TECHNICAL REPORT

ISO/TR 11071-1

First edition
1990-12-01

AMENDMENT 2
2001-07-15

Comparison of worldwide lift safety standards —

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

AMENDMENT 2: References to Australian standards

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Comparaison des normes mondiales de sécurité des ascenseurs —
Partie 1: Ascenseurs électriques
AMENDEMENT 2: Références aux normes australiennes

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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).

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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 Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

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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.

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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.

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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

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.

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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	
				> 0,75 ≤ 1,0: 1,4			
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	> 1,0 ≤ 1,5: 1,6	> 0 + 0,035V^2	same as 1.3	
				> 1,5 ≤ 2,0: 1,8			
	Note 1: 0,035V^2 represents ½ gravity stop distance with 115% rated speed. This may be reduced:			> 2,0 ≤ 2,5: 2,0			
				> 2,5 ≤ 3,0: 2,3			
	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)	> 3,0 ≤ 3,5: 2,7	V replaced by reduced stroke buffer speed	No spec	
				> 3,5 ≤ 4,0: 3,3			
				> 4,0: 4,0			
	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						

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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						
a)	Clearance ..... min.	(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)
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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