designed to operate; (c) the governor pull-through tension (force) in N (lbf) (see 2.18.6.2); (d) manufacturer's name or trademark; (e) statement "DO NOT LUBRICATE GOVERNOR ROPE".			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of requirements in ASME A17.1-2010/CSA B44-10, 2.18.9 (b), (c) and (e)

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	Annex F (normative) **Safety components — Tests procedures for verification of conformity** **F.4 Overspeed governors** **F.4.1 General provisions** The applicant shall indicate the following to the laboratory: a) the type (or the types) of safety gear which will be operated by the governor; b) the maximum and minimum rated speeds of lifts for which the governor may be used; c) the anticipated value of the tensile force produced in the rope by the overspeed governor when tripped. The following documents are to be attached to the application: Detailed and assembly drawings showing the construction, operation, materials used, the dimensions and tolerances on the construction components.	— Governors are tested during: — **Acceptance Inspections and Tests of governors** are described in 8.10.2.2.2 (hh) and (ii) The latter, 8.10.2.2.2 (ii) is copied in Convergence — Part 3 — Safety Gears — For comparison copied below is also **8.10.2.2.2 (hh)** **(hh) Governor, Overspeed Switch, and Seal (Item2.13)** (1) The tripping speed of the governor and the speed at which the governor overspeed switch operates shall be tested to determine conformance with 2.18.2 and 2.18.4. (2) The governor rope pull-through and pull-out forces shall be tested to determine conformance with 2.17.15 and 2.18.6. If adjustments are made to the governor it shall be sealed immediately following the test. (3) The adjustable means shall be sealed (2.18.3). (4) A marking plate conforming to 2.18.9 shall be attached at the governor. (5) Access and securing of car, if applicable (2.7.6.3.4).			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adoption of EN 81–1:1998, 9.9 and F4.
	F.4.2 Check on the characteristics of the governor **F.4.2.1 Test samples** The following shall be submitted to the laboratory: a) one overspeed governor; b) one rope of the type used for the overspeed governor and in the normal condition in which it should be installed. The length to be supplied is fixed by the laboratory; c) a tensioning pulley assembly of the type used for the overspeed governor.				
	F.4.2.2 Test **F.4.2.2.1 Method of test** The following shall be checked: a) the speed of tripping; b) the operation of the electric safety device called for in **9.9.11.1** causing the machine to stop, if this device is mounted on the overspeed governor; c) the operation of the electric safety device called for in **9.9.11.2** preventing all movement of the lift when the overspeed governor is tripped; d) the tensile force produced in the rope by the overspeed governor when tripped.				

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.4.2.2.2 Test procedure At least 20 tests shall be made in the speed range for tripping corresponding to the range of rated speeds of the lift, indicated in F.4.1 b). NOTE 1 The tests may be made by the laboratory in the component manufacturers works. NOTE 2 The majority of tests should be made at the extreme values of the range. NOTE 3 The acceleration to reach the tripping speed of the overspeed governor should be as low as possible, in order to eliminate the effects of inertia.				
	F.4.2.2.3 Interpretation of the test results **F.4.2.2.3.1** In the course of 20 tests the tripping speeds shall lie within the limits called for in **9.9.1**. NOTE If the limits laid down are exceeded, an adjustment may be made by the manufacturer of the component and 20 new tests carried out. **F.4.2.2.3.2** In the course of the 20 tests the operation of the devices for which the test is required in **F.4.2.2.1 b)** and **c)** shall occur within the limits laid down in **9.9.11.1** and **9.9.11.2**. **F.4.2.2.3.3** The tensile force in the rope produced by the overspeed governor when tripped shall be at least 300 N or any higher value which is specified by the applicant. NOTE 1 Unless otherwise requested by the manufacturer of the device and specified in the test report, the arc of engagement should be 180°. NOTE 2 In the case of a device, which operates by gripping the rope it should be checked that there is no permanent deformation of the rope.				

Table 3 *(continued)*

Sq #	EN 81–1 1998+Amd. A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and proposals for convergence
	F.4.3 Type examination certificate **F.4.3.1** The certificate shall be drawn up in triplicate, i.e. two copies for the applicant, and one for the laboratory. **F.4.3.2** The certificate shall indicate the following: a) information according to **F.0.2**; b) type and application of overspeed governor; c) the maximum and minimum rated speeds of the lift for which the overspeed governor may be used; d) the diameter of the rope to be used and its construction; e) in the case of an overspeed governor with traction pulley, the minimum tensioning force; f) the tensile force in the rope which can be produced by the overspeed governor when tripped.				

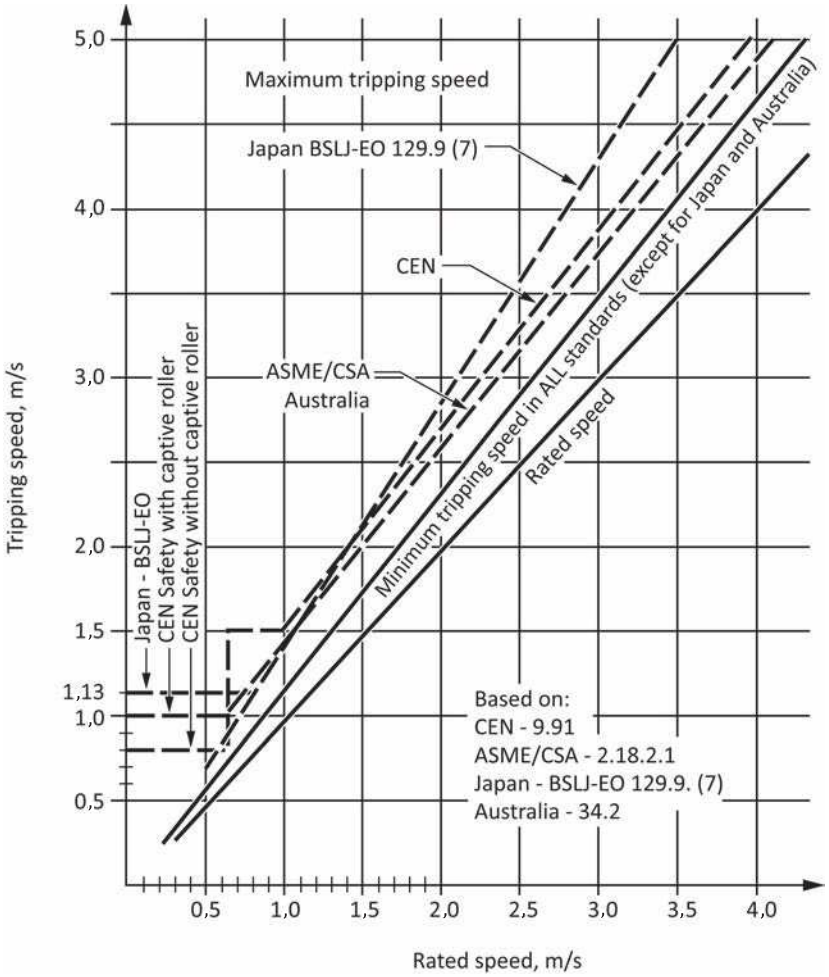


Figure A.1 — Overspeed governors

4.4 Brakes

Table 4 contains a comparison of brakes in the CEN-ASME/CSA-Japanese standards and prescriptive recommendations prepared by the TFC.

Table 4 — Convergence of CEN-ASME-Japan elevator standards — Brakes

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	12.4 Braking system **12.4.1 General provisions** **12.4.1.1** The lift shall be provided with a braking system, which operates automatically: a) in the event of loss of the mains power supply; b) in the event of the loss of the supply to control circuits. **12.4.1.2** The braking system shall have an electro-mechanical brake (friction type), but may, in addition, have other braking means (e.g. electric).	**2.24.8 Braking System** **2.24.8.1 General Requirements** The elevator shall be provided with a braking system conforming to 2.24.8.2. **2.26.8.3** The brake shall apply automatically when (a) the operating device of a car switch or continuous pressure operation elevator is in the stop position, (b) a normal stopping means functions, (c) any electrical protective device is activated, and (d) there is a loss of power to the driving-machine brake. **2.24.8.2 Braking System** **2.24.8.2.1** The braking system shall consist of a driving-machine brake and in addition shall be permitted to include other braking means, such as electrically assisted braking. **2.24.8.2.2** The braking system shall be capable of decelerating the car from its rated speed when it is carrying its rated load (see 2.16.8*) in the down direction, or empty car in the up direction from the speed at which the governor overspeed switch is set. Any deceleration not exceeding 9,8 m/s^2 (32.2 ft/s^2) is acceptable, provided that all factors such as, but not limited to, system heat dissipation and allowable buffer striking speeds are considered. The loss of main line power shall not reduce the braking system capacity below the requirements stated here.	Double brake with electro-mechanical brake or one is electro-mechanical and other is the brake which work in emergency case.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting requirements shown in EN 81–1:1998, 12.4.1.
	All the mechanical components of the brake which take part in the application of the braking action on the drum or disk shall be installed in two sets. If one of the components is not working a sufficient braking effort to slow down the car, travelling downwards at rated speed and with rated load shall continue to be exercised. Any solenoid plunger is considered to be a mechanical part, any solenoid coil is not.				
		2.26.8.4 The application of the brake shall be permitted to occur on or before the completion of the slowdown and levelling operations, under conditions described in 2.26.8.3 (a) and (b).			

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.24.8.5 Marking Plates for Brakes The brake setting and method of measurement shall be permanently and legibly marked on the driving machine.	Manufacturer provides Owner's Manual		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider requiring data plate for setting and method of adjustment or measurement for brakes similar to ASME A17.1-2010/CSA B44-10, 2.24.8.5. Consider adopting requirements for owner's manual similar to in EN 81–1:1998, 16.3.
	12.4.2 Electro-mechanical brake **12.4.2.1** This brake on its own shall be capable of stopping the machine when the car is travelling downward at rated speed and with the rated load plus 25 %. In these conditions the retardation of the car shall not exceed that resulting from operation of the safety gear * or stopping on the buffer.	**2.24.8.3 Driving-Machine Brake** The driving-machine brake, on its own, shall be capable of: (a) holding the car at rest with its rated load (see 2.16.8* and 2.26.8) *Also 25 %; (b) holding the empty car at rest; (c) decelerating the empty car travelling in the up direction from the speed at which the governor overspeed switch is set. Any deceleration not exceeding 9,8 m/s^2 (32.2 ft/s^2) is acceptable provided that all factors such as, but not limited to, system heat dissipation and allowable buffer striking speeds are considered.	Per TS: 1) Double brake; Stopping: Gov-OS X 110 % rated load Holding: 125 % rated load (by double) 0 % to 100 % rated load (by single) Average deceleration: Not exceeding 1 g 2) Single Brake + Emergency Brake; Stopping: Gov-OS X 110 % rated load (SB) Gov-OS X 0 % to 100 % rated load (EB) Holding: 125 % rated load (SB): 0 % to 100 % rated load (EB) Average deceleration: Not exceeding 1 g_n (SB and/or EB)		
	12.4.2.1 (second paragraph) All the mechanical components of the brake which take part in the application of the braking action on the drum or disk shall be installed in two sets. If one of the components is not working a sufficient braking effort to slow down the car, travelling downwards at rated speed and with rated load shall continue to be exercised. Any solenoid plunger is considered to be a mechanical part, any solenoid coil is not.				

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	12.4.2.2 The component on which the brake operates shall be coupled to the traction sheave or drum or sprocket by direct and positive mechanical means.		Geared machined can be used if strength requirements are met.		
	12.4.2.3 To hold off the brake, in normal operation, shall require a continuous flow of current. **12.4.2.3.1** The interruption of this current shall be effected by at least two independent electrical devices, whether or not integral with those, which cause interruption of the current feeding the lift machine. If, while the lift is stationary, one of the contactors has not opened the main contacts, further movement of the car shall be prevented at the latest at the next change in the direction of motion.	**2.26.8.2** Two means shall be provided to independently remove power from the brake. The electrical protective devices required by 2.26.2 shall control both means, except that levelling shall be permitted to take place with power opening of doors and gates in conformance with 2.13.2.1.1 and 2.13.2.2.1. One of the means shall be either a contactor, or an E/E/PES with a SIL of not less than the highest SIL of the function for the electrical protective devices involved with removing power from the brake and shall be listed/certified and labelled/marked for compliance with the applicable requirements of IEC 61508–2 and IEC 61508–3. This means is not required to remove power from the driving-machine motor. If the brake circuit is ungrounded, power shall be interrupted at all power feed lines to the brake.	Same as EN 81–1		
		2.26.8.3 The brake shall apply automatically when: (a) the operating device of a car switch or continuous pressure operation elevator is in the stop position; (b) a normal stopping means functions; (c) any electrical protective device is activated; (d) there is a loss of power to the driving-machine brake.	Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting requirement similar to ASME A17.1-2010/CSA B44-10, 2.26.8.3 (b).
	12.4.2.3.2 When the motor of the lift is likely to function as a generator, it shall not be possible for the electric device operating the brake to be fed by the driving motor.	**2.26.8.5** The brake shall not be permanently connected across the armature or field of a direct-current elevator driving-machine motor.			
	0.3.1 Components are: a) designed in accordance with usual engineering practice and calculation codes, taking into account all failure modes;	**2.24.8.6 Driving-Machine Brake Design.** The driving- machine brake design shall ensure contact of the friction material on the braking surface consistent with good engineering practice. Means shall be provided to protect the braking surfaces from contamination caused by any driving-machine fluid leak.	Same as ASME A17.1/ CSA B44		

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	12.4.2.3.3 Braking shall become effective without supplementary delay after opening of the brake release circuit. NOTE The use of a diode or capacitor connected directly to the terminals of the brake coil is not considered as a means of delay.		Same as EN 81–1		
	12.4.2.4 Any machine fitted with a manual emergency operating device (**12.5.1**) shall be capable of having the brake released by hand and require a constant effort to keep the brake open.	**2.24.8.4 Means for Manual Release.** Means shall be permitted for manual release of the driving-machine brake. The means shall permit car movement in a gradual, controllable manner. Provision shall be made to prevent unintended actuation of the device. The manual release device shall be designed to be hand applied only with continuous effort. The brake shall reapply at its fully adjusted capacity in the absence of the hand applied effort. Devices required in accordance with 2.19 are permitted to be temporarily disabled when the manual release device is in use.	Same as EN 81–1		
	12.4.2.5 The brake shoe or pad pressure shall be exerted by guided compression springs or weights.	**2.24.8.3 Driving-Machine Brake.** The driving machine shall be equipped with a friction brake applied by a spring or springs, or by gravity, and released electromechanically or electrohydraulically (see 1.3) in conformance with 2.26.8.....	Same as EN 81–1 except no gravity release.		
	12.4.2.6 Band brakes shall not be used.		Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider deletion of 12.4.2.6.
	12.4.2.7 Brake linings shall be incombustible.		Same as EN 81–1		
In the following section, the presentation follows the ASME A17.1/CSA B44 requirements sequence rather than EN 81–1.					

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.10 Ascending car overspeed protection means	**SECTION 2.19 ASCENDING CAR OVERSPEED AND UNINTENDED CAR MOVEMENT PROTECTION** **2.19.1 Ascending Car Overspeed Protection** **2.19.1.1 Purpose.** Ascending car overspeed protection shall be provided to prevent the car from striking the hoistway overhead structure as a result of a failure in (a) the electric driving-machine motor, brake, coupling, shaft, or gearing (b) the control system (c) any other component upon which the speed of the car depends, except the suspension ropes and the drive sheave of the traction machine.			
	A traction drive lift shall be provided with ascending car overspeed protection means conforming to the following:	**2.19.1.2 Where Required and Function.** All electric traction elevators, except those whose empty car weight exceeds the total weight of the suspension ropes and counterweight, shall be provided with a device to prevent an ascending elevator from striking the hoistway overhead structure. This device (see 2.26.2.29) shall:	Same as EN 81–1		
	9.10.1 The means, comprising speed monitoring and speed reducing elements, shall detect uncontrolled movement of the ascending car at a minimum 115 % of the rated speed, and maximum as defined in **9.9.3**, and shall cause the car to stop, or at least reduce its speed to that for which the counterweight buffer is designed	(a) detect an ascending car overspeed condition at a speed not greater than 10 % higher than the speed at which the car governor is set to trip (see 2.18.2.1); (1) If the overspeed detection means requires electrical power for its functioning: (a) a loss of electrical power to the ascending car overspeed detection and control means shall cause the immediate activation of the emergency brake as required in 2.19.1.2 (b); (b) the occurrence of a single ground, or the failure of any mechanically operated switch that does not meet the requirements of 2.26.4.3.1, any single magnetically operated switch, contactor, or relay, or any single solid-state device, or a failure of a software system not conforming to 2.26.4.3.2, shall not render the detection means inoperative;	Same as EN 81–1, except the following: "at a minimum 115 % of the rated speed "and" at least reduce its speed to that for which the counterweight buffer is designed." Detected at 130 % of rated speed. Maximum speed is not more than 10 % of governor tripping speed. Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider incorporating ASME A17.1-2010/CSA B44-10, 2.19.1.2 (a)(1), (2) and (3) into Type Test requirements (F7).

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		(2) The failure of any single mechanically operated switch that does not meet the requirements of 2.26.4.3 shall not render the detection means inoperative. (3) When a fault specified in 2.19.1.2 (a)(1)(b) or 2.19.1.2 (a)(2) is detected, the car shall stop at or before the next landing for which a demand was registered, and shall not be permitted to restart.			
	9.10.6 When the means has been activated its release shall require the intervention of a competent person.	(4) Once actuated by overspeed, the overspeed detection means shall remain actuated until manually reset, and the car shall not start or run unless the detection means is reset.			
	9.10.2 The means shall be capable of performing as required in 9.10.1 without assistance from any lift component that, during normal operation, controls the speed or retardation, or stops the car, unless there is built-in redundancy A mechanical linkage to the car, whether or not such linkage is used for any other purpose, may be used to assist in this performance.	(b) decelerate the car when loaded with any load up to its rated load [see 2.16.8 (h)] by applying an emergency brake conforming to 2.19.3. The car shall not start or run unless the emergency brake is reset.	Same as EN 81–1		
		2.19.3 Emergency Brake **(See Non mandatory Appendix F)** **2.19.3.1 Where Required** **2.19.3.1.1** When required by 2.19.1 for protection against ascending car overspeed, an emergency brake (see 1.3) conforming to 2.19.3.2 shall be provided. **2.19.3.1.2** When required by 2.19.2 for protection against unintended car movement, an emergency brake (see 1.3) conforming to 2.19.3.2 shall be provided. **2.19.3.1.3** A single device shall be permitted to meet the requirements of both 2.19.3.1.1 and 2.19.3.1.2, or separate devices shall be provided.			

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.10.4 The means shall act: a) to the car, b) to the counterweight, c) on the rope system (suspension or compensating), d) on the traction sheave (e.g. on the sheave directly or on the same shaft in the immediate vicinity of the sheave).	**2.19.3.2 Requirements.** The emergency brake is permitted to consist of one or more devices and shall (a) function to decelerate the car by acting on one or more of the following (see also **2.19.4**): (1) counterweight [e.g. counterweight safety (see **2.17.4** and **2.17.7**)]; (2) car; (3) suspension or compensation rope system; (4) drive sheave of a traction machine; (5) brake drum or braking surface of the driving-machine brake, provided that the driving-machine brake surface is integral (cast or welded) with or directly attached to the driving-machine sheave. Attachments, where used, shall conform to **2.24.3** and **2.24.4.1**. Welding, where used, shall conform to **8.8**; (b) be independent of the driving-machine brake; (c) not be used to provide, or assist in providing, the stopping of the car when on automatic operation., unless applied as required in **2.19.1** and **2.19.2**, or as permitted in **2.19.3.2 (e)** and **(f)**; (d) be permitted to be applied only after the car is stopped when on automatic operation, except as required in **2.19.1** and **2.19.2**; (e) be permitted to be applied to a stationary or moving braking surface when any electrical protective device (**2.26.2**) is actuated; (f) be permitted to be applied to a stationary or moving braking surface when on continuous-pressure operation (e.g. continuous-pressure inspection operation, inspection operation with open door circuits, or hoistway access operation;	Same as EN 81–1, except: c) Delete brake on compensating rope. d) Delete; immediate vicinity Add; mechanical connected parts with driving sheave, provided mechanical strength is ensured		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adding requirements of ASME A17.1-2010/CSA B44-10, 2.19.3.2 (a)(5) in lieu of language in brackets in 9.10.4 (d). Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of requirements in ASME A17.1-2010/CSA B44-10, 2.19.3.2 (d), (e) and (f) as an alternative solution.
	9.10.9 If the means requires external energy to operate, the absence of energy shall cause the lift to stop and keep it stopped. This does not apply for guided compressed springs.	(g) not require application of electric power for its activation, nor be rendered inoperative by failure of any power supply;	Same as ASME A17.1/ CSA B44		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language in EN 81–1:1998, 9.10.9.

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		(h) not on its own cause the average car retardation to exceed 9,8 m/s^2 (32.2 ft/s^2) during the stopping or slowdown phase during ascending car overspeed; (i) be designed so that factor of safety based on maximum stresses developed in the parts subject to load during the operation of the emergency brake shall comply to the following: (1) Where an emergency brake is applied only when protecting against either an ascending car overspeed condition or unintended car movement with the car and hoistway doors open, the minimum factors of safety, when applied during the retardation phase of emergency braking, shall be not less than those specified in **2.17.12.1**. (2) Where an emergency brake is applied as permitted in **2.19.3.2 (d)**, **(e)** and **(f)**, the minimum factors of safety, when applied during retardation phase of emergency braking, shall be not less than those specified in **2.24.3.1** and **2.24.3.2**. Degradation of the emergency brake due to wear shall be considered. (3) Where an emergency brake acts on suspension or compensation means, (a) the factor of safety with respect to the breaking strength of the suspension and compensation members shall be not less than 5 at any time during the retardation phase, and (b) it shall be designed to prevent appreciable damage or deformation to the suspension and compensation member resulting from its activation	Same as EN 81–1 (JIS use the average deceleration)		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider revising average retardation to take account of instantaneous retardation. Standards writing bodies to review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4.
		(j) be arranged to be tested in accordance with the requirements specified in **8.10.2** (k) if the design of emergency brake is such that field adjustment or servicing is required and the emergency brake acts on the brake drum or braking surface of the driving-machine brake, it shall be provided with a sign stating “EMERGENCY BRAKE”. The sign shall be located on the emergency brake at the location visible from the area likely to require service. The sign shall be of such material and construction that the letters shall remain permanently and readily legible. The height of the letters shall be not less than 6 mm (0.25 in).			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider requiring data plate identifying emergency brake similar to ASME A17.1-2010/ CSA B44-10, 2.19.3.2 (k). Consider adopting requirements for owner’s manual similar to EN 81–1:1998, 16.3.

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.19.3.3 Marking Plate Requirements. The emergency brake shall be provided with a marking plate indicating the range of total masses (car with attachments and its load) for which it is permitted to be used, the range of speeds at which it is set to operate, and the criteria such as rail lubrication requirements that are critical to the performance.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider requiring data plate identifying emergency brake similar to ASME A17.1-2010/ CSA B44-10, 2.19.3.3. Consider adopting requirements for owner's manual similar to EN 81–1:1998, 16.3.
	9.10.5 The means shall operate an electric safety device in conformity with **14.1.2** if it is engaged. **9.10.7** The release of the means shall not require the access to the car or the counterweight. **9.10.8** After its release, the means shall be in a condition to operate.		Same as EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language in EN 81–1:1998, 9.10.7 and 9.10.8.
	9.10.10 The speed monitoring element of the lift to cause the ascending car overspeed protection means to actuate shall be, either: a) a governor conforming to the requirements of **9.9**, or b) a device conforming to 9.9.1, 9.9.2, 9.9.3, 9.9.7, 9.9.8.1, 9.9.9, 9.9.11.2, and where equivalence to 9.9.4, 9.9.6.1, 9.9.6.2, 9.9.6.5, 9.9.10 and 9.9.11.3 is ensured.		Same as EN 81–1		
	9.10.11 The ascending car overspeed protection means is regarded as a safety component and shall be verified according to the requirements in **F.7**.		Same as EN 81–1. Slight differences in F.7.3 in TS.		Standards writing bodies to review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4. Requirements for type testing to be considered when reviewing good engineering practice.
In the following section, the presentation follows the ASME A17.1/CSA B44 requirements sequence rather than EN 81–1.					
	Unintended car movement a non-commanded movement of the car with doors open within the door zone away from the landing, excluding movements resulting from loading/unloading operation	**Unintended car movement:** any movement of an elevator car that is not intended car movement resulting from a component or system failure.	No definition in TS		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language of ASME A17.1/CSA B44 definition of "unintended car movement".

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.11 Protection against unintended car movement **9.11.1** Lifts shall be provided with a means to stop unintended car movement away from the landing with the landing door not in the locked position and the car door not in the closed position, as a result of failure in any single component of the lift machine or drive system upon which the safe movement of the car depends, except failure of the suspension ropes and the traction sheave of the machine. NOTE A failure of the traction sheave includes a loss of traction. **9.11.2** The means shall detect unintended movement of the car, shall cause the car to stop, and keep it stopped.	**2.19.2 Protection Against Unintended Car Movement** **2.19.2.1 Purpose.** Protection shall be provided with a device to prevent unintended car movement away from the landing with the hoistway door not in the locked position and the car door not in the closed position, as a result of failure in (a) the electric driving-machine motor, brake, coupling, shaft, or gearing (b) the control system (c) any other component upon which the speed of the car depends, except the suspension ropes and the drive sheave of the traction machine.	Same as EN 81–1. Single failure in brake, machine or control circuit		
		2.19.2.2 Where Required and Function. All electric traction elevators shall be provided with a device (see 2.26.2.30) that shall:			
		(a) detect unintended car movement away from the landing with the hoistway door not in the locked position and the car door not in the closed position. NOTE Freight elevators provided with combination mechanical locks and contacts on the hoistway door shall detect the closed position of the hoistway door and the closed position of the car door. (1) If the detection means requires electrical power for its functioning, then: (a) a loss of electrical power to the unintended movement detection and control means shall cause the immediate activation of the emergency brake as required in			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider incorporating 2.19.2.2 (a)(1), (2) and (3) into Type Test requirements (F7).

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.19.2.2 (b); (b) the occurrence of a single ground, or the failure of any mechanically operated switch that does not meet the requirements of 2.26.4.3, any single magnetically operated switch, contactor, or relay, or any single solid-state device, or software failure, shall not render the detection means inoperative (2) The failure of any single mechanically operated switch that does not meet the requirements of 2.26.4.3, shall not render the detection means inoperative. (3) When a fault in 2.19.2.2 (a)(1)(b) or 2.19.2.2 (a)(2) is detected, the car shall stop at or before the next landing for which a demand was registered, and shall not be permitted to restart.			
		(4) Once actuated by unintended movement, the detection means shall remain actuated until manually reset			
	9.11.9 When the means has been activated or the redundancy monitoring has indicated a failure of the stopping element of the means, its release or the reset of the lift shall require the intervention of a competent person.				
	9.11.5 The means shall stop the car in a distance: a) not exceeding 1,20 m from the landing where the unintended car movement has been detected; b) the vertical distance between the landing sill and the lowest part of the car apron shall not exceed 200 mm; c) the free distance from car sill to landing door lintel, or from landing sill to car door lintel shall not be less than 1,00 m (see Figure 4). These values are obtained with any load in the car, up to 100 % of rated load.	**2.19.2.2 (b)** upon detection of unintended car movement, stop and hold the car, with any load up to rated load [see also 2.16.8 (h)*], by applying an emergency brake conforming to 2.19.3. The stopped position of the car shall be limited in both directions, to a maximum of 1 220 mm (48 in.) as measured from the landing sill to the car sill.	Same as EN 81–1, except vertical distance from car apron to landing sill <110 mm.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting requirements according to good engineering practice taking into account the technology being applied.

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.19.3 Emergency Brake (See Non mandatory Appendix F) **2.19.3.1 Where Required** **2.19.3.1.1** When required by 2.19.1 for protection against ascending car overspeed, an emergency brake (see 1.3) conforming to 2.19.3.2 shall be provided. **2.19.3.1.2** When required by 2.19.2 for protection against unintended car movement, an emergency brake (see 1.3) conforming to 2.19.3.2 shall be provided. **2.19.3.1.3** A single device shall be permitted to meet the requirements of both 2.19.3.1.1 and 2.19.3.1.2, or separate devices shall be provided.	Same as EN 81–1		
	9.11.4 The stopping element of the means shall act: (a) on the car, or (b) on the counterweight, or (c) on the rope system (suspension or compensating), or (d) on the traction sheave (e.g. on the sheave directly or on the same shaft in the immediate vicinity of the sheave). The stopping element of the means, or the means preventing the car movement may be common with those used for: — preventing overspeed in down direction, and — preventing ascending car overspeed (9.10)	**2.19.3.2 Requirements.** The emergency brake is permitted to consist of one or more devices and shall (a) function to decelerate the car by acting on one or more of the following (see also 2.19.4): (1) counterweight [e.g. counterweight safety (see 2.17.4 and 2.17.7)]; (2) car; (3) suspension or compensation rope system; (4) drive sheave of a traction machine; (5) brake drum or braking surface of the driving-machine brake, provided that the driving-machine brake surface is integral (cast or welded) with or directly attached to the driving-machine sheave. Attachments, where used, shall conform to 2.24.3 and 2.24.4.1. Welding, where used, shall conform to 8.8.	Same as EN 81–1, except: c) Delete brake on compensating rope. d) Delete; immediate vicinity Add: mechanical connected parts with driving sheave provided mechanical strength is ensured		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adding requirements of ASME A17.1-2010/CSA B44-10, 2.19.3.2 (a)(5) in lieu of language in brackets in 9.11.4 (d).

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.11.3 The means shall be capable of performing as required without assistance from any lift component that, during normal operation, controls the speed or retardation, stops the car or keeps it stopped, unless there is built-in redundancy and correct operation is self-monitored. In the case of using the machine brake, self-monitoring implies verification of correct lifting or dropping of the mechanism or verification of braking force. If a failure is detected, next normal start of the lift shall be prevented. Self-monitoring is subject to type examination. **9.11.12** If the means requires external energy to operate, the absence of energy shall cause the lift to stop and keep it stopped. This does not apply for guided compressed springs.	(b) be independent of the driving-machine brake; (c) not be used to provide, or assist in providing, the stopping of the car when on automatic operation., unless applied as required in 2.19.1 and 2.19.2, or as permitted in 2.19.3.2 (e) and (f); (d) be permitted to be applied only after the car is stopped when on automatic operation, except as required in 2.19.1 and 2.19.2; (e) be permitted to be applied to a stationary or moving braking surface when any electrical protective device (2.26.2) is actuated; (f) be permitted to be applied to a stationary or moving braking surface when on continuous-pressure operation (e.g. continuous-pressure inspection operation, inspection operation with open door circuits, or hoistway access operation; (g) not require application of electric power for its activation, nor be rendered inoperative by failure of any power supply;	Similar to EN 81–1, except monitoring requirements are more elaborate and UCMP is subject to type testing.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adoption of requirements in ASME A17.1-2010/CSA B44-10, 2.19.3.2 (d), (e) and (f) as an alternative solution.

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.11.6 During the stopping phase, the stopping element of the means shall not allow a retardation of the car in excess of: 1 g_n for unintended movements in .up direction, the values accepted for safety gears in down direction. These values are obtained with any load in the car, up to 100 % of rated load.	(h) not on its own cause the average car retardation to exceed 9,8 m/s^2 (32.2 ft/s^2) during the stopping or slowdown phase during ascending car overspeed (i) be designed so that factor of safety based on maximum stresses developed in the parts subject to load during the operation of the emergency brake shall comply to the following: (1) Where an emergency brake is applied only when protecting against either an ascending car overspeed condition or unintended car movement with the car and hoistway doors open, the minimum factors of safety, when applied during the retardation phase of emergency braking, shall be not less than those specified in 2.17.12.1. (2) Where an emergency brake is applied as permitted in 2.19.3.2 (d), (e) and (f), the minimum factors of safety, when applied during retardation phase of emergency braking, shall be not less than those specified in 2.24.3.1 and 2.24.3.2. Degradation of the emergency brake due to wear shall be considered. (3) Where an emergency brake acts on suspension or compensation means, (a) the factor of safety with respect to the breaking strength of the suspension and compensation members shall be not less than 5 at any time during the retardation phase, and (b) it shall be designed to prevent appreciable damage or deformation to the suspension and compensation member resulting from its activation.	Similar to EN 81–1, except that deceleration is average of 1 g.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider revising average retardation to take account of instantaneous retardation. Standards writing bodies to review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4.
		(j) be arranged to be tested in accordance with the requirements specified in 8.10.2 (k) if the design of emergency brake is such that field adjustment or servicing is required and the emergency brake acts on the brake drum or braking surface of the driving-machine brake, it shall be provided with a sign stating “EMERGENCY BRAKE”. The sign shall be located on the emergency brake at the location visible from the area likely to require service. The sign shall be of such material and construction that the letters shall remain permanently and readily legible. The height of the letters shall be not less than 6 mm (0.25 in).			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider requiring data plate identifying emergency brake similar to ASME A17.1-2010/ CSA B44-10, 2.19.3.2 (k). Consider adopting requirements for owner’s manual similar to EN 81–1:1998, 16.3.

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.19.3.3 Marking Plate Requirements. The emergency brake shall be provided with a marking plate indicating the range of total masses (car with attachments and its load) for which it is permitted to be used, the range of speeds at which it is set to operate, and the criteria such as rail lubrication requirements that are critical to the performance.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider requiring data plate identifying emergency brake similar to ASME A17.1-2010/ CSA B44-10, 2.19.3.3. Consider adopting requirements for owner's manual similar to EN 81–1:1998, 16.3.
	9.11.7 The unintended movement of the car shall be detected by at least one switching device at latest when the car leaves the unlocking zone (7.7.1). This switching device shall: a) either be a safety contact in conformity with 14.1.2.2, or b) be connected in such a way as to satisfy the requirements for safety circuits in 14.1.2.3, or c) satisfy requirements of 14.1.2.6.	**Not in ASME A17.1/CSA B44**	Similar to EN 81–1, except the switching device is type tested. And safety circuits are not required.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting use of safety circuits and PESSRAL devices in addition to electrical protective device or safety switch.
	9.11.8 The means shall operate an electric safety device in conformity with 14.1.2 if it is engaged. NOTE This can be common to switching device of 9.11.7. **9.11.10** The release of the means shall not require the access to the car or the counterweight. **9.11.11** After its release, the means shall be in a condition to operate. **9.11.13** The unintended car movement with open doors protection means is regarded as a safety component and shall be verified according to the requirements in F.8.	**Not in ASME A17.1/CSA B44**	Similar to EN 81–1		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language in EN 81–1:1998, 9.11.8, 9.11.10 and 9.11.11.
	Annex F (normative) Safety components — Tests procedures for verification of conformity **F.7** Ascending car overspeed protection means This specification applies to ascending car overspeed protection means which are not using safety gears, overspeed governors, or other devices which are subject to verifications according to **F.3**, **F.4** and **F.6**. **F.7.1 General provisions** The applicant shall state the range of use provided: a) minimum and maximum masses; b) maximum rated speed;	**8.10.2.2.2 Machine Room/Spaces, Control Room/Spaces** (jj) Ascending Car Overspeed, and Unintended Car Motion Protection (1) Ascending Car Overspeed Protection. The means to prevent ascending car overspeed shall be inspected and tested with no load in the car to verify conformance with 2.19.1.2. (2) Unintended Car Motion. The means to prevent unintended car motion shall be inspected and tested to verify conformance with 2.19.2.2.	Similar to EN 81–1		Standards writing bodies to review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4. Requirements for type testing to be considered when reviewing good engineering practice.

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	c) use in installations with compensating ropes. The following documents are to be attached to the applications: a) detailed and assembly drawings showing the construction, operation, materials used, the dimensions and tolerances on the construction components; b) if necessary, also a load diagram relating to elastic parts; c) detailed information on the materials used, the type of part on which the ascending car overspeed protection means acts, and its surface condition (drawn, milled, ground, etc.).				
	F.7.2 Statement and test sample **F.7.2.1** The applicant shall state for what mass (in kilograms) and tripping speed (in metres per second) the test is to be carried out. If the device has to be certified for various masses, the applicant shall specify them and indicate in addition whether adjustment is by stages or continuous. **F.7.2.2** As defined between applicant and the laboratory: — either a complete assembly consisting of both elements, braking device and speed monitoring device, or — only that device which was not subject to verifications according to **F.3**, **F.4** or **F.6** shall be placed at the disposal of the laboratory. The number of sets of gripping elements necessary for all the tests shall be attached. The type of part on which the device acts, shall also be supplied with the dimensions specified by the laboratory.				

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.7.3 Test **F.7.3.1 Method of test** The method of test shall be defined between applicant and test laboratory, depending on the device and its functioning to achieve a realistic function of the system. Measurements shall be made of: a) the acceleration and speed; b) the braking distance; c) the retardation. Measurements shall be recorded as a function of the time. **F.7.3.2 Test procedure** At least 20 tests shall be made with the speed monitoring element in the speed range for tripping corresponding to the range of rated speeds of the lift indicated in **F.7.1 b)**. NOTE The acceleration of the mass to reach the tripping speed should be as low as possible, in order to eliminate the effects of inertia. **F.7.3.2.1 Device certified for a single mass** The laboratory shall carry out four tests with the system mass representing an empty car. Between each test the friction parts shall be allowed to return to their normal temperature. During the tests several identical sets of friction parts may be used. However, one set of parts shall be capable of: a) three tests, if the rated speed does not exceed 4 m/s; b) two tests, if the rated speed exceeds 4 m/s. The test shall be made at the maximum tripping speed for which the device may be used.				
	F.7.3.2.2 Device certified for different masses Adjustment in stages or continuous adjustment. A series of tests shall be carried out for the maximum value applied for and a series for the minimum value. The applicant shall supply a formula, or a chart, showing the variation of the braking force as a function of a given parameter. The laboratory shall verify by suitable means (in the absence of anything better, by a third series of tests for intermediary points) the validity of the supplied formula.				

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.7.3.2.3 Overspeed monitoring device **F.7.3.2.3.1 Test procedure** At least 20 tests shall be made in the speed range for tripping without applying the braking device. The majority of tests shall be made at the extreme values of the range. **F.7.3.2.3.2 Interpretation of the test results** In the course of 20 tests the tripping speeds shall lie within the limits called for in **9.10.1**.				
	F.7.3.3 Checking after the tests After the test: a) the hardness of the gripping element shall be compared with the original values quoted by the applicant. Other analyses may be carried out in special cases; b) if there is no fracture, deformations and other changes shall be examined (for example, cracks, deformations or wear of the gripping elements, appearance of the rubbing surfaces); c) if necessary, photographs shall be taken of the gripping elements and the parts on which the device acts for evidence of deformations or fractures; d) it shall be checked that the retardation with the minimum mass has not exceeded 1 g_n.				

Table 4 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.7.4 Possible modification to the adjustments If, during the tests, the values found differ by more than 20 % from those expected by the applicant, other tests may be made with his agreement, after modification of the adjustments if necessary.				
	F.7.5 Test report In order to achieve reproducibility the type examination shall be recorded in all details, such as: — the method of test defined between applicant and laboratory; — the description of the testing arrangement; — location of the device to be tested in the testing arrangement; — number of tests carried out; — record of measured values; — report of observations during the test; — evaluation of the test results to show compliance with the requirements.				
	F.7.6 Type examination certificate **F.7.6.1** The certificate shall be drawn up in triplicate, i.e. two copies for the applicant and one copy for the laboratory. **F.7.6.2** The certificate shall indicate: a) information according to **F.0.2**; b) type and application of overspeed protection means; c) the limits of the permissible masses; d) the tripping speed range of the overspeed monitoring device; e) the type of parts on which the braking elements act.				

4.5 Safety gear

Table 5 contains a comparison of safety gear in the CEN-ASME/CSA-Japanese standards and prescriptive recommendations prepared by the TFC.

Table 5 — Convergence of CEN-ASME-Japan elevator standards — Safety gear

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.8 Safety gear **9.8.1 General provisions** **9.8.1.1** The car shall be provided with a safety gear capable of operating in the downward direction and capable of stopping a car carrying the rated load, at the tripping speed of the overspeed governor, even if the suspension devices break, by gripping the guide rails, and of holding the car there. A safety gear operating in upward direction may be used in accordance with **9.10**. NOTE The safety gear operating devices shall preferably be located at the lower part of the car.	**SECTION 2.17** **CAR AND COUNTERWEIGHT SAFETIES** **2.17.1 Where Required and Location** (paragraph 1) The car of every elevator suspended by wire ropes shall be provided with one or more car safety devices of one of the types identified in 2.17.5. **2.17.3 Function and Stopping Distance of Safeties** (first paragraph) The safety device, or the combined safety devices, where furnished, shall be capable of stopping and sustaining the entire car with its rated load from governor tripping speed (see also 2.16.8).	For Japan data, see Tables A.5.1 and A.5.2.	Only one applicable [p] has been identified. See GESR 6.4.9 [p2] in line with 9.8.4.	Standards writing bodies to review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4. Requirements for type testing to be considered when reviewing good engineering practice.
		2.17.1 (continuation of paragraphs 1 and 2) The safeties shall be attached to the car frame, and one safety shall be located within or below the car frame. All car safeties shall be mounted on a single car frame and shall operate only on one pair of guide rails between which the frame is located.			
	9.8.1.2 In the case envisaged in **5.5 b)**, the counterweight or the balancing weight shall also be equipped with safety gear, operating only on a downward moving counterweight or balancing weight, capable of stopping it, at the tripping speed of the overspeed governor (or if the suspension devices break in the specific case of **9.8.3.1**), by gripping the guide rails, and of holding the counterweight or the balancing weight there.	**2.17.4 Counterweight Safeties** Counterweight safeties, where furnished [see 2.6 and 2.19.3.2 (a)(1)], shall conform to the requirements for car safeties, except as specified in 2.17.7 and 2.18.1.			

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.17.7 Governor-Actuated Safeties and Car Safety Mechanism Switches Required **2.17.7.1** Counterweight safeties, where provided for rated speeds over 0,75 m/s (150 ft/min), and car safeties, shall be actuated by separate speed governors. Counterweight safeties for rated speeds of not over 0,75 m/s (150 ft/min) shall be permitted to be operated as a result of the breaking or slackening of the suspension ropes and shall be permitted to be of the inertia or other approved type without governors. Where counterweight safeties are furnished to provide ascending car overspeed protection in accordance with 2.19.1.1, they shall be actuated by a counterweight speed governor (see 2.17.4).			
	9.8.1.3 The safety gear is regarded as a safety component and shall be verified according to the requirements in **F.3**.	**Not in ASME A17.1/CSA B44**			
	9.8.2 Conditions of use for different types of safety gear **9.8.2.1** Car safety gear shall be of the progressive type if the rated speed of the lift exceeds 1 m/s. It can be: a) of the instantaneous type with buffered effect if the rated speed does not exceed 1 m/s; b) of the instantaneous type if the rated speed does not exceed 0,63 m/s.	**2.17.8 Limits of Use of Various Types of Safeties** **2.17.8.2 Type C (Combination Instantaneous and Oil-Buffer Safety).** Type C safeties shall be permitted subject to the requirements of 2.17.8.2.1 to 2.17.8.2.8. **2.17.8.2.1** The rated speed shall be not more than 2,5 m/s (500 ft/min).	BSLJ permits instantaneous safety gear up to 0,75 m/s and slack rope safety without governor, limited to 0,75 m/s, 13 m travel and 300 kg load.		Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider elimination of these types of safeties [9.8.2.1 (a)].
	9.8.2.2 If the car carries several safety gears they shall all be of the progressive type.	**2.17.2 Duplex Safeties** Where duplex (two) safeties are provided, the lower safety device shall be capable of developing not less than one-half of the force required to stop the entire car with rated load (see 2.16.8). Duplexed safety devices shall be arranged so as to function approximately simultaneously. Type A or Type C safety devices (see 2.17.5) shall not be used in multiple (duplexed)			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adding requirements per ASME A17.1-2010/CSA B44-10, 2.17.2.

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.8.2.3 The safety gear of the counterweight or balancing weight shall be of the progressive type if the rated speed exceeds 1 m/s, otherwise the safety gear may be of the instantaneous type.	**2.17.8.1 Type A (Instantaneous) Safeties.** Type A safeties shall be permitted on elevators having a rated speed of not more than 0,75 m/s (150 ft/min). When overspeed occurs, with the hoisting rope intact, such safeties shall be actuated by the governor. On the parting of the hoisting ropes (free fall), Type A governor-operated safeties shall apply without appreciable delay, and their application shall be independent of the speed action of the governor and of the location of the break in the hoisting ropes (inertia application), and shall be permitted to be accomplished by the use of a governor and governor rigging having a sufficiently high value of inertia to apply the safety on free fall independently of the speed action of the governor (see 8.10 for inertia-application test of car safety).			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider adopting requirements in 2.17.8.1 (0,75 m/s).
	instantaneous safety gear (*parachute à prise instantanée*) (*Sperrfangvorrichtung*): A safety gear in which the full gripping action on the guide rails is almost immediate.	**2.17.5 Identification and Classification of Types of Safeties** Car safety devices (safeties) are identified and classified on the basis of performance characteristics after the safety begins to apply pressure on the guide rails. On this basis, there are three types of safeties. **2.17.5.1 Type A Safeties.** Safeties that develop a rapidly increasing pressure on the guide rails during the stopping interval, the stopping distance being very short due to the inherent design of the safety. The operating force is derived entirely from the mass and the motion of the car or the counterweight being stopped. These safeties apply pressure on the guide rails through eccentrics, rollers, or similar devices, without any flexible medium purposely introduced to limit the retarding force and increase the stopping distance.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider harmonizing definitions with EN 81–1.

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	progressive safety gear (*parachute à prise amortie*) (*Bremsfangvorrichtung*): A safety gear in which retardation is effected by a braking action on the guide rails and for which special provisions are made so as to limit the forces on the car, counterweight or balancing weight to a permissible value.	**2.17.5.2 Type B Safeties.** Safeties that apply limited pressure on the guide rails during the stopping interval, and which provide stopping distances that are related to the mass being stopped and the speed at which application of the safety is initiated. Retarding forces are reasonably uniform after the safety is fully applied. Safeties that require or do not require continuous tension in the governor rope to operate the safety during the entire stopping interval shall be permitted. Minimum and maximum distances are specified on the basis of governor tripping speed (see 2.17.3).			
	instantaneous safety gear with buffered effect (parachute à prise instantanée avec effet amorti) (Sperrfangvorrichtung mit Dämpfung): A safety gear in which the full gripping action on the guide rails is almost immediate, but the reaction on the car, counterweight or balancing weight is limited by presence of an intermediate buffering system	**2.17.5.3 Type C Safeties (Type A With Oil Buffers).** Safeties that develop retarding forces during the compression stroke of one or more oil buffers interposed between the lower members of the car frame and a governor-operated Type A auxiliary safety plank applied on the guide rails. The stopping distance is equal to the effective stroke of the buffers.			
	9.8.3 Methods of tripping **9.8.3.1** The safety gear of the car, counterweight or balancing weight shall each be tripped by its own overspeed governor. When the rated speed does not exceed 1 m/s, the safety gear of a counterweight or balancing weight may be tripped by the failure of the suspension gear or by a safety rope. **9.8.3.2** Safety gears shall not be tripped by devices, which operate electrically, hydraulically or pneumatically.	**2.17.7.1** (see above in line with 9.8.1.2 and 9.8.3.1) **…….**"shall be actuated by separate speed governors" ……." shall be permitted to be operated as a result of the breaking or slackening of the suspension ropes and shall be permitted to be of the inertia" or other approved type without governors. **2.17.9.1 Means of Application.** Safeties shall be applied mechanically. Electric, hydraulic, or pneumatic devices shall not be used to apply the safeties required by 2.17, nor to hold such safeties in the retracted position.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting requirements in EN 81–1:1998, 9.8.3.

Table 5 *(continued)*

<table>
<tr><th>Sq #</th><th>EN 81–1+A3:2009</th><th>ASME A17.1–2010/CSA B44–10</th><th>Japan</th><th>ISO/ TS 22559-2</th><th>Comments and Proposal for convergence</th></tr>
<tr><td></td><td>Retardation
For progressive safety gear the average retardation in the case of free fall with rated load in the car shall lie between 0,2 g_n and 1 g_n.</td><td>2.17.3 Function and Stopping Distance of Safeties (second paragraph)
Type B safeties shall stop the car with its rated load from governor tripping speed within the range of the maximum and minimum stopping distances as determined by the formulas in 8.2.6. Table 2.17.3 and Figure 8.2.6 show the maximum and minimum stopping distances for various governor tripping speeds, when tested in conformance with 8.10 and 8.11.
Table 2.17.3 Maximum and Minimum Stopping Distances for Type B Car Safeties With Rated Load and Type B Counterweight Safeties
<table>
<tr><th rowspan="2">Rated Speed m/s</th><th rowspan="2">Maximum Governor Trip speed</th><th colspan="2">Stopping Distances, mm</th></tr>
<tr><th>Min.</th><th>Max.</th></tr>
<tr><td>0–0.63</td><td>0,90</td><td>25</td><td>380</td></tr>
<tr><td>0,75</td><td>1,05</td><td>50</td><td>415</td></tr>
<tr><td>0,87</td><td>1,25</td><td>75</td><td>485</td></tr>
<tr><td>1,00</td><td>1,40</td><td>100</td><td>540</td></tr>
<tr><td>1,12</td><td>1,55</td><td>125</td><td>605</td></tr>
<tr><td>1,25</td><td>1,70</td><td>150</td><td>675</td></tr>
<tr><td>1,50</td><td>2,00</td><td>200</td><td>840</td></tr>
<tr><td>1,75</td><td>2,30</td><td>250</td><td>1 025</td></tr>
<tr><td>2,00</td><td>2,55</td><td>330</td><td>1 200</td></tr>
<tr><td>2,25</td><td>2,90</td><td>430</td><td>1 480</td></tr>
<tr><td>2,50</td><td>3,15</td><td>505</td><td>1 700</td></tr>
<tr><td>3,00</td><td>3,70</td><td>710</td><td>2 250</td></tr>
<tr><td>3,50</td><td>4,30</td><td>940</td><td>2 950</td></tr>
<tr><td>4,00</td><td>4,85</td><td>1 200</td><td>3 680</td></tr>
<tr><td>4,50</td><td>5,50</td><td>1 540</td><td>4 660</td></tr>
<tr><td>5,00</td><td>6,00</td><td>1 835</td><td>5 500</td></tr>
<tr><td>5,50</td><td>6,60</td><td>2 220</td><td>6 600</td></tr>
<tr><td>6,00</td><td>7,20</td><td>2 640</td><td>7 800</td></tr>
<tr><td>6,50</td><td>7,80</td><td>3 100</td><td>9 110</td></tr>
</table></td><td></td><td></td><td>Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 1 — Consider additional limitations in both freefall and overspeed conditions to minimize effective retardations. See TFC Doc NACSG S2–1, 2, 3.</td></tr>
</table>

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10				Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		7,00	8,40	3 595	10 530			
		7,50	9,00	4 125	12 050			
		8,00	9,60	4 695	13 670			
		8,50	10,20	5 300	15 400			
		9,00	10,80	5 940	17 240			
		9,50	11,40	6 620	19 180			
		10,00	12,00	7 335	21 220			
	9.8.5 Release **9.8.5.1** When a safety gear has tripped its release shall require the intervention of a competent person. **9.8.5.2** The release and automatic reset of a safety gear on the car, counterweight or balancing weight shall only be possible by raising the car, counterweight or balancing weight.	**2.17.9.3 Release.** When car safeties are applied, no decrease in tension in the governor rope or motion of the car in the down direction shall release the safeties, but such safeties shall be permitted to be released by the motion of the car in the up direction. **2.17.9.4 Force Providing Stopping Action to Be Compressive.** Safeties shall be so designed that, on their application, the forces that provide the stopping action shall be compressive forces on each side of the guiderail section.						Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language shown in EN 81–1:1998, 9.8.5.
	9.8.6 Constructional conditions **9.8.6.1** Jaws or blocks of safety gears shall not be used as guide shoes.	**2.17.10 Minimum Permissible Clearance Between Rail-Gripping Faces of Safety Parts** In the normally retracted position of the safety, the distance between the rail-gripping faces of the safety parts shall be not less than the thickness of the guide rail plus 3,5 mm (0.14 in.), and the clearance on any side between the gripping face and the guide rail shall be not less than 1,5 mm (0.06 in.), as measured on the side of the rail toward which the car frame is pressed with sufficient force to take up all clearances in the guide shoe assembly. Safety jaws, while in the retracted position, shall be so restrained as to prevent a reduction of this minimum clearance.						Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider developing performance-based language to ensure that safeties are not inadvertently activated. NOTE Consider revisions to EN 81–1. (9.8.6.1 and 2.17.10)

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.8.6.2 For safety gear of the instantaneous type with buffered effect, the design of the buffering systems shall be of the energy accumulation type with buffered return movement or the energy dissipation type, satisfying the requirements of **10.4.2** or **10.4.3**.	**2.17.8.2 Type C (Combination Instantaneous and Oil-Buffer Safety).** **2.17.8.2.2** The oil buffers shall conform to all requirements specified in 2.22 for oil buffers, except that the stroke shall be based on governor tripping speed and on an average retardation not exceeding 9,81 m/s^2 (32.2 ft/s^2). **2.17.8.2.3** After the buffer stroke, as defined in 2.17.8.2.2, has been completed, provision shall be made for an additional travel of the plunger or piston of not less than 10 % of the buffer stroke, to prevent excessive impact on the buffer parts and the auxiliary safety plank. **2.17.8.2.4** Where the distance between guide rails exceeds 2 450 mm (96 in.), the safety shall be provided with two oil buffers of substantially identical calibration, and the buffers shall be so located as to develop minimum stresses in the auxiliary safety plank during safety operation. Buffers shall be located in line with and symmetrically between the guide rails. **2.17.8.2.5** The auxiliary safety plank shall be so supported and guided below the car frame that the clearances specified in 2.17.10 for the safety parts are maintained during normal operation. The auxiliary safety plank shall be so designed that the maximum stresses in the plank shall not exceed those specified for similar car-frame members in 2.15.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider elimination of these types of safeties

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.17.8.2.6 The rail-gripping device of the auxiliary safety plank shall be so arranged and connected as to prevent the plank from being out of level more than 13 mm (0.5 in.) in the length of the plank when the safety is operated to stop the car. **2.17.8.2.7** An electric switch shall be provided and so arranged and connected that the elevator cannot be operated by means of the normal operating device if any buffer is compressed more than 10 % of its stroke (see 2.26.2.13). **2.17.8.2.8** Means shall be provided to prevent operation of the elevator by means of the normal operating device if the oil level in buffer is below the minimum level (see 2.26.2.13).			
	9.8.6.3 If the safety gear is adjustable, the final setting shall be sealed. **15.14 Safety gear** On safety gears a data plate shall be fixed indicating: a) the name of the manufacturer of the safety gear; b) the type examination sign and its references.	**2.17.14 Marking Plates for Safeties** A metal plate shall be securely attached to each safety so as to be readily visible, and shall be marked in a legible and permanent manner with letters and figures not less than 6 mm (0.25 in.) in height indicating: (a) the type of safety, based on 2.17.5 (b) the maximum tripping speed in m/s (ft/min) for which the safety is permitted (c) the maximum weight in kg (lb), that the safety is designed and installed to stop and sustain (d) the force in N (lbf) required to activate the safety or rope releasing carrier, if provided (e) the manufacturer's name or trademark			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider method to provide permanent data with safeties. Consider ASME A17.1/CSA B44 data plate in 2.17.14 and EN 81–1 Certificate.
	9.8.7 Inclination of the car floor When the car safety gear operates, the floor of the car without or with the load uniformly distributed shall not incline more than 5 % from its normal position.	**2.17.9.2 Level of Car on Safety Application.** The application of a Type A or Type B safety to stop the car, with its rated load centred on each quarter of the platform symmetrically with relation to the centerlines of the platform, shall not cause the platform to be out of level more than 30 mm/m (0.36 in./ft)* in any direction. (See 2.17.8.2.6 for Type C safeties.)			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language shown in EN 81–1:1998, 9.8.7.

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	9.8.8 Electrical checking When the car safety gear is engaged, an electric safety device in conformity with **14.1.2**, mounted on the car shall initiate the stopping of the machine before or at the moment of safety gear operation See 9.8.5.	**2.17.7.2** Every car safety shall be provided with a switch, operated by the car safety mechanism (see 2.26.2.9). A switch operated by the safety mechanism is not required on counterweight safeties. **2.17.7.3** The car safety mechanism switch shall operate before or at the time of application of the safety. **2.17.7.4** Switches operated by the car safety mechanism shall be of a type that cannot be reset until the car safety mechanism has been returned to the unapplied position.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider adopting language shown in EN 81–1:1998, 9.8.8 and 9.8.5.
	Not in EN 81–1	**2.17.11 Maximum Permissible Movement of Governor Rope to Operate the Safety Mechanism** For all Type B safeties, the movement of the governor rope, relative to the car or the counterweight, respectively, required to operate the safety mechanism from its fully retracted position to a position where the safety jaws begin to exert pressure against the guide rails, shall not exceed the following values based on rated speed: (a) for car safeties (1) 1 m/s (200 ft/min) or less, 1 070 mm (42 in.) (2) 1,01 m/s (201 ft/min) to 1,9 m/s (375 ft/min), 915 mm (36 in.) (3) over 1,9 m/s (375 ft/min), 756 mm (30 in.) (b) for counterweight safeties, all speeds, 1,070 mm (42 in.) Drum-operated car and counterweight safeties, requiring continual unwinding of the safety drum rope to fully apply the safety, shall be so designed that not less than three turns of the safety rope will remain on the drum after the overspeed test of the safety has been made with rated load in the car.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Review ongoing revisions to EN 81–1 which will accomplish this objective using a different approach. To be reviewed when EN 81–1 language is finalized.

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.17.12 Minimum Factors of Safety and Stresses of Safety Parts and Rope Connections **2.17.12.1** Parts of safeties, except springs, safety-rope drums, leading sheaves, and their supporting brackets and safety-jaw gibs, shall have a factor of safety of not less than 3,5, and the materials used shall have an elongation of not less than 15 % in a length of 50 mm (2 in.) when tested in accordance with ASTM E8. Forged, cast, or welded parts shall be stress relieved. **2.17.12.2** Springs are permitted in the operation of car or counterweight safeties. Where used, and where partially loaded prior to safety operation, the loading on the spring shall not produce a fibre stress exceeding one-half the elastic limit of the material. During operation of the safety, the fibre stress shall not exceed 85 % of the elastic limit of the material. Helical springs, where used, shall be in compression.			Priority 1 — Standards writing bodies to review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4.
		2.17.12.3 Safety-rope drums, leading sheaves, and their supporting brackets and safety-jaw gibs, are permitted to be made of cast iron and other metals provided such parts have a factor of safety of not less than 10. **2.17.12.4** Rope used as a connection from the safety to the governor rope, including rope wound on the safety-rope drum, shall be not less than 9,5 mm (0.375 in.) in diameter, shall be made of metal, and shall be corrosion resistant. The factor of safety of the rope shall be not less than 5. Tiller-rope construction shall not be used. **2.17.12.5** The factors of safety shall be based upon the maximum stresses developed in the parts during the operation of the safety when stopping rated load from governor tripping speed. **2.17.12.6** Safety-rope leading sheave brackets and other safety operating parts shall not be attached to or supported by wood platform members.			

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		2.17.13 Corrosion-Resistant Bearings in Safeties and Safety-Operating Mechanisms Bearings in safeties and in the safety-operating mechanisms shall be of corrosion-resistant construction, with one or both members of the bearing made of, or electroplated with, a corrosion-resistant material.			Priority 2 — Standards writing bodies to review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4.
		2.17.15 Governor-Rope Releasing Carriers Where a governor-rope releasing carrier is used to prevent actuation of the safety by the inertial forces of the governor-rope system, or used for any other purpose, the governor-rope releasing carrier on the car (or on the counterweight) shall be set to require a tension in the governor rope, to pull the rope from the carrier, of not more than 60 % of the pull-through tension developed by the governor. The means to regulate the governor-rope pull-out force shall be mechanical and shall be sealed. The carrier shall be designed so that the pullout tension cannot be adjusted to exceed the amount specified without breaking the seal. **2.17.16 Rail Lubricants and Lubrication Plate** Rail lubricants or coatings that will reduce the holding power of the safety, or prevent its functioning as required in 2.17.3, shall not be used (see 8.7 for maintenance requirements). A metal plate as required by 2.16.3.2 shall be securely attached to the car crosshead in an easily visible location, and, where lubricants are to be used, shall carry the notation, "CONSULT MANUFACTURER OF THE SAFETY FOR THE CHARACTERISTICS OF THE RAIL LUBRICANT TO BE USED." If lubricants are not to be used, the plate shall so state. If lubricants other than those recommended by the manufacturer are used, a safety test shall be made to demonstrate that the safety will function as required by 2.17.3.			Proposal: Standards writing bodies to consider adopting the following proposed requirements: Priority 2 — Consider future convergence for this item.

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	Annex F (normative) **Safety components — Tests procedures for verification of conformity** **F.3 Safety gear** **F.3.1 General provisions** The applicant shall state the range of use provided, i.e.: — minimum and maximum masses; — maximum rated speed and maximum tripping speed. Detailed information shall be provided on the materials used, the type of guide rails and their surface condition (drawn, milled, ground). The following documents shall be attached to the application: a) detailed and assembly drawings showing the construction, operation, materials used, the dimensions and tolerances on the construction components; b) in the case of progressive safety gear, also a load diagram relating to elastic parts.	**Not required in ASME A17.1/CSA B44**	Type Test incorporated into TS. Very close to EN 81–1 requirement.		Standards writing bodies to review requirements considering good engineering practice as described in ISO/TS 22559-2:2010, 5.4. Requirements for type testing to be considered when reviewing good engineering practice.
	F.3.2 Instantaneous safety gear **F.3.2.1 Test samples** Two gripping assemblies with wedges or clamps and two lengths of guide rail shall be submitted to the laboratory. The arrangement and the fixing details for the samples shall be determined by the laboratory in accordance with the equipment that it uses. If the same gripping assemblies can be used with different types of guide rail, a new test shall not be required if the thickness of the guide rails, the width of the grip needed for the safety gear and the surface state (drawn, milled, ground) are the same.				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.3.2.2 Test **F.3.2.2.1 Method of test** The test shall be made using a press or similar device, which moves without abrupt speed change. Measurements shall be made of: a) the distance travelled as a function of the force; b) the deformation of the safety gear block as a function of the force or as a function of the distance travelled. **F.3.2.2.2 Test procedure** The guide rail shall be moved through the safety gear. Reference marks shall be traced onto the blocks in order to be able to measure their deformation. The distance travelled shall be recorded as a function of the force. After the test:				
	a) the hardness of the block and the gripping element shall be compared with the original values quoted by the applicant. Other analyses may be carried out in special cases; b) if there is no fracture, deformations and other changes shall be examined (for example, cracks, deformations or wear of the gripping elements, appearance of the rubbed surfaces); c) if necessary, photographs shall be taken of the block, the gripping elements and the guide rail for evidence of deformations or fractures.				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.3.2.3 Documents **F.3.2.3.1** Two charts shall be drawn up as follows: a) the first shall show the distance travelled as a function of the force; b) the other shall show the deformation of the block. It shall be done in such a way that it can be related to the first chart. **F.3.2.3.2** The capacity of the safety gears shall be established by integration of the area of the distance-force chart. The area of the chart to be taken into consideration shall be: a) the total area if there is no permanent deformation; b) if permanent deformation or rupture has occurred, either: 1) the area up to the value at which the elastic limit has been reached, or 2) the area up to the value corresponding to the maximum force.				
	F.3.2.4 Determination of the permissible mass **F.3.2.4.1 Energy absorbed by the safety gear** A distance of free fall, calculated with reference to the maximum tripping speed of the overspeed governor fixed in **9.9.1** shall be adopted. The distance of free fall in metres shall be taken as: $h = \frac{V_1^2}{2 \cdot g_n} + 0{,}1 + 0{,}03$ where: v_1 = tripping speed of overspeed governor in metres per second; g_n = standard acceleration of free fall in metres per square second; 0,10 m is the distance travelled during the response time; 0,03 m is the travel during take-up of clearance between the gripping elements and the guide rails.				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	The total energy the safety gear is capable of absorbing: $2 \cdot K = (P + Q)_1 \cdot g_n \cdot h$ from which: $\left(P + Q\right)_1 = \frac{K}{g_n \cdot h}$ where $(P + Q)_1$ = permissible mass in kilograms; P = masses of the empty car and components supported by the car, i.e. part of the travelling cable, compensating ropes/chains (if any), etc. in kilograms; Q = rated load in kilograms; K, K_1, K_2 = energy absorbed by one safety gear block in joules (calculated in accordance with the chart).				
	F.3.2.4.2 Permissible mass a) If the elastic limit has not been exceeded: K is calculated by the integration of the area defined in **F.3.2.3.2 a)**; 2 is taken as the safety coefficient. The permissible mass in kilograms will be: $\left(P + Q\right)_1 = \frac{K}{g_n \cdot h}$ b) if the elastic limit has been exceeded: two calculations shall be made taking the one which is the more favourable to the applicant; 1) K_1 is calculated by the integration of the area defined in **F.3.2.3.2 b) 1)**; 2 is adopted as the safety coefficient and this will give the permissible mass in kilograms as: $\left(P + Q\right)_1 = \frac{K_1}{g_n \cdot h}$ 2) K_2 is calculated by the integration of the area defined in **F.3.2.3.2 b) 2)**; 3,5 is adopted as the safety coefficient, and this will give the permissible mass in kilograms as: $\left(P + Q\right)_1 = \frac{2 \cdot K_2}{3{,}5 \cdot g_n \cdot h}$				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.3.2.5 Checking the deformation of the block and of the guide rail If too great a deformation of the gripping elements in the block or the guide rail might cause difficulty in disengaging the safety gear, the permissible mass shall be reduced.				
	F.3.3 Progressive safety gear **F.3.3.1 Statement and test sample** **F.3.3.1.1** The applicant shall state for what mass in kilograms and tripping speed in metres per second of the overspeed governor the test is to be carried out. If the safety gear has to be certified for various masses, he shall specify them and indicate in addition whether adjustment is by stages or continuous. NOTE The applicant should choose the suspended mass in kilograms by dividing the anticipated braking force in newtons by 16 to aim at an average retardation of 0,6 g_n. **F.3.3.1.2** A complete safety gear assembly mounted on a cross-piece, with the dimensions fixed by the laboratory, together with the number of brake shoes necessary for all the tests shall be placed at the disposal of the laboratory. The number of sets of brake shoes necessary for all the tests shall be attached. For the type of guide rail used, the length specified by the laboratory shall also be supplied.	**Acceptance Inspections and Tests** **8.10.2.2.2 (ii)** (4) Types B and C Safeties (a) Types B and C safeties shall be subjected to an overspeed test, with the suspension ropes attached, by gradually increasing the speed of the car until the governor causes application of the safety. Safeties of elevators equipped with AC driving machine motors, where the car with its rated load does not cause sufficient overspeed when the machine brake is released to trip the governor jaws, shall be tested by operating the car at its rated speed in the down direction and tripping governor jaws by hand; see 8.10.2.2.2 (bb)(1)(b) for test of governor tripping speed. (b) The overspeed switch on the governor shall be inoperative during the overspeed test. In order to ensure that the safety will retard the car with the minimum assistance from the elevator driving machine and minimize the development of slack rope and fallback of the counterweight, the switch on the car operated by the car safety mechanism shall, for the duration of the test, be temporarily adjusted to open as close as possible to the position at which the car safety mechanism is in the fully applied position.			

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
		(c) The stopping distances for Type B safeties shall conform to 2.17.3, and shall be determined by measuring the length of the marks made by the safety jaws or wedges on both sides of each car guide rail, deducting the length of the safety jaw or wedge used, and taking the average of the four readings. (d) For Type B safeties, the movement of the governor rope to operate the safety mechanism shall be tested to determine conformance with 2.17.11. (e) For Type C safeties, the stopping distance shall be equal to the stroke of the buffer located between the lower member of the car frame and the auxiliary safety plank, and shall conform to 2.17.8.2. After the safety has stopped the car, the level of the auxiliary safety plank shall be checked to determine conformance with 2.17.8.2.6. (f) For Type C safeties, the buffer compression switch and oil level devices shall be tested to determine conformance with 2.17.8.2.7 and 2.17.8.2.8.			
	F.3.3.2 Test **F.3.3.2.1 Method of test** The test shall be carried out in free fall. Direct or indirect measurements shall be made of: a) the total height of the fall; b) the braking distance on the guide rails; c) the sliding distance of the overspeed governor rope, or that of the device used in its place; d) the total travel of the elements forming the spring. Measurements a) and b) shall be recorded as a function of the time. The following shall be determined: 1) the average braking force; 2) the greatest instantaneous braking force; 3) the smallest instantaneous braking force.				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.3.3.2.2 Test procedure **F.3.3.2.2.1 Safety gear certified for a single mass** The laboratory shall carry out four tests with the mass $(P + Q)_1$. Between each test the friction parts shall be allowed to return to their normal temperature. During the tests several identical sets of friction parts may be used. However, one set of parts shall be capable of: a) three tests, if the rated speed does not exceed 4 m/s; b) two tests, if the rated speed exceeds 4 m/s. The height of free fall shall be calculated to correspond to the maximum tripping speed of the overspeed governor for which the safety gear can be used. The engagements of the safety gear shall be achieved by a means allowing the tripping speed to be fixed precisely. NOTE For example, a rope may be used, the slack of which should be carefully calculated, fixed to a sleeve which can slide with friction over a fixed smooth rope. The friction effort should be the same as the effort applied to the operating rope by the governor attached to this safety gear.				
	F.3.3.2.2.2 Safety gear certified for different masses Adjustment in stages or continuous adjustment. Two series of tests shall be carried out for: a) the maximum, and b) the minimum value applied for. The applicant shall supply a formula, or a chart, showing the variation of the braking force as a function of a given parameter. The laboratory shall verify by suitable means (in the absence of anything better, by a third series of tests for intermediary points) the validity of the supplied formula.				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.3.3.2.3 Determination of the braking force of the safety gear **F.3.3.2.3.1 Safety gear certified for a single mass** The braking force of which the safety gear is capable for the given adjustment and the type of guide rail is taken as equal to the average of the average braking forces determined during the tests. Each test shall be made on an unused section of guide rail. A check shall be made that the average values determined during the tests lie within a range of ±25 % in relation to the value of the braking force defined above. NOTE Tests have shown that the coefficient of friction could be considerably reduced if several successive tests were carried out on the same area of a machined guide rail. This is attributed to a modification in the surface condition during successive safety gear operations. It is accepted that, on an installation, an inadvertent operation of the safety gear would have every chance of occurring at an unused spot. It is necessary to consider that if, by chance, this were not the case, the braking force would have a lower value until an unused portion of guide rail surface was reached. Hence, greater sliding than normal. This is a further reason for not permitting any adjustment causing too small a retardation at the beginning.				
	F.3.3.2.3.2 Safety gear certified for different masses Adjustment in stages or continuous adjustment. The braking force of which the safety gear is capable shall be calculated as laid down in **F.3.3.2.3.1** for the maximum and minimum values applied for.				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.3.3.2.4 Checking after the tests a) the hardness of the block and the gripping elements shall be compared with the original values submitted by the applicant. Other analyses may be made in special cases; b) the deformations and modifications (for example, cracks, deformations or wear of the gripping elements, appearance of the rubbing surfaces) shall be checked; c) if necessary, the safety gear assembly, the gripping elements and the guide rails shall be photographed in order to reveal deformations or fractures.				
	F.3.3.3 Calculation of the permissible mass **F.3.3.3.1 Safety gear certified for a single mass** The permissible mass shall be calculated using the following formula: $(P + Q)_1 = \frac{Braking\ \ force}{16}$ where $(P + Q)_1$ = permissible mass in kilograms; P = masses of the empty car and components supported by the car, i.e. part of the travelling cable, compensating ropes/chains (if any), etc. in kilograms; Q = rated load in kilograms; *Braking force* = the force in newtons determined in accordance with **F.3.3.2.3**.				
	F.3.3.3.2 Safety gear certified for different masses **F.3.3.3.2.1 Adjustment in stages** The permissible mass shall be calculated for each adjustment as laid down in **F.3.3.3.1**. **F.3.3.3.2.2 Continuous adjustment** The permissible mass shall be calculated as laid down in **F.3.3.3.1** for the maximum and minimum values applied for and in accordance with the formula supplied for the intermediate adjustments.				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.3.3.4 Possible modification to the adjustments If, during the tests, the values found differ by more than 20 % from those expected by the applicant, other tests may be made with his agreement, after modification of the adjustments if necessary. NOTE If the braking force is clearly greater than that allowed for by the applicant, the mass used during the test would be clearly smaller than that which one would be led to authorize by calculation **F.3.3.3.1** and consequently the test would not allow the conclusion that the safety gear is able to dissipate the required energy with the mass resulting from the calculation. **F.3.4 Comments** a) 1) When it is applied to a given lift, the mass stated by the installer shall not exceed the permissible mass for the safety gear (for instantaneous safety gear or instantaneous safety gear with buffered effect), and the adjustment considered;				
	2) in the case of progressive safety gear, the mass stated may differ from the permissible mass defined in **F.3.3.3** by ±7,5 %. It is accepted in these conditions that the requirements of **9.8.4** are met on the installation, notwithstanding the usual tolerances on the thickness of the guide rails, the surface conditions, etc.; b) to evaluate the validity of welded parts, reference shall be made to standards on this subject; c) a check shall be made that the possible travel of the gripping elements is sufficient under the most unfavourable conditions (accumulation of manufacturing tolerances); d) the friction parts shall be suitably retained so that it can be certain that they will be in place at the moment of operation; e) in the case of a progressive type safety gear, it shall be checked that the travel of the components forming the spring is sufficient.				

Table 5 *(continued)*

Sq #	EN 81–1+A3:2009	ASME A17.1–2010/CSA B44–10	Japan	ISO/ TS 22559-2	Comments and Proposal for convergence
	F.3.5 Type examination certificate **F.3.5.1** The certificate shall be drawn up in triplicate, i.e. two copies for the applicant, and one for the laboratory. **F.3.5.2** The certificate shall indicate the following: a) information according to **F.0.2**; b) type and application of safety gear; c) the limits of the permissible masses [see **F.3.4 a)**]; d) the tripping speed of the overspeed governor; e) the type of guide rail; f) the permissible thickness of the guide rail blade; g) the minimum width of the gripping areas; and, for progressive safety gear only: h) the surface condition of the guide rails (drawn, milled, ground); i) the state of lubrication of the guide rails. If they are lubricated, the category and specification of the lubricant.				

Bibliography

[1] ISO/TR 11071, *Comparison of worldwide lift safety standards*

[2] ISO/TS 22559-2:2010, *Safety requirements for lifts (elevators) — Part 2: Safety parameters meeting the global essential safety requirements (GESRs)*

[3] CEN EN 81-1:1998+A3:2009, *Safety rules for the construction and installation of lifts — Part 1: Electric lifts*

[4] IEC 61508–2, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems*

[5] IEC 61508–3, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 3: Software requirements*

[6] EN 60947–4-1, *Low-voltage switchgear and controlgear — Contactors and motor-starters — Electromechanical contactors and motor-starters*

[7] EN 60947–5-1, *Low-voltage switchgear and controlgear — Control/circuit devices and switching elements — Electromechanical control circuit devices*

[8] ASME A17.1-2010/CSA B44-10, *Safety Code for Elevators and Escalators*

[9] JIS TS A 0028-1:2011, *Safety rules for Elevators and Escalators - Part 1: Electric Elevators*

[10] JIS A 4302, *Inspection standard of elevator, escalator and dumbwaiter*

[11] ASTM E8, *Standard Test Methods for Tension Testing of Metallic Materials*

[12] ANSI Z535.2, *Environmental Facility and Safety Signs*

[13] CAN/CSA-Z321, *Signs and Symbols for the Workplace*

[14] Building Standard Law of Japan. http://www.bcj.or.jp/en/services/reference.html

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