TECHNICAL REPORT

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AMENDMENT 2
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Comparison of worldwide lift safety standards —

Part 1: **Electric lifts [elevators]**

AMENDMENT 2: References to Australian standards

Comparaison des normes mondiales de sécurité des ascenseurs —

Partie 1: Ascenseurs électriques

AMENDEMENT 2: Références aux normes australiennes

Reference number
ISO/TR 11071-1:1990/Amd.2:2001(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;

— type 3, when a technical committee has collected data of different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

Technical Reports are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Attention is drawn to the possibility that some of the elements of this Amendment may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

Amendment 2 to Technical Report ISO/TR 11071-1:2001 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators, passenger conveyors*.

ISO/TR 11071 consists of the following parts, under the general title *Comparison of worldwide lift safety standards:*

— *Part 1: Electric lifts (elevators)*

— *Part 2: Hydraulic lifts (elevators)*

ISO/TR 11071-1/Amd. 1:1999 references Japanese standards.

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Introduction

Technical Report ISO/TR 11071-1:1990 consists of a comparison of the requirements of lifts (elevators) as covered by the following safety standards for electric lifts that were used in various countries or regions at the end of 1989:

a) CEN – European Standard EN 81, *Part 1: Lifts and service lifts* [1985 edition, as presented in BS 5655-1:1986 (excluding national Appendix)];

b) ASME – ASME/ANSI A17.1, *Safety code for elevators and escalators* (1987 edition, including the A17.1a-1988 and A17.1b-1989 addenda);

c) CSA – CSA Standard CAN3-B44, *Safety code for elevators* (1985 edition, including Supplement 1-1987);

d) USSR – USSR, *Elevator design and safe operation code* (NEDRA, 1971 edition, as presented in English version NEDRA 1972);

e) Australia – Lift Code Australia, AS1735-2:1993.

The intention of the Technical Report was to provide reference information to assist national committees when reviewing and revising individual standards. This process was expected to initiate a gradual convergence of the technical requirements.

The original Technical Report did not include the safety requirements and standards used in Japan or in Australia.

At the initiative of Technical Committee ISO/TC 178, experts from the Australian Elevator Association provided ISO/TC 178 Working Group 4 with tables comparing Australian requirements with those in CEN, ASME, CSA, USSR, and Japan safety standards. It should be noted that since the publication of ISO/TR 11071-1, the CMEA has been cancelled and the USSR [NEDRA, 1971] standard has been withdrawn and replaced with a new code for the Russian Federation [PUBEL:1992]. Furthermore, the ASME and CSA standards have been revised and new editions published.

By Resolution No. 1995/117 and No. 1996/128, however, ISO/TC 178 asked WG 4 to review the material prepared by Australian experts with the intention of publishing it as the second amendment to ISO/TR 11071-1:1990, rather than revising and updating the whole 1990 edition.

Amendment 1:1999 to ISO/TR 11071-1 gives references to the lift (elevator) requirements stipulated in Japanese standards were added to the comparison tables; the sources of those requirements are listed.

Amendment 2 to ISO/TR 11071-1 adds references to the lift (elevator) requirements specified in SA Standards Australia – Lift Code Australia, AS1735-2:1993, and other Australian standards listed in this amendment.

ISO/TR 11071-1 or its amendments do not replace safety standards compared therein. The information contained in these documents does not necessarily represent the opinions of the standard-writing organizations responsible for the development of the safety standards being compared, and they should be consulted regarding interpretations of their requirements.

NOTE ISO/TR 11071-1 and this amendment do not deal with lift rated loads and suspension ropes. The subjects are, however, covered in ISO/TR 11071-2:1996, in clauses 7 and 8, which include tables and analysis of corresponding requirements in CEN, ASME and CSA standards as related to both electric and hydraulic lifts (elevators). In addition, Table 7.1 of Amendment 1:1998 to ISO/TR 11071-2:1996, compares requirements for suspension ropes and chains for CEN, ASME, CSA, Australian and Japanese Standards for both electric and hydraulic lifts (elevators).

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Comparison of worldwide lift safety standards —

Part 1:
Electric lifts [elevators]

Amendment 2: References to Australian standards

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This amendment illustrates Australian lift safety requirements in relation to the requirements of all standards covered in the original Technical Report, ISO/TR 11071-1:1990 and Amendment 1:1999, except CMEA.

This amendment consists of the tables and charts reproduced from Amendment 1, with the CMEA columns deleted and the Australian requirements added in a new column “AUSTRALIA”. Tables 3.3.2.3, 3.9.2, and 3.10.2 and all tables in annexes are included.

These tables may therefore be inserted to replace the original tables in ISO/TR 11071-1:1990.

This amendment does not constitute a general review of ISO/TR 11071-1:1990. No data in any of the other columns have been altered.

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Replace the original Table 3.3.2.3 with the following.

Table 3.3.2.3 — Comparison of components’ ratings (Percentage of rated load)

Component	CEN	ASME	CSA	USSR	AUSTRALIA	JAPAN
Rope traction	Dynamic: 125 % (9-Notes)	Dynamic: 125 % (208.2)	Dynamic: 125 % (3.10.2.2)	Dynamic: 110 % (7.3.10)	125% (2.14)	Dynamic: 125 % (passenger) 120 % (freight) [BSLJ-EO-129.9(6)]
				Static: 200 % (7.3.9 b)	No spec	Static: 125 % (passenger) 120 % (freight) [BSLJ-EO-129.9(6)]
Mechanical brake alone from rated speed	125 % (12.4.2.1)	[a] (208.8)	125 % (3.10.8.2)	110 % (7.3.10)	125 % (7.10 h)	125 % (passenger) 120 % (freight) [BSLJ-EO-129.9(6)]
Safety gear [b]	100 % (9.8.1.1)	125 % (205.3)	125 % (3.7.4.1)	110 % (7.3.10)	100% (33.4.1)	100 % [JIS A4302-4.2.1(6)]

[a] Holding capacity for 125 %. There are no requirements in ASME for deceleration from any speed at any load.

[b] CEN and USSR safety gear is tested in free-fall, ASME and CSA in overspeed with 100 % rated load.

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Replace Table 3.9.2 and Table 3.10.2 with the following.

Table 3.9.2 — Assumption 7 as applied in current standards

Assumption	CEN	ASME	CSA	USSR	AUSTRALIA	JAPAN
Static force						
Landing doors	300 N (7.2.3)	1110 N [110.11 e(7)]	2500 N (2.11.10.4.7)	No spec	1200 N (12.4.1)	No spec
Car enclosure	300 N (8.3.2.1)	334 N (204.1c)	330 N (3.6.1.3)	No spec	330 N (23.18)	No spec
Impact	No spec	No spec	5000 N (2.11.10.5)	No spec	No spec	No spec
Force distribution	No spec	No spec	No spec	No spec	50 mm sq?	No spec

Table 3.10.2 — Assumption 8 as applied in current standards

Assumption	CEN	ASME	CSA	USSR	AUSTRALIA	JAPAN
Average retardation [a]						
Safety gear	1 g (9.8.4)	1 g (205.8 b)	1 g (3.7.9.2)	1 g (4.9.1)	1 g	1 g (JIS A 4302)
Buffers	1 g (10.4.3.3)	1 g (201.4 b)	1 g (3.3.5.2)	No spec	1 g	1 g [BSLJ-EO-129.9(9)]
Maximum retardation						
Safety gear	No spec	No spec	No spec	2,5 g 0,04 s (4.7.5)	2,5 g 0,04 s	No spec
Buffers duration	2,5 g 0,04 s (10.4.3.3)	2,5 g 0,04 s (201.4 b)	2,5 g 0,04 s (3.3.5.2)	2,5 g 0,04 s (4.0.1)	2.5 g 0.04 s (9.6.3)	2,5 g 0,04 s [BSLJ-EO-129.9(9)]

[a] Average retardation levels exceeding 1 g can occur with a lightly loaded car during safety or buffer application.

NOTE 1 g = 9,81 m/s².

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In annex A, replace the Notes and Legend by the following explanatory text, and insert the replacement tables.

NOTE 1 Column “Australia” is added based on the requirements in the following laws and standards.

SA Standards Australia - Lift Code AS 1735 part 2-1993
AS 1735.1 General requirements
AS 1735.2 Passenger and Goods Lifts – Electric - 1993
AS 1735.10 Tests – 1986
AS 1735.11 Fire-rated landing doors
AS 1979-1993 Flexible travelling cables for lifts
AS 3000 Australian Wiring rules – 1991
AS 3569 Steel wire ropes
AS/NZ 4431 Guidelines for safe working on new lift installations in new construction

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Building regulations:
BCA Building Code of Australia

Fire emergency lifts
Fire emergency lifts are required for buildings over 25 m, where two or more fire emergency lifts are provided they shall be in at least two separate lift shafts.

NOTE 2 Column “CMEA” has been deleted.

NOTE 3 In other columns, the bracketed numbers cross-reference rules in individual standards CEN, ASME, CSA, USSR (see Introduction) and in Japanese Standards (see Amendment 1).

NOTE 4 The following abbreviations and symbols are used in the tables.

Notation	Meaning
No spec	There is no rule covering the specific subject
N/A	The question is not applicable to the specific standard for various reasons
-	Same as “No spec” or “N/A”
?	The requirement in the standard is not clear, or the data were not available at the time of publication of the report
>	Greater than
<	Less than
≤	Up to (less or equal)

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Table A.1A — Spaces and clearances (Part 1 of 5)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
1.	Top car clearances for traction elevators (With counterweight on fully compressed buffers in all except JAPAN columns)	(5.7.1) (see Note 1)	(107.1e & k) (see Note 1)	BSLJ-EO 129-6(5) And JIS A 4302 4.1.4	(2.8.5) (see Note 1)	(4.1.7)	AS1735 part 2, Section 8
1.1	Guided travel of car..... min.	0,1 m + 0,035V^2	See 200.8	Top car clearance (TCC) in this column means car frame to overhead floor or beam distances when car is level with top landing	See 3.2.8	See 4.3.4	
1.2	Free height above a specific area of the car roof ..... min.	1 m + 0,035V^2	1,07 m + possible car jump		No spec	0,75 m	
1.3	Well roof to car crosshead..... min.	0,3 m + 0,035V^2	0,60 m + 0,035V^2	**Rated speed** m/s / **TCC** m	0,60 m + 0,035V^2	0,2 m + 0,06V^2 or 0,5 m V = rated speed 0,5 if oil buffers	
1.4	Well roof to equipment on car top (except 1.5) ..... min.	same as 1.3	0,15 m + 0,035V^2	≤ 0,75 / 1,2	0,15 m + 0,035V^2	0,2 m + 0,06v^2	
1.5	Well roof to guide shoes, rope attachments, door header of vert. sliding doors ..... min.	0,1 m+0,03V^2	> 0 + 0,035V^2	> 0,75 ≤ 1,0 / 1,4 > 1,0 ≤ 1,5 / 1,6 > 1,5 ≤ 2,0 / 1,8 > 2,0 ≤ 2,5 / 2,0 > 2,5 ≤ 3,0 / 2,3 > 3,0 ≤ 3,5 / 2,7 > 3,5 ≤ 4,0 / 3,3 > 4,0 / 4,0	> 0 + 0,035V^2	same as 1.3	
	Note 1: 0,035V^2 represents ½ gravity stop distance with 115% rated speed. This may be reduced:						
	a) If slow down control is used, 0,035V^2 may be:	multiplied by ½ if V ≤ 4m/s 1/3 if V > 4m/s min. 0,25 m	replaced by ½ buffer stroke (107.1e (4)b)		V replaced by reduced stroke buffer speed	No spec	
	b) If comp. rope tie-down, 0,035V^2 may be reduced	see 5.7.1.4 min. 0,2 m	See 107.1e (4)b min. 0,0 m		see 2.8.5(d) min. 0,0 m	No spec	
2.	Top counterweight clearance (with car on compressed buffers)	(5.7.1.2)	(107.1h)	No spec	(2.8.8)	(4.1.7)	(8.5)
2.1	Guided travel of counterweight..... min.	same as 1.1	same as 1.1	No spec	same as 1.1	same as 1.1	No spec
2.2	Well roof to counterweight ..... min.	No spec	same as 1.4	No spec	same as 1.4	same as 1.3	No spec
3.	Refuge space on car top	(5.7.1.1(d))	(107.1k)		(2.8.11)	(4.1.7.2)	—
3.1	Minimum area	Rect. block	0,419 m^2	No spec	(1,07 x 0,76) m^2	No spec	(8.3.2)
3.2	Minimum height.....	(0,5 x 0,6 x 0,8) m	same as 1.2	No spec	same as line 1.3	same as 1.2	(23.13.3.2)

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Table A.1A — Spaces and clearances (Part 2 of 5)

	REQUIREMENTS	CEN	ASME	JAPAN						CSA	USSR	AUSTRALIA
4.	Bottom runby	N/A	(107.1b & d)	JIS A 4302 4.2.4		IF SPRING BUFFER			IF OIL BUFFER	(2.8.2 & 2.8.4)	(4.1.13)	
4.1	Minimum car & CW runby .....min.	No spec	0 to 0,3 m depends on type of buffer & motor control	m/s		$V \leq 0{,}125$	$< V \leq 0{,}25$	$< V \leq 0{,}5$	$0{,}5 > V$	0 if spring return oil buffers (3.3.5) 0,15 m otherwise	No spec	300 mm spring (8.2) 230 mm oil buffer (8.2)
				MIN	AC	75 mm	150 mm	225 mm	300 mm			
4.2	Maximum car runby.....max.	No spec	610 mm		DC	150				600 mm	200 mm	600 mm (8.2)
4.3	Maximum CW runby.....max.	No spec	914 mm	MAX	CAR	600				900 mm	200 mm	(8.4)
					CWT	900						460 mm (8.4.1)
5.	Pit clearances (with car on fully compressed buffers **in CEN and ASME columns)**	(5.7.3.3)	(107.1a)	JIS A 4302 4.2.4						(2.8.1)	(4.1.10)	
				For rated speed m/s		**Pit depth** m						
				≤ 0,75		1,2						
5.1	Pit floor and the lowest portion of car structure (except 5.2) .....min.	0,5 m	0,6 m	> 0,75	≤ 1,0	1,4				0,6 m	0,75 m	0,6 mm
				> 1,0	≤ 1,5	1,6						
				> 1,5	≤ 2,0	1,8						
5.2	Pit floor to guide shoes, roller, safety gear blocks, toe guards, car door ...min.	0,1 m	> 0	> 2,0	≤ 2,5	2,0				> 0	No spec.	0,05 mm
				> 2,5	≤ 3,0	2,3						
				> 3,0	≤ 3,5	2,7						
5.3	Sufficient space for a rectangular block	(0,5 x 0,6 x 1,0) m	No spec	> 3,5	≤ 4,0	3,3				No spec.	No spec.	Rectangular box 1,37 x 0,6 x 0,45
				> 4,0		4,0						

Table A.1A — Spaces and clearances (Part 3 of 5)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
6.	Well to entrance-side-car clearances						
6.1	Car without car doors	(11.3 & 5.4.4)	(204.4a) Not permitted	Not permitted	(3.6.4.1) Not permitted	(4.5.5) Not permitted	(24.1) Not permitted
6.1.1	Car sill to inner well face ..... max.	20 mm	—	—	—	—	0.125 (15.12.3.1(c))
6.1.2	Car entrance header to inner face (if car entrance height less than 2.5m)..... min.	70 mm	—	—	—	—	No spec
	..... max.	120 mm	—	—	—	—	No spec
6.1.3	Projection permitted – if not bevelled..... max.	2 mm	—	—	—	—	No spec
6.1.4	Projection permitted – if bevelled ..... max.	5 mm	—	—	—	—	No spec
6.	Well to entrance-side-car clearances						
6.2	Car with car doors	(5.4.3 & 11.2)	(110.10/108.1e&d)	BSLJ-EO 129-6.(4)	(2.11.9.1/2.9.4 & 2.9.5)	(4.1.14 & Table 1)	Yes (24.1)
6.2.1	Car sill to landing sill ..... min.	No spec	13 mm (19*)	No spec	13 mm (20*)	15 mm	13 mm
	..... max.	35 mm	38 mm *Corner car guides	40 mm BSLJ-EO 129-6.(4)	32 mm *Corner car guides	50 mm	40 mm 20 mm corner car guides
6.2.2 a)	Car sill to inner well face limited to ..... max.	150 mm	127 mm	125 mm	125 mm	125...swing 200...1-slide 250...2-slide	40 mm (15.1)
b)	except for vertical sliding doors to ..... max.	200 mm	190 mm	No spec	190 mm	250 mm	150 mm
c)	except if car door lock provided..... max.	Not limited	No spec	No spec	Not limited	No spec	125 mm
d)	specific cases..... max.	20 mm through height max. 500 mm	No spec	No spec	No spec	No spec	No spec
6.2.3	Car door panel to landing door panel ..... max.	120 mm (11.2.3)	140 mm (204.4e)	No spec	140 mm (3.6.4.3)	No spec	150 mm (15.1.5)
	– swinging landing door + car gate..... max.	No spec	102 mm	—	100 mm	No spec	No spec
	swinging landing door on freight elevator ..... max.	No spec	Not spec'd max. but permitted	—	165 mm	No spec	No spec

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Table A.1A — Spaces and clearances (Part 4 of 5)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
7.	Other horizontal well clearances	(11.4 & 5.6.2)	(108.1a, b, c)		(2.9.1/2/3)	(Table 1)	
7.1	Car to well enclosure ..... min.	No spec	19 mm	No spec	20 mm	25 mm (50*) *if wire mesh well	20 mm (15.2a)
	except sides covered in 6) ..... max.	No spec	No spec	No spec	No spec	250–650 mm	No spec
7.2	Car to counterweight ..... min.	50 mm	25 mm	No spec	25 mm	50 mm	25 mm (25.2b)
	..... max.	No spec	No spec	No spec	No spec	250 mm	No spec
7.3	Counterweight to well enclosure ..... min.	No spec	19 mm	No spec	20 mm	25 mm (50*) *if wire mesh well	20 mm (15.2c)
7.4	Counterweight to CWT guard ..... min.	No spec	19 mm	No spec	20 mm	No spec	25 mm (15.2c)
7.5	Car to CWT guard ..... min.	No spec	No spec	No spec	13 mm	No spec	20 mm (15.2a)
7.6	Car to car in multiple wells ..... min.	300 mm (without partition)	51 mm	No spec	150 mm	No spec	100 mm (15.2d)
8.	Clearances in machine room(MR) & machinery spaces(MS)	(6.3.2/6.4.2.2)	(101.4/100.3f/ 101.3d)	BSLJ-EO 129-8.1	(2.3.4/2.3.7/ 2.2.3.6/2.3.3.5)	(6.1.5/6.1.6)	(5.7.2)
8.1	Clearances around panel or cabinet		ANSI/NFPA 70: 620–70 & 110–16 (102.1 & 210.4)		C.22.1:38–44 (2.4.1 & 3.12.4.1)	—	
8.1.1	In front						
a)	Depth ..... min.	0,7 m	0,9 m (0–150V) 1,1 m (151–600V)	0,5 m	0,75 m	0,75 m	600 mm (5.7.2)
b)	Width ..... min.	0,5 m (Note 1)	0,762 m	No spec	No spec	0,5 m	No spec
8.1.2	At rear if openable ..... min.	No spec	same as front	same as front	0,6 m	0,5 m	600 mm (26.14.1)
8.2	Clearance near parts requiring maintenance & inspection	(0,5 x 0,6) m	same as 8.1	0,5 m	0,45 m (2.3.7)	0,5 m	0,45 m (5.7.2)
a)	Clearance ..... min.						
b)	Accessway to those areas ..... min.	0,5 m	110–16(c)	0,5 m	0,45 m	0,5 m	0,45 m (5.7.2)
c)	Accessway if no moving parts ..... min.	0,4 m	110–16(c)	0,5 m	0,45 m	0,5 m	0,45 m (5.7.2)

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Table A.1A — Spaces and clearances (Part 5 of 5)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
8.3	Clear headroom in MR & MS ..... min.	1,8 m	2,13 m	BSLJ-EO 129-8.(2)	2,13 m	2,2 m	2 m (5.6)
	Exceptions:			2,0 m			
a)	Space for sheaves only ..... min.	1,5 m	1,07 m	BSLJ-EO 129-8.(2) 1,5 m	1,07 m	0,8 m	1,4 m
b)	Space for governor & selector ..... min.	1,5 m	1,37 m	BSLJ-EO 129-8.(2) 1,5 m	1,37 m	No spec	1,7 m
8.4	Clear vertical distance above rotating parts min.	0,3 m	No spec	No spec	No spec	No spec	No spec
8.5	If difference in MR floor levels exceeds this height, stairs or ladders and guard rails must be provided	0,5 m (6.3.2.4)	0,38 m (100.3f)	0,23 m BSLJ-EO 129-8.(5)	0,4 m (2.2.3.6)	0,35 m (6.1.9)	0,3 m
8.6	Machine room door –width ..... min.	0,6 m	0,76 m	0,7 m	0,75 m	No spec	0,6 m
	–height ..... min.	1,8 m	1,83 m	1,8 m BSLJ-EO 129-8.(4)	2,03 m	No spec	2,0 m
8.7	Machine room access trap door..... min.	0,8 x 0,8 m (6.3.3.2)	Prohibited	Prohibited	Prohibited (2.3.3.2c)	Prohibited (6.1.11)	Permitted (5.9.2)
8.8	Pulley room access trap door ..... min.	same as 8.7	(762 x 762) mm (101.3d(a))	No spec	(750 x 750) mm (2.3.3.5.1b)	No spec	No spec

NOTE Respecting CEN entry in line 8.1.1(b): The width of the clearances in front of the panel or cabinet must be the full width of the panel or the cabinet or 0,5 m, whichever is greater.

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Table A.2A — Door systems and interlocks (Part 1 of 4)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
1.	DOOR PANELS Elastic deformation allowed for panels (deflection/force)	15 mm/300 N (7.2.3)	No spec	BSLJ-EO 129-6.(1) Hoistway shall be provided with strong walls or enclosures and doors for entrances/exits (including emergency exits: the same in this Section) which are so constructed that persons or articles outside the elevator shafts cannot come in contact with cages or counterweights.	No spec	—	1,2 kN (12.4.1)
2.	-Max horizontal force without permanent deformation -applied at -Area of application of testing	300 N either side 5 cm^2	1110 N (110.11e-7) landing side 100 cm^2	No spec for forces	2500 N (2.11.10.4.7) landing side 100 cm^2	— — —	1,2 kN (12.4.1) Centre of panel 0,1 m^2 (12.4.1)
3.	Maximum horizontal force without -displacement exceeding 20 mm -area of application of the force -maximum upwards force of 1000 N and simultaneous horizontal force on 1000 N from landing side	No spec No spec No	No spec No spec No		5000 N (2.11.10.5.2) 900 cm Yes (2.11.10.5.3)	No spec No spec No	No spec No spec No
4.	Minimum vertical force on door hanger tracks	No spec	4 times load up + down (110.11b)		4 times load up + down (2.11.10.3.4)	—	4 times load up + down (12.16.4)
5.	Maximum force to prevent closing Measured at.....	150 N (7.5.2.1.1) 1/3 to 3/3 of travel	133 N (112.4b) 1/3 to 2/3 of travel	147 N (JEAS-511A) center of travel	135 N (2.13.4(d)) 1/3 to 2/3 of travel	120 N (4.2.5) No spec	130 N (25.5) From rest
6.	LOCKS/CONTACTS/LINKAGE/UNLOCKING Locking device required? ..... Unlocking zone	Yes (7.7.3) ± 200 mm ± 350 mm if auto. doors (7.7.1)	Yes (111.1) ± 254 mm if manual levelling ± 762 mm if auto levelling ± 76 mm if solid state control (210.1e)	Yes [BSLJ-EO 129-9.(2)] ± 200 mm	Yes (2.12.1.1/2) ± 255 mm if manual levelling ± 460 mm if auto levelling ± 75 mm if solid state control (3.12.1.3)	Yes (4.2.& 3) ± 150 mm	Yes (13.1) ± 450 mm auto levelling (13.2.1) ± 230 mm w/out levelling
7.	Type of contact for (6)	safety contact (7.7.3.1)	positive opening (111.3b(1))	Required: « Devices to prevent the cage from moving unless all the doors are closed. » [BSLJ-EO 129-9.(1)]	positive opening (2.12.2.1.1)	safety contact —	2 safety contacts (13.1)
8.	Minimum engagement for locking pin	7 mm (7.7.3.1.1)	No spec	No spec for design	6 m (2.12.2.1.3)	—	No spec

Table A.2A — Door systems and interlocks (Part 2 of 4)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
9.	Is metal required for locking elements?	Yes	No spec	No spec	No spec	No spec	No spec
10.	Force applied to lock in open direction..... min.	1000 N (7.7.3.1.6)	No spec	No spec	1000 N (2.12.2.1.6)	No spec	500 N
10a)	Locking action by: Gravity.....	Yes (7.7.3.1.7)	Yes (111.3b(2))	No spec	Yes (2.12.2.1.2)	No spec	AS1735-10 (4.14.16)
	Permanent magnet	Yes	No		No		No
	Compression spring.....	Yes	Yes		Yes		Yes (14.2 b)
	Positive linkage.....	No	Yes		Yes		No
10b)	Self-closing of landing doors required with car out of landing zone	Yes (7.7.3.2)	Yes (110.3(a))	No spec	Yes (2.11.6.4)	Yes (4.2.3)	Yes (12.27)
11.	Is emergency unlocking..... Required?	Yes–each door (7.7.3.2)	Yes – at access landing (111.9/10) except as in 12	No spec	Yes – at access landing (2.12.9) except as in 12	No	Yes at terminal landings (12.21)
	.....Permitted?	N/A	Yes – on other landings	N/A	Yes – on other landings (2.12.10)	Yes (4.2.14)	Yes at other landings (12.25)
12.	Hoistway switch required or forbidden?	No spec	Required if hw door locked w/car at landing	No spec	required on the 2nd landing if 900 mm to car top	Yes	No spec
13.	Parking device required?	No	Yes (111.8)	No spec	Yes (2.12.8)	Yes	No spec
14.	Neutralization by single action prohibited?	Yes (7.7.5.1)	No spec (111.3d)	No spec	No – see location (2.12.5 & 2.12.2.1.1)	Yes	Yes (13.1.2)
15.	Specs for linkage of multipanels	Vague (7.7.6.2)	Yes safety factors (110.11g)	No spec	Yes safety factors (2.11.10.4.10)	—	Yes (12.16.5)
16.	Door contact required on trailing panels?	Yes (7.7.6.2)	No (111.3b(4))	No spec	No (2.12.2.1.7)	Yes	No (if 12.16.5 is applied)
17.	Opening of landing doors						
	.....in landing zone from inside car	required (8.11.1)	required (111.12)	No spec	required (3.6.5.6)	Yes	Yes
	.....out of landing zone	permitted, except prohibited if 5.4.3.2.2 applicable	prohibited	No spec	required in power-off otherwise prohibited	Yes	No spec
	..... max. force	300 N	334 N (204.5h)	No spec	200 N	No spec	No spec

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Table A.2A — Door systems and interlocks (Part 3 of 4)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
	TESTING						
18.	Type test required?	Yes (7.7.3.1.6)	Yes (111.6a)	No spec	Yes (2.12.4)	—	Yes (14.3)
19.	To be carried on complete doors?	Yes if multipanels (F.1.1.1)	No	No spec	No	—	No (AS1735/10)
20.	No. of cycles with lubrication during test	1 000 000 (F.1.2.2.1.1)	—	No spec	—	—	No spec
21.	No. of cycles with original lubricant	—	100 000 (1101.4)	No spec	100 000 (11.4.4.2)	—	100 000 AS1735/10 (4.7)
22.	No. of cycles without lubricant	—	25 000	No spec	25 000	—	15 000 AS1735/10 (4.10e)
23.	No. of cycles in moisture atmosphere	—	10 000+20+15 000	No spec	10 000+20+15 000		15 000 AS1735/10 (4.9)
24.	Electrical current during endurance test?	Yes (F.1.2.2.1)	Yes (1101.3a)	No spec	Yes (11.4.3.1)	—	Yes
	(with no « break ») Voltage	rated	115 V	JIS A4302	115 V	—	115 V DC
	Current	2 x rated	½ A (DC)		½ A (DC)		0.5 A
25.	Static test (force) – see 10 above	1000 N	—	No spec	—	—	500 N
25a)	Forces & retiring cam movement test	—	Yes (1101.4a)	No spec	Yes (11.4.4.8)	No spec	Yes (AS1735/10)
26.	Dynamic test (weight/fall)	4 kg. /0,5 m	—	No spec	—	—	No spec
27.	Misalignment test	—	Yes (1101.4e)	No spec	No (11.4.4.6)	—	Yes AS1735/10 (4.11)
28.	Electrical checks: « break AC »	Yes (F.1.2.4.2.1)	Not contemplated	No spec	Not contemplated	—	No spec
	number	50 times	—		—		
	voltage.....	110 % rated	—		—		
	amps	1 100 %	—		—		
	power factor.....	0,7	—		—		

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Table A.2A — Door systems and interlocks (Part 4 of 4)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
29.	Electrical checks: « break DC » number ..... voltage..... amps	Yes (F.1.2.4.2.2) 20 times 110 % rated 110 % rated	Yes (1101.4b) 1 000 times 230 V 2 A	No spec	Yes (11.4.4.3) 1 000 times 230 V 2 A	—	No spec
30.	Minimum contact opening	4 mm or 2.2 mm	No specs	No spec	No specs	—	No spec
31.	Minimum creep distances	6 mm (14.1.2.2)	No specs	No spec	No specs	—	No spec
32.	Minimum air gaps	6 mm (14.1.2.2)	No specs	No spec	No specs		No spec
33.	Insulation tests	according IEC	$\sqrt{2 \times \text{rated V}} + 1000\ V$ (1101.4f)	No spec	$\sqrt{2 \times \text{rated V}} + 1000\ V$ (11.4.4.7)	—	$\sqrt{2 \times \text{rated V}} + 1000\ V$, 40/60 Hz AS1735/10 (4.12)
34.	All lock tests to include linkage	Yes (F.1.3.1)	No spec	No spec	No spec	—	No spec
NOTE In this table, it is considered that the locking system consists not only of the lock itself, but also of the panels, their hangers, the tracks, the bottom guides and the linkage elements (in the case of multipanels doors). Specific cases are ignored.							

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Table A.3A — Kinetic energy

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
	POWER OPERATED HORIZONTALLY SLIDING DOORS:	(7.5.2.1)	(112.4/5)	JEAS-511	(2.13.4/5)	(4.2.5)	(25)
1.	FORCE:						
1.1	To prevent door closing .....max.	150 N	133 N (130 lbf)	147 N (15 kg) (Residential)	135 N	118 N (12 kgf)	130 N (25.5lb)
1.2	Measured in portion of travel	1/3 to 3/3* *Full close	1/3 to 2/3	½	1/3 to 2/3	No spec	Full closed
2.	KINETIC ENERGY OF AUTOMATIC DOORS:						
2.1	If re-opening device is provided .....max.	10 J	9,49 J (7ft. lbf)	No spec	10 J	7,84 J (0,8 kgm)	9.5 J (25.5)
2.2	If re-opening device is not provided or made inoperative .....max.	4 J	3,39 J (2.5ft lbf)	No spec	3,5 J	3,92 J (0,4 kgm)	3,4 J (25.6.2, 25.6.3)
2.3	Energy calculated or measured	both	calculated	No spec	calculated	No spec	No spec
2.4	Energy calculated/measured at average closing speed over door's travel, less at each end of travel:						
	-if centrally closing door.....	25 mm	25 mm (1 in)	No spec	25 mm	No spec	25 mm
	-if side closing door.....	50 mm	51 mm (2 in)	No spec	50 mm	No spec	50 mm
2.5	Measuring device specified	Yes	No	No spec	No	No	No
3.	KINETIC ENERGY OF CONTINUOUS PRESSURE BUTTON operated doors may exceed that in 2.1.....	Yes	Yes	No spec	Yes	No spec	No spec
	-if the average closing speed is limited to .....max.	0,3 m/s	Not limited	No spec	Not limited	No spec	No spec
	-if certain requirements related to CPB operation and location fulfilled.....	Not mentioned	Yes (112.3b)	No spec	Yes (2.13.3.2)	No spec	No spec

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Table A.4A — Traction

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
1.	MAXIMUM: Machine shall not raise						
	-empty car with counterweight on buffers.....	Yes (9.3.1)	No spec	No spec	Yes (3.10.2.2)	Yes (4.4.2)	Yes (7.14b)
	-counterweight, with car on buffers.....	No spec	No spec	No spec	Yes (9.2.3b)	Yes (4.4.2)	Yes (7.14b)
2.	MINIMUM STATIC:						
	-car with this percentage of rated load						
	.. .. passenger	125 % (9.note 1)	125 % (208.2c)	125 % [BSLJ-EO 129.9.(6)]	125 % (3.10.2)	200 % (7.3.9)	No spec
	.. .. freight [a]	150 % (D.2.h.3)	100 %	120 % [BSLJ-EO 129.9.(6)]	100 %	200 %	
	-shall not break traction when stationary in the lowest landing.....	Yes	Yes	Yes	Yes	Yes	
3.	MINIMUM DYNAMIC			BSLJ-EO 129.9.(6)			
	-car with this percentage of rated load	125 % (D.2.h)	(1002.3a) [b] (208.2c)	125 % 120 %	125 % 100 %	110 % (7.3.10)	125 % (7.14a)
	shall not break traction out of control [c]						
	when making downwards - emergency stops	Yes (D.2.h)	[b] No spec	Yes	Yes (9.2.3)	No spec	No spec
	- normal stops	—	Yes (1002.3d)	Yes	Yes (3.10.2.2)	No spec	Yes
4.	MAXIMUM SPECIFIC PRESSURE of ropes in grooves limited	Yes (9.3.2)	No spec	No spec	No spec	No spec	No spec
5.	MINIMUM DRIVE SHEAVE–ROPE diameter ratio	40 (9.2.1)	40 (208.2b)	40 [BSLJ-EO 129-4.2.(1)]	40 (3.10.2.1)	45 if > 1,4 m/s 40 if ≤ 1,4 (4.4.4)	40.1 (19.2)
6.	Car – counterweight mass ratio						
	-limited in standard.....	No	No	No	No	No	40 % to 50 % (20.1.1.2)
	-design data verified at inspection.....	Yes (D.2.h.4)	No	No	No	No	Yes but not specified

[a] See 2.1.2 for terminology.

[b] Explicitly not specified. However, consider other rules that a passenger lift must be able to safely lower, stop and hold a car with 125% rated load from the rated speed or the speed at which governor overspeed switch is set.

[c] Out of control means that car may accelerate.

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Table A.5A — Passengers cars instantaneous safety (Part 1 of 2)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA*	USSR	AUSTRALIA
1.	Car direction for setting	down only (9.8.1.1)	down only (205.6)	down only BSLJ-EO 129-9.(7)	down only* (3.7.7)	down only (4.7.1)	Down only (33.6)
2.	Ability to operate in free fall	Yes	Yes (205.8a)	No spec	Yes (3.7.9.1)	Yes (4.7.1)	Yes (4.7.1)
3.	Acceptable load in car	100 % nominal	125 % nominal (205.3)	100 % nominal JIS A4302 4.2.1.(6)	125 % nominal (3.7.4.1)	110 % nominal (7.3.10)	110 % nominal (33.4.1)
4.	Upper speed limit for plain instantaneous	0,63 m/s (9.8.2)	0,75 m/s (205.8)	0,75 m/s [BSLJ-EO 129-9.2]	0,75 m/s (3.7.9)	1,00 m/s (4.7.4)	0,65 m/s (33.8.1)
5.	Upper speed limit if buffered effect (Type C)	1,00 m/s	2,50 m/s	No spec	2,50 m/s	No spec	2,5 m/s (33.8.2)
6.	Oil buffer required for (5)	No (9.8.6.2)	Yes	No spec	Yes	No spec	Yes
7.	Tripping by overspeed	Yes (9.8.3.1)	Yes (205.7)	Yes [BSLJ-EO 129-9.(7)]	Yes (3.7.8.1)	Yes (4.7.3)	Yes (33.8)
8.	Tripping by inertia or equivalent	No	Yes	No spec	Yes	No	Yes (33.8)
9.	Release by lifting the car only	Yes (9.8.5.1)	Optional (205.9c)	No spec	Yes (3.7.10.3.2)	Yes	Yes (33.9.3)
10.	Deceleration limit specified	No	No	No spec	No	≤ 25 m/s² (4.7.5) or more if < 0,04 s	No
11.	Type test required	Yes (note 1) (F.3.2)	No	Yes [JEAS-517]	No	No	Yes (AS 1735/10)
12.	Test required at lift acceptance	Yes (D.2.j)	Yes (1003.2b)	Yes [JIS A4302 4.2.1(6)]	Yes (9.2.1)	Yes (7.3.12)	Yes
13.	Load in car for (12)	100 % nominal	100 % nominal	638 N (65 kg)	100 % nominal	110 % nominal (7.3.10)	100 %
14.	Speed of car for (12)	100 % nominal	100 % nominal	slow speed	gov. trip speed (9.2.1.2)	gov. trip speed (7.3.14)	gov. trip speed AS 1735/10 (5.4)
15.	Type D safeties recognized (free wheeling pinion on rack)	No	No	No	Yes (3.7.6d)	No	No

*See footnote a in Table A.5A – Part 2

NOTE The type test conditions are such that the safety must be able to absorb 2 times the kinetic energy of the falling mass.

Table A.5A — Passengers cars instantaneous safety (Part 2 of 2)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA [a]	USSR	AUSTRALIA
1.	Car direction for setting	down only (9.8.1.1)	down only (205.6)	down only BSLJ-EO 129-9.(7)	down only[a] (3.7.7)	down only (4.7.1)	down only (33.6)
2.	Ability to operate in free fall	Yes	Yes (note 2)	No spec	Yes (note 2)	Yes (4.7.1)	Yes (33.4.1)
3.	Acceptable load in car	100 % nominal	125 % nominal (205.3)	100 % nominal JIS A4302 4.2.1.(6)	125 % nominal (3.7.4.1)	110 % nominal (7.3.10)	100%
4.	Upper speed limit	No limit	No limit	No limit	No limit	No limit	No limit
5.	Tripping by overspeed governor only	Yes	Yes (205.7)	Yes [BSLJ-EO 129-9.(7)]	Yes[a] (3.7.8.1)	Yes (4.7.3)	Yes
6.	Tripping by inertia or equivalent	No	No	No spec	No	No	No spec
7.	Release by lifting the car only	Yes (9.8.5.1)	No spec (205.7)	No spec	Yes (3.7.10.3.2)	No spec	Yes (33.9.3)
8.	Deceleration limit specified	Yes	Yes (1306)	Yes [JIS A4302 4.2.1(6)]	Yes (G6.1)	≤ 25 m/s² (4.75) or more if ≤ 0,045	Yes (33.9.3)
9.	Type test required	Yes (F.3.3)	No	Yes [JEAS-517]	No	No	Yes (AS1735-10(2))
10.	Test required at lift acceptance	Yes (note 1) (D.2.j.2)	Yes (1003.2d)	Yes [JIS A4302 4.2.1(6)]	Yes (9.2.1)	Yes (7.3.12)	Yes (AS1735-10(5.4))
11.	Load in car for (10)	125 % nominal	100 % nominal	638 N (65 kg)	100 % nominal	110 % nominal (7.3.10)	100 %
12.	Speed of car for (10)	levelling or inspection speed	gov. trip speed	slow speed	gov. trip speed	gov. trip speed (7.3.14)	Gov. trip speed

[a] Entries in CSA column are based on 1985 edition of CSA code. Refer to item 8.2.7 in this report. The 1990 CSA code requires

(i) protection against uncontrolled overspeed in up and down directions,

(ii) permits tripping by other than governor,

(iii) permits freefall and overspeed by separate devices,

(iv) requires protection against uncontrolled car movement at any speed with the landing and car door open.

NOTE 1 The capacity of the gear is determined by the type test and corresponds to the car with 100 % rated load.

NOTE 2 See ASME A17 Interpretation Book No. 11-Inquiry 86-2.

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Table A.6A — Overspeed governors (Part 1 of 4)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
1.	GOVERNOR TRIPPING SPEED — CAR DOWNWARDS			**For rated speed (RS):**	see Table A.6A	see Table	See Table (34.2)
1.1	Maximum	see Table A.6A (part 3)	see Table A.6A (part 3)	RS ≤ 0,75 m/s: 1,13 m/s RS > 0,75 m/s: 140 % of RS [BSLJ-EO 129-9.(7)]	(part 3) 115 % (3.8.2.1)	A.6A (part 3) 115 % (4.8.1)	120 %
1.2	Maximum percentage of rated speed	115 % (9.9.1)	115 % (206.2a)	No spec			
2.	OVERSPEED SWITCH						
2.1	Required	Yes (9.9.11)	Yes (note 1)	Yes	Yes (note 3)	No	Yes (34.3)
2.2	As necessary part of governor	No (9.9.11)	Yes	Yes	Yes	—	Yes > 0,65 m/s Static power or Vee belt drive
3.	MAXIMUM TRIPPING SPEED OF OVERSPEED SWITCH as percentage of governor trip. speed (see 1 above) « RS » means rated speed	Any direction : 100 % (9.9.11.1) if RS ≤ 1 m/s then 115 % of RS	In down direction: 90 % if RS= 0,75 to 2,5 m/s 95 % if RS > 2,5m/s 90 % if static control 100 % with speed reducing switch (206.4b)	•if RS ≤ 0,75m/s 1,05 m/s •if RS > 0,75 m/s 130 % of RS [BSLJ-EO 129-9.(5)]	In down direction : 90 % if RS = 0,75 to 2,5 m/s 95 % if RS>2,5m/s 90 % if static control 100 % with speed reducing switch (3.8.4.2)	No spec	N/A Static control 90 %, RS ≤ 2,5 m/s 95 %, RS > 2,5 m/s Other controls 90 % of RS (34.3.3)
			In up direction : 100 % (206.4b4)		In up direction : 100 % (3.8.4.2(c))		
4.	INERTIA OPERATION FOR INST. SAF. REQ'D	No	Yes (205.8a)	No	Yes (3.7.9.1.c)	No	Yes (33.8.1)
5.	AUTOMATIC RESETTING REQUIRED	No	No	No	No	No	No spec
6.	SWITCH FOR NON-AUTO RESETTING REQUIRED	Yes (9.9.11.2)	Note 2 (206.4c)	No	Note 2 (3.8.4.3)	No	Note 2, (34.3.2)
7.	GENERATED MINIMUM FORCE						
7.1	X times force required by safety gear	2 X (9.9.4)	1,67 (205.15)	No spec	1,67 (3.7.19)	Not specified	2 x (33.14)
7.2	Absolute minimum	300 N	No spec	No spec	No spec	No spec	No spec
8.	GOVERNOR ROPE						
8.1	Minimum diameter (mm)	6 (9.9.6.3)	9,5 (206.5a)	No spec	9,5 (3.8.5.1)	7 (4.10.3)	9,5 mm (34.5.2)
8.2	Factor of safety	8 (9.9.6.2)	5 (206.5a)	No spec	5 (3.8.5.1)	No spec	5 (34.6)
8.3	Sheave to rope ratio (min.)	30 (9.9.6.4)	32–42 (206.7)	No spec	32–42 (3.8.7.6)	25–35 (4.4.3)	25 to 37 (Table 34.7)
8.4	Slack rope contact required	Yes (9.9.11.3)	jawed–No jawless–Yes	No	jawed–No jawless–Yes	Yes (4.8.2) No	No spec
8.5	Jaws grip required	No	No	No	No	N/A	Yes (34.6)

NOTE 1 Except governors for rated speed less than 0,76 m/s without static control (206.4a)
NOTE 2 Switch in item No. 2 and also switch on safeties must be of a manually reset type
NOTE 3 Except on elevators with squirrel cage motors regardless of speed (3.8.4.1.1)

Table A.6A — Overspeed governors (Part 2 of 4)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
9.	COUNTERWEIGHT GOVERNOR						
9.1	Not required if speed equal or less than (m/s)	1,0 (9.8.3)	0,76 (205.7a)	1,0 [BSLJ-EO 129-9-2]	0,76 (3.7.8.1)	No spec	No spec
9.2	Max. tripping speed, % of (1.1)	110 % (9.9.3)	110 % (206.2b)	110 % [BSLJ-EO 129-9.(7)]	110 % (3.8.2.2)	—	110 % (34.2.2)
10.	TEST TYPE REQUIRED	Yes (F.4)	No	Yes [GUIDELINE 8.3]	No	No	No
11.	ACCEPTANCE TEST REQUIRED	Yes (D.2.i)	Yes (1003.2)	Yes [JIS A4302 4.2.1(6)]	Yes (9.2.1)	Yes (7.3.12)	Yes
12.	PERIODIC TEST REQUIRED	Yes (E.1)	Yes (1002.2c)	Yes [JIS A4302 4.2.1(6)]	Yes (B1.5.1)	Yes (7.4)	Yes (AS 1735-10)

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Table A.6A — Overspeed governors (Part 3 of 4)

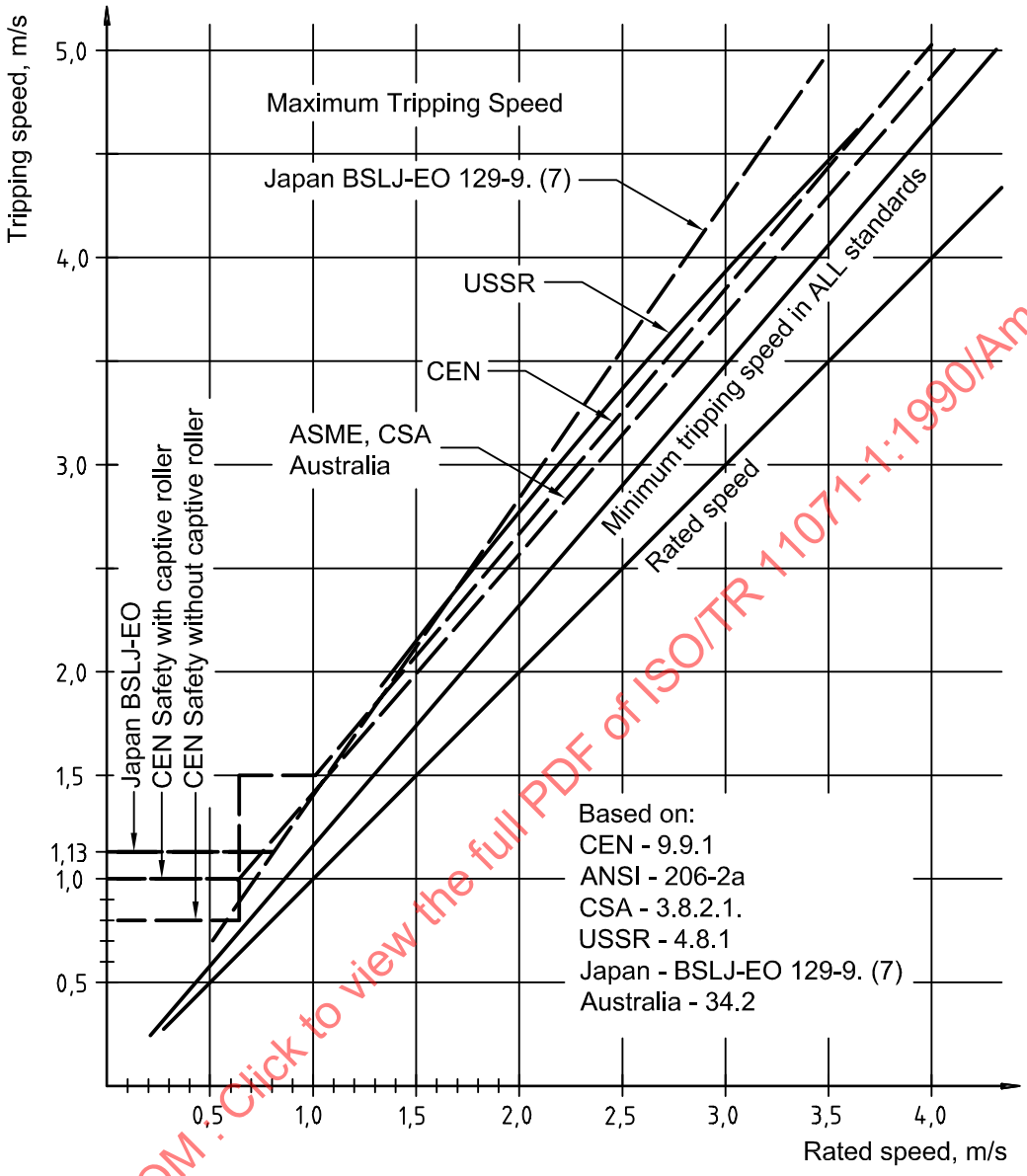

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Table A.6A — Overspeed governors (Part 4 of 4)

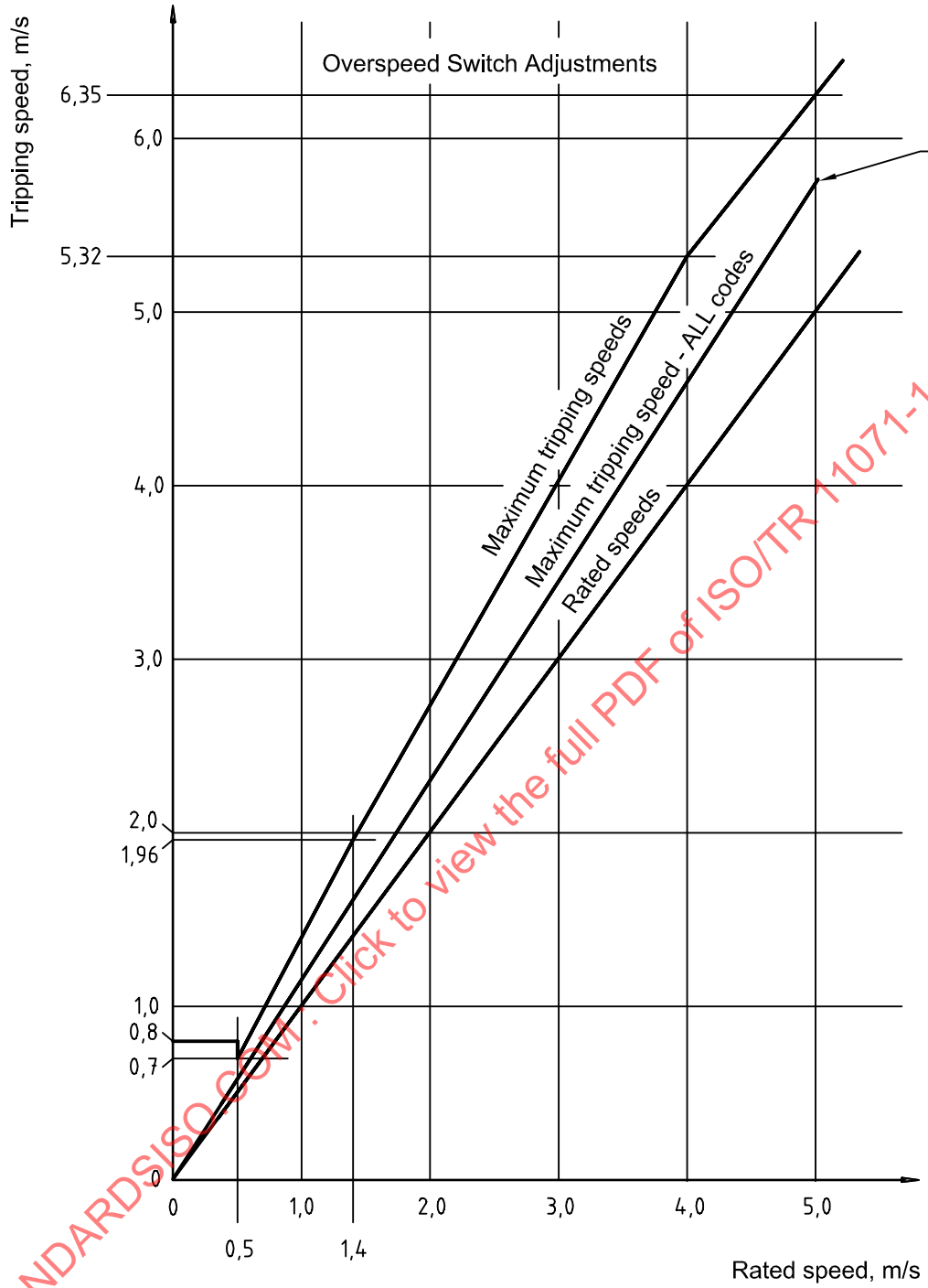

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Table A.7A — Spring buffers (Part 1 of 3)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
1.	Maximum rated speed for bumpers	Not permitted	Not permitted	No. spec	Not permitted	0,5 m/s 0,0 for bed lifts	0,4 m/s (l 9.1)
2.	Maximum rated speed for springs	1 m/s (10.3.3)	1 m/s (201.1a)	1 m/s [BSLJ-EO 129-9.(9)]	1 m/s (3.3.1)	see Note	1,0 m/s (cl 9.1)
3.	Strokes	see Table A.7 (part 2)	see Table A.7A (part 2)	see Table A.7A (part 2) RS ≤ 0,5 m/s: 38 mm and over 0,5 < RS ≤ 0,75: 64 mm and over 0,75 < RS ≤ 1,0: 100 mm and over BSLJ-EO 129-9.(9)	see Table A.7A (part 2)	see Note	see Table 9.5.2 similar to Japan/ANSI
4.	Minimum stroke	0,065 m (10.4.1)	0,038 m (201.3a)	0,038 m [BSLJ-EO 129-9.(9)]	0,038 m (3.3.4.1)	see Note	0.038 mm (9.5)
5.	Car rated load to be considered	100 % (10.4.1.2)	100% (201.3b)	No spec	100 % (3.3.4.2)	110 % (4.9.1)	100 %
6.	Force at full compression (ratio to max suspended load)	$2{,}5 \leq R \leq 4$	$2 \leq R \leq 3$	No spec	$2 \leq R \leq 3$	see note 1	$2 \leq R \leq 3$
7.	Type test	No	No	No	No	No	No spec
8.	Data required at lift acceptance	spring curve	None	None	None	None	None
9.	Stroke and load rating marked on buffer	No	Yes (201.3c)	No	Yes (3.3.4.3)	No	Yes (9.5.3)
10.	Test at life acceptance	static D.2(1)	No (1003.2e)	No	No (9.2.2.1)	dynamic (7.3.10)	Dynamic AS1735-10 (6.2A)

NOTE The retardation limits (9.81 m/s^2 average and 2.5 m/s^2 maximum) applicable to hydraulic buffers seem to apply to spring buffers also. Governor tripping speed and 0 to 110 % rated load must be considered (4.9.1)

Table A.7A — Spring buffers (Part 2 of 3)

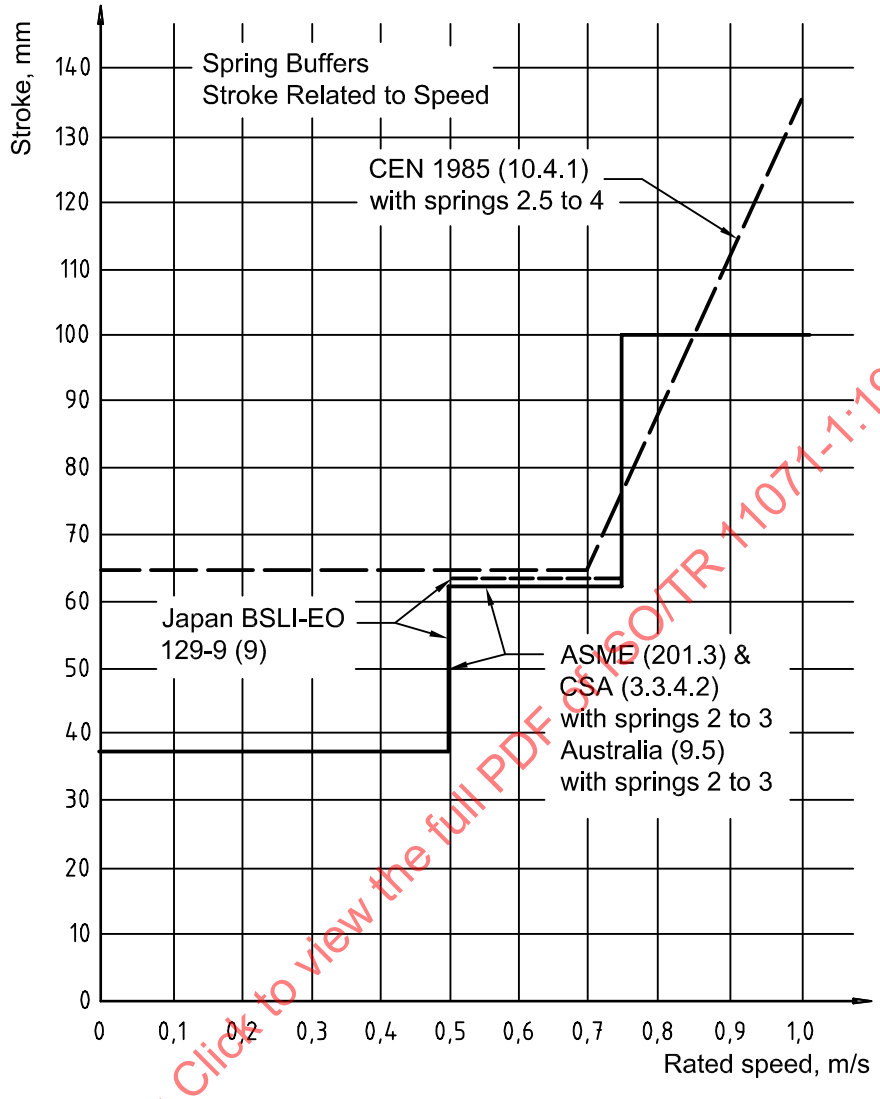

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Table A.7A — Hydraulic buffers (Part 3 of 3)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
1.	Limits of application	None	none	None [BSLJ-EO 129-9.(9)]	None	None	None
2.	Minimum stroke in relation to speed (V = rated speed in m/s, g = 9,81 m/s^2)	$(1{,}15\ V)^2/(2\ g)$[a]	$(1{,}15\ V)^2/(2\ g)$[a]	$(1{,}15\ V)^2/(2\ g)$[a]	$(1{,}15\ V)^2/(2\ g)$[a]	$(\text{ovsp})^2/(2\ g)$[a]	$(1{,}15\ V)^2/(2\ g)$
3.	Absolute minimum stroke	None	none	None	None	None	None
4.	Max mean deceleration (Note 1)	1 g (10.4.3.3)	1 g (201.4b)	1 g [BSLJ-EO 129-9.(9)]	1 g (3.3.5.2)	1 g (4.9.1)	1 g (9.6.2a)
5.	Not to exceed 2,5* g more than 0,04 s	Yes	Yes	Yes [BSLJ-EO 129-9.(9)]	Yes	Yes	Yes
6.	Car rated load to be considered for (4) + (5)	100 %	68 kg to 100 % (full range)	100 % [BSLJ-EO 129-9.(9)]	68 kg to 100 % (full range)	0 kg to 110 % (full range)	0 kg to 100% (9.6.3)
7.	Reduced stroke buffers permitted	Yes (10.4.3.2)	Yes (201.4a2)	Yes [BSLJ-EO 129-9.(5)]	Yes (3.3.5.1)	No	Yes
8.	If rated speed ≤ 4 m/s, min. stroke	50 % of (2)	50 % of (2)	50 % of (2) [BSLJ-EO 129-9.(5)]	50 % of (2)	—	Not permitted
9.	But min stroke for (8)	0,42 m[a]	No spec	No spec	No spec	—	No spec
10.	If rated speed > 4 m/s, min. stroke	33,3 % of (2)	L	33,3 % of (2) BSLJ-EO 129-9.(9)	33,3 % of (2)	—	33,3 % (9.6.2)
11.	But with min stroke for (10)	0,42 m [a]	0,46 m [a]	0,46 m [BSLJ-EO 129-9.(9)]	0,46 m [a]	—	1,080 m
12.	Switch for checking full extension	Yes (10.4.3.4)	Yes, if gas return (201.4e(3))	No	No	No	No spec
13.	Type test	Yes (F.5)	Yes (201.4g)	Yes	Yes (3.3.5.10)	Yes (4.9.3)	Yes (9.6.10)
14.	Acceptance test	Yes (D.2e)	Yes (1003.2e)	Yes	Yes (9.2.2.2)	Yes (7.3.10)	Yes
	[a] Minimum stroke in (9) and (11) translates to this speed below which reduced stroke buffers in (8) and (10) are not permitted.	50 %..2,5 m/s 33,3 %..2,5 m/s	50 %...No spec 33,3 %...2,6 m/s	50 %...No spec 33,3%...2,6 m/s	50 %...No spec 33,3 %... 2,6 m/s	N/A N/A	N/A N/A

NOTE None of the codes specifies if the average must be based on time or on distance. Calculations ready made in ANSI and CSA, as well as the minimum given by the CEN formula, indicate that the mean deceleration considered is based on distance.

Table A.8A — Braking systems (Part 1 of 2)

	REQUIREMENTS	CEN	ASME	JAPAN	CSA	USSR	AUSTRALIA
1.	Electromechanical brake alone must be able to handle:			BSLJ-EO 129-9.(6)			
1.1	In DOWN direction						
	- this % of rated load	125 % (12.4.2.1)	125 % [a]	125 % (passenger, bed) 120 % (other than above)	125 % [a]	200 % (2.3.9)	125 % (7.10h)
	- from this % of rated speed	100 %	0 % (208.8)	10 %	0 % (3.10.8.2)	0 %	5 % to 10 %
1.2	In UP direction						
	- this load	No spec.	No spec	125 % (passenger, bed) 120 % (other than above)	Empty car (3.10.8.3.2c)	No spec	No spec
	- from this speed	No spec	No spec	100 %	gov. trip sp.	No spec	No spec
2.	Braking system, including (1) and other braking means (eg, electric) must be able to handle						
2.1	This % of rated load	125 % (D.2d)	125% [a]	125 % (passenger, bed) 120 % (other than above)	125 % [a]	110 % (7.3.10)	100 % (7.10 c 11)
2.2	From this % of rated speed	100 %	100% (1002.3d)	100 %	100 % (3.10.8.2)	100 %	100 %
3.	The brake shall be held off:	by continuous flow of current (12.4.2.3)	electrically (208.8)	electrically [BSLJ-EO 129-9.(6)]	electrically (3.10.8.1)	implied electrically (5.1.3/4)	electrically (7.10 (a))
4.	Current to brake controlled by at least this number of devices (contactors)	2 (12.4.2.3.1)	2 (210.9c)	No spec	2 (3.12.9c)	No spec	2 (7.10 c)
5.	Checking of contactors at every stop required	Yes [b] (12.4.2.3.1)	In specific case (210.9d & e)	No spec	Yes (3.12.9.d)[c]	No (see item 10)	Static control (29.11g)
6.	Delay in brake application in emergency	Not permitted (12.4.2.3.3)	Not permitted (210.8)	Not permitted [BSLJ-EO 129-9.(6)]	Not permitted (3.12.8.2)	Not permitted	No spec
7.	Brake application by	Springs/weights (12.4.2.5)	Springs/gravity (208.8)	Springs	Springs/gravity (3.10.8.1)	No spec (4.4.4)	Springs/weights (7.10)

[a] Where ASME or CSA columns indicate 125 % rated load, it should read 100 % for freight lifts.

[b] At least at the next change in the direction of motion.

[c] In 1990 edition of CSA.

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